

Mission Competitiveness Analysis

DRAFT June 28, 2010

Cascade County, Montana

Prepared For:

Central Montana Defense Alliance



Prepared By:

BBP & Associates, LLC
111 Annapolis Street
Annapolis, MD 21401





TABLE OF CONTENTS

Section 1 Existing Conditions Assessment..... 2

Introduction 2

 Purpose 2

 Organization..... 2

 Background 2

Political Assessment..... 4

 Local Representation 4

Mission Assessment..... 6

 Malmstrom Air Force Base..... 6

 Montana Air National Guard Base in Great Falls 8

Physical Asset Assessment..... 10

Key Findings 14

Section 2 Best Practices/Case Studies 15

 Summary 19

Section 3 Ranked Listing of Mission Opportunities 21

Section 4 Implementation Strategy..... 30

Appendix A: Unmanned Aerial Vehicles/Remotely Piloted Aircraft Data Sources.....A1

Section 1 Existing Conditions Assessment

Introduction

Purpose

The purpose of this Existing Conditions Assessment is to conduct a baseline assessment of the current political, mission and physical assets of the Great Falls area as it relates to Malmstrom Air Force Base and the Montana Air National Guard Base. The existing conditions of a particular area are the base from which recommendations for future actions are built. Understanding the area's strengths and constraints helps to develop a realistic implementation plan for maximizing the area's opportunities. The results from this Assessment will be used in subsequent tasks to develop a ranked listing of mission opportunities at Malmstrom Air Force Base and the Montana Air National Guard Base and a strategy for implementing the top mission opportunities.

Organization

The Existing Conditions Assessment is organized into the following sections:

- 1) Introduction
- 2) Political Assessment
- 3) Mission Assessment
- 4) Physical Asset Assessment
- 5) Key Findings

Background

The information presented in the Existing Conditions Assessment is based on a number of sources. These sources include reports and interviews as well as websites which are referenced in footnotes throughout the document. The interviews with local leadership were conducted during a three day trip to Great Falls on March 2nd through 4th as well as follow-up telephone interviews. Interviews were conducted with (presented in alphabetical order):

- Tom Alfrey, Vice President, The Great Falls Area Chamber of Commerce
- Joe Briggs, Cascade County Commissioner, Cascade County
- Colonel Anthony Cotton, Vice Commander 341st Missile Wing, Air Force
- Brett Doney, President, Great Falls Montana Development Authority
- Gregory Doyon, City Manager, City of Great Falls
- Colonel Michael Fortney, Commander 341st Missile Wing, Air Force
- Col J. Peter Hronek, Commander 120th Fighter Wing, Montana Air National Guard

- Bonnie Keller, Field Director, Senator Max Baucus
- Brigadier General Brad Livingston, Commander, Montana Air National Guard
- Cheryl MacArthur-Ulmer, Field Director, Senator Jon Tester
- Percy “Steve” Malicott, President/CEO, The Great Falls Area Chamber of Commerce
- Jeff Mangan, Chairman, Great Falls International Airport Authority
- Andrew Person, Legislative Assistant, Senator Max Baucus
- Owen Robinson, President/CEO, Lumber Yard Supply
- Ryan Schrenk, Director Distance Learning, MSU Great Falls
- Brigadier General Rex Tanberg, Montana Air National Guard
- David Weismann, Committee Chair, Central Montana Defense Alliance
- Warren Wenz, Jardine Stephenson, Blewett & Weaver, P.C.

Various documents and reports were reviewed. The reports reviewed include the *Opportunity Assessment Malmstrom Air Force Base* (Science Applications International Corporation, 2005 (SAIC)), *Great Falls Region Defense Diversification Project* (Praxis Strategy Group, 2009), and the *Quadrennial Defense Review Report* (Department of Defense, 2010).



Political Assessment

Fostering a strong relationship between a military installation and the surrounding local community, which includes the citizens, the elected officials, the business community, is important to achieving positive growth both on the base and off the base. Positive growth is growth that is both beneficial to the economic development of the local community and supports the existence of current and future missions at the base. Maintaining this relationship between the local community and the base is also important to the U.S. Congressional Representatives, the State Representatives, the Governor, and senior leadership within the Department of Defense.

Local Representation

The representatives from the City of Great Falls, Cascade County, the Great Falls Chamber of Commerce and other local organizations have been extremely successful at building a positive relationship with Malmstrom Air Force Base (MAFB) and the Montana Air National Guard (MANG).

The Central Montana Defense Alliance (CMDA) was formed in 2009 by the Great Falls Area Chamber of Commerce. The mission of the CMDA is to support existing organizations in the region including MAFB, MANG, and other guard and reserve units, Department of Homeland Security, U.S. Border Patrol and others as identified. The CMDA is the officially recognized, unified voice for the region to maintain current missions, promote new missions, increase capabilities and growth. The CMDA is made up of City and County representatives, business leaders, Great Falls International Airport representatives, and former military members.

There is currently a Joint Land Use Study (JLUS) being undertaken for Malmstrom Air Force Base. The Study is managed by Cascade County. The results of this study will help to understand if and to what extent the land uses surrounding the base impact the current mission.

United States Congressional Representation

The interest of maintaining active missions at MAFB AND MANG goes beyond the local communities. There has also been key support in building the relationship with the Bases from U.S. Senators Max Baucus and Jon Tester and U.S. Representative Dennis Rehberg. Support is evidenced through the backing of appropriations to the military bases, military committee membership, meetings with local and Washington D.C. Department of Defense leadership and Great Falls area leadership.

Senator Baucus is a member of the Air Force and Space Power Caucus in Congress. He has been a leader in identifying new missions to Malmstrom and securing the missions at MANG. He also helped to secure \$140 million for new housing units, \$7 million for a community activities center and \$13.5 million for a new physical fitness center at Malmstrom. He also met with military leadership to save the MANG's mission in Montana which eventually was secured.¹

¹ <http://baucus.senate.gov/>



Senator Tester works with Senator Baucus to preserve and enhance the military presence in Montana. He also serves on the Homeland Security and Governmental Affairs and Veteran's Affairs Committees among others.²

Representative Rehberg has been a supporter of re-building America's military infrastructure and has worked to increase efforts to secure the US borders. He currently serves on the House Committee on Appropriations.³

² <http://tester.senate.gov/>

³ <http://rehberg.house.gov/>

Mission Assessment

There are currently two missions at Malmstrom Air Force Base and two missions at the Montana Air National Guard. Each mission has its own unique set of security needs, buildings and infrastructure, military and civilian personnel, and military craft. Future missions at both MANG and MAFB will be matched with the military installation based on the mission's unique set of needs and the ability of the bases to support those needs.

Mission needs can vary greatly. Missions, such as the existing missile mission at MAFB, require heightened security. Others, such as the F-15C mission at MANG require airspace for aircraft training. Other missions can be tied to the proximity to Department of Defense Contractors.

Malmstrom Air Force Base

Malmstrom Air Force Base (MAFB) is on the east side of Great Falls and contains over 3,300 acres of land. It is currently the number one employer in Great Falls with just over 4,900 employees.

Current Mission

The current missions at MAFB are the 341st Missile Wing (341st) and the 819th Red Horse Squadron (RHS). The 341st employs approximately 4,500 people and the RHS employs approximately 400 people.⁴

The 341st mission at MAFB is one of three that maintains and operates the Minuteman III intercontinental ballistic missile. The mission of the 341st is to defend America with combat-ready Airmen and nuclear forces. In addition to maintaining 150 Minuteman III missiles, the 341st also operates eight UH-1N helicopters throughout the 13,800 square mile missile complex.

The RHS relocated to MAFB in 1997 and consists of active duty Air Force, Air National Guard (219th Red Horse Squadron), and Air Force Reservists. The RHS provides combat engineering to military and humanitarian operations worldwide.

Changes in the Mission

MAFB received its first mission in 1942, the B-17 Flying Fortress. At that time the base was named "Great Falls Army Air Base". Since then, several missions have landed and departed at MAFB. The legacies of MAFB missions involve different military branches, private contractors, and agreements with foreign countries.

There have been two changes in missions that have had significant impacts in the last fifteen years. The first was the deactivation of the 43rd Air Refueling Group that resulted from the 1995 Defense Base

⁴ 341st Missile Wing Commander's Data Card, Fiscal Year 2009 and <http://www.malmstrom.af.mil/library/factsheets/factsheet.asp?id=4683>



Realignment and Closure Commission (BRAC) decision and the second was the deactivation of the 564th Missile Squadron in 2007.

In 1995, the aircraft from the 43rd Air Refueling Group was moved to McDill Air Force Base. As a result of this realignment, in early 1997 MAFB's runway was declared inactive. On March 10th 2010, a delegation from the CMDA met with Col. Ed Chupein (Chief, Air Force Ranges and Airspace) and as a part of the briefing he addressed this issue of the MAFB airstrip. According to Col Chupein, planning processes within the Air Force were changed such that all facilities are now evaluated for all mission bed downs regardless of the status of or even existence of a runway. These changes in Air Force planning processes now allow the runway to be considered in mission basing decisions. Although, its inactive status and lack of an ILS system still represent significant impediments.

The 564th Missile Wing was a member of the existing 341st Space Wing at MAFB. In 2007, the Quadrennial Defense Review announced the Air Force's plans to deactivate the 564th. The 564th provided the operation, security, support and maintenance of 50 Minuteman III Launch Facilities and five missile alert facilities. A total of 492 positions were eliminated by the inactivation of the 564th, and using an average of 1.1 family members for each active duty military personnel, approximately 1,050 people were directly affected by the realignment.⁵

Potential Future Missions

The number one priority for MAFB leadership is to maintain the current 341st mission. In general, the leadership is supportive of new missions and other opportunities so long as they do not conflict with safety and security of the current mission or quality of life for MAFB personnel. For example, an enhanced use lease (EUL) coal to liquid plant was presented to MAFB. Leadership did not support the EUL because it conflicted with security of the base and the quality of life of the airmen because of the resulting noise, dust and other impacts.

On-base EUL opportunities are often limited by the amount of excess, physical space available on the base. MAFB leadership indicated that underutilized space is limited, but most often underutilized space is quickly torn down to maximize the efficiency of base operations.

Another significant impediment to EUL opportunities is the secure nature of the primary mission at MAFB. Any proposed EUL would need to be a Department of Defense contractor with security clearances. EUL activities must be compatible with the current mission and not jeopardize the safety and quality of life of the personnel at MAFB.

A potential future mission is the E-Medical Records mission. Base leadership has been supportive of gaining the Air Force's E-Medical Records mission. Montana State University Great Falls has online health information technology, medical billing and coding, and medical transcription courses. If selected for the E-Medical records mission, these courses would help to quickly train and support military and civilian personnel. MAFB leadership indicated that a decision may be made regarding the mission late 2011.

⁵ Great Falls Region Defense Diversification Project, Praxis Strategy Group

Montana Air National Guard Base in Great Falls⁶

The Montana Air National Guard (MANG) occupies 141 acres of leased land on the Great Falls International Airport (GFIA). The GFIA and the MANG share runway space and the MANG provides fire emergency service to the GFIA.

Current Mission

The missions at Montana Air National Guard in Great Falls are the 120th Fighter Wing (120th) and the 219th Red Horse Squadron (RHS). In Great Falls, the MT Air National Guard employs approximately 1,033 in people.

Currently, the 120th Fighter Wing flies the F-15C Eagle. There are currently 18 F-15C aircraft. The 120th has both a state and federal mission. Its federal mission is to maintain well-trained and equipped units available for quick mobilization during war and to provide assistance during national emergencies. When not mobilized for its federal mission, the 120th reports to the governor of Montana. Its state mission is to protect the life and property, preserve peace, order and public safety, to provide services during emergencies such as floods, earthquakes, forest fires, search and rescue operations, and to support civil authorities. The 120th has over 900 employees and is considered the largest in the Air National Guard.

The 219th Red Horse Squadron organizes, trains, and equips its personnel for its role as a highly mobile, rapidly deployable, self-sustaining heavy construction and repair unit. Approximately 120 personnel are assigned to the RHS.

Changes in the Mission

The 120th Fighter Wing started in 1947 flying F-51's, and during the following years 120th flew F-86, F-89, F-102, and F-16s. The F-16 mission was located at MANG for over 20 years and was reassigned in 2005.

Through data obtained in interviews with MANG, the F-15s will remain in the Air National Guard's inventory through 2025. It is possible that an unknown number of MANG F-15s and staff will be relocated from Great Falls to the base in Hawaii. At the same time, Canada has only two squadrons of F-18s and having F-15s so close to the Canadian border in Great Falls provides fighter wing support to Canada should an attack happen in Canada.

Potential Future Missions

The number one priority for the MANG is to maintain the current F-15 mission in Great Falls. MANG leadership has identified the F-15E mission as a future opportunity. The F-15E performs day and night, all weather air-to-air and air-to-ground missions. The F-15E expands the capabilities of the F-15 by adding a rear seat and crew member and incorporating an entirely new suite of air-to-ground avionics. Training for air-to-ground missions involves dropping inert materiel/munitions by using a physical "drop platform" and/or an electronic simulation program. At this time the MANG training space does not have

⁶ MANG information acquired through the 120th Fighter Wing, Air National Guard.



a physical “drop platform”. However, if the F-15E mission came to Great Falls, one could be constructed.

Upgrading the MANG Base at Great Falls to receive an Alert mission is another potential future mission. An Alert mission responds to homeland defense emergencies within a specific area. The MANG stands ready for the alert mission should it be assigned to MANG.

The Air Force is in the process of selecting a base for the MC-12W mission. This training mission would utilize “C-12” class aircraft that would provide direct Full Motion Video/Signal Intelligence to ground forces. Two squadrons will be located at one base for stateside training. The mission could bring more than 550 jobs. The Air Force will release its preferred locations late summer 2010 and its list of final selections in April 2011.

At this time, the leadership at MANG is not opposed to gaining a remotely piloted aircraft (RPA) mission or sharing airspace and other associated space with a remotely piloted aircraft private sector opportunity as long as it does not jeopardize the current F-15 mission.

Physical Asset Assessment

The physical assets are those which support additional opportunities for missions and economic development within, outside, above and under the military bases. These can include access to natural resources, existing industries and workforce characteristics, quality of life factors, and space availability. While the Great Falls region has many physical assets, only those which have been identified as supportive of new missions or Enhanced Use Lease (EUL) opportunities will be discussed in this Assessment.

Natural Resources, Existing Industries and Workforce

Natural Resources

The City of Great Falls is located on the Missouri River, approximately 50 miles east of the Continental Divide, and only 120 miles south of the Canadian border. The Missouri River drops in elevation over 500 feet in 10 miles within the Great Falls area. Great Falls is proximate to a mountainous area. It also has a semiarid climate, similar to that in Afghanistan. These factors contribute the area's opportunities for special operations training.

Cascade County is within the Chinook Zone. The Chinook Zone is characterized by a wind which is a warm, turbulent wind originating from the Pacific. The "Chinook wind" in Cascade County makes it one of the windiest places in the United States. More than one-third of the County is characterized by powerful, predictable Class 4 wind power density.⁷ Wind power density is a way for evaluating wind resources. It is measured in watts per square meter and indicates how much energy is available at a site for conversion by a wind turbine. In general, sites with a Wind Power Class rating of 4 or higher are preferred for large scale wind plants. Wind Power Classes range from 1, which is the lowest, to 7 which is the highest.⁸

Industries

Agriculture is an existing industry in the Great Falls area that can potentially support new mission and private sector opportunities with regard to producing bio-fuels. The Sweet Grass Region (includes Cascade, Glacier, Pondera, Teton, and Toole Counties) has a semiarid prairie grassland environment which is supportive of raising small grains, forage crops and forage animals. The region's agricultural crop is lead by wheat, barley and forage crops representing approximately 97 percent of the harvested land. The remaining 3 percent is used for crops including durum wheat, canola, camelina, and oats. Regarding forage animals, the Cascade County area fosters the cow/calf operations (calves are shipped to feedlots in other states) and farrow to finish hogs (shipped to other states of slaughter and processing). The fastest growing segment of production agriculture and agriculture processing is in organics and natural products.⁹

⁷ *Cascade County Wind Power Put Wind to Work for You*, Cascade County Commission.

⁸ American Wind Energy Association, 2010, www.awea.org.

⁹ Great Falls Region Defense Diversification Project, Agri-Processing and Alternative Agriculture Assessment

The competitive advantages of the Sweet Grass Region as it relates to energy production and capacity include topography and elevation change, hydropower, enhanced wind power, existing energy infrastructure, existing transportation access, oil and gas resources, coal resources and biomass resources.¹⁰ At this time, five electric transmission projects are in predevelopment. These projects will provide the infrastructure required to send the energy to buyers.

Camelina production has been identified by farmers, processors and biodiesel marketers as a biodiesel product. A life-cycle analysis conducted by Sustainable Oils announced in 2009 that the jet fuel created from camelina seeds grown in Montana reduced carbon emissions by 84 percent compared to petroleum jet fuel. Several companies have shown interest in harvesting camelina in Montana and at least one company, The Great Plains Oil and Exploration Company has been contracting with regional farmers to grow camelina. However, camelina harvested acres has dropped in the Sweet Grass Region during the one year period between 2007 and 2008.¹¹ The United States Department of Agriculture, National Agricultural Statistics Service (USDA NASS) reported that in 2007, 20,400 acres of camelina were harvested and the number of harvest acres in 2008 dropped to 9,100 acres. However, yields depend on soils, rainfall and irrigation.

Ethanol production has been presented as a bio-fuel opportunity. There are currently no biomass derived large-scale ethanol (or other alcohol fuels) or biodiesel production facilities located in Montana.¹² However, ethanol has been found to be less efficient than other bio-fuels as well as taking away productive agriculture land away from food production. By switching to crops which yield bio-fuels, farmers reduce the supply of food staples and prices for food staples rise. "Bio-fuel expansion in the U.S. has contributed to a decline in grains stocks to a low level and has put upward pressure on world cereal prices".¹³

Workforce

Montana State University - Great Falls College of Technology (MSU Great Falls) is a two-year college offering Associate of Applied Science degrees, Associate of Arts degree, and the Associate of Science degree along with certificate programs. The College serves approximately 2,000 students a year.¹⁴ MSU Great Falls has an extensive distance learning division. Over 100 courses are offered online in the areas of general education, computer technology, business, health science, and office technology. The program attracts military personnel and their spouses. Many military personnel find the online courses advantageous because of the non-traditional flexibility to work on assignments.

MSU Great Falls has an existing relationship with the local medical groups through the ongoing provision of online health information technology, medical billing and coding, and medical transcription courses. MSU Great Falls also has an existing relationship with Malmstrom Air Force Base through a pharmacy technology program provided on Base and a computer training program.

In spring of 2010, MSU Great Falls received an Electronic Health Records Grant through the American Recovery and Reinvestment Act (Department of Health and Human Services). This grant will provide

¹⁰ The proposed Montana Alberta Tie line will move power between Alberta and Montana.

¹¹ Great Falls Region Defense Diversification Project, Agri-Processing and Alternative Agriculture Assessment

¹² Great Falls Region Defense Diversification Project, Energy Assessment

¹³ The World Bank, *Biofuels: The Promises and Risks, in World Development Report 2008*

¹⁴ Montana State University Great Falls College of Technology, <http://www.msugf.edu/about/index.html>, 2010 and interviews with Ryan Schrenk, Director of MSU Great Falls Distance Learning in March 2010.

MSU Great Falls approximately \$225,000 over a two year period to provide training in Health Information Technology. The goal for MSU Great Falls is to graduate 50 people over a one year period from a 15-18 hour program.

MSU Great Falls also has the Customized Training Center in the College of Technology which develops specialized training programs for organizations and businesses. Training can be provided on location or at the College and can incorporate continuing education units.

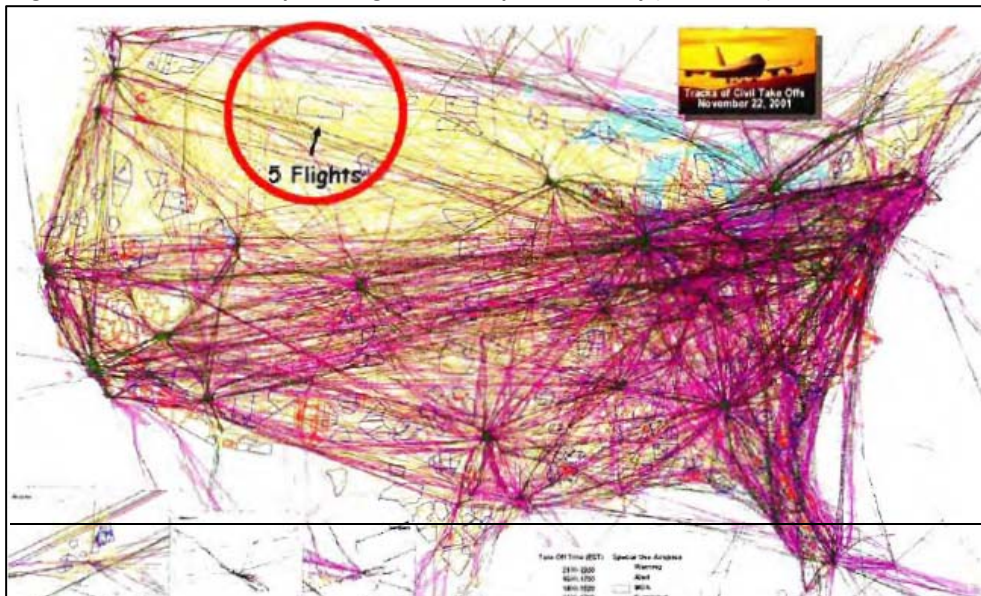
Space Availability

Space availability includes a review of the air space, land and building availability for new missions and businesses. The airspace training range above the Great Falls area has negligible commercial air traffic, which minimizes disruption to both the training flights out of MANG and the commercial flights out of the Great Falls International Airport. The abundance of clear operating space in Great Falls Vicinity is a major asset for new missions. Figure 1 on the following page graphically depicts the national civilian air traffic.

The Great Falls area has both land and building availability to support new missions and businesses. The Great Falls Economic Development Authority (GFDA) works with local governments, regional partners and private developers to prepare sites for industrial developments for new business opportunities. These opportunities could result from expansion of existing businesses and new businesses to the area. The GFDA has been working on a new industrial park in the area of River Drive North and 18th Avenue North. This site will be appropriately zoned and have infrastructure needs in place. There are plans to construct a rail spur to the site to gain access to the railroad. This site is adjacent to Malmstrom AFB.

The Great Falls International Airport (GFIA) recently expanded the runway and is now a Category III airport. As a result, there is more time and capacity to run more flights out of GFIA. In addition, there is unused, undeveloped land south of the Airport that could be used for additional hangers and/or buildings for enhanced military or private sector use. GFIA also has an agreement with the Department of Homeland Security (DHS) to fly several fixed wing planes and helicopters out of the Airport. The transportation facilities are also expanding and becoming more efficient. Four carriers operate out of the Airport (Horizon, United, Delta/NW, and Legion).

Figure 1 2001 National Airspace Usage: Civilian Operations Only (SAIC, 2005)



Quality of Life Factors

The process of determining a mission's location includes examining a number of criteria. One of which is the location's impact on quality of life for the military personnel. The Great Falls area boasts a number of recreational, cultural and historic activities for residents. Several national parks and wilderness areas are a short drive away as well as world renowned trout fishing. Great Falls hosts a variety of events and has a number of museums, artists and interpretive centers.

According to Kiplinger, Great Falls scores a 100 on the cost of living index.¹⁵ The Cost of Living Index is based on 100 being the national average.

For all ages, there are a variety of high quality educational facilities. The public school system supports 15 elementary schools, two middle schools, and three high schools. The University of Great Falls is a four-year institution with a master's program, the Malmstrom Air Force Base Education Center offers three master's degrees and five bachelor's degrees, and, as discussed earlier, the Montana State University College of Technology is located in Great Falls.

Great Falls is also the regional healthcare center, providing care to many of Montana's residents. There is one accredited hospital, four centers for long-term care and eight clinics.

¹⁵ The Kiplinger Washington Editors. "How Does Your City Stack Up?". May 2010.
http://www.kiplinger.com/tools/bestcities_sort/

Key Findings

This Existing Conditions Assessment is the base on which the recommendations contained in subsequent sections of this report are made. The Existing Conditions Assessment establishes the strengths and constraints of the Great Falls area for future mission and economic development opportunities.

The key strengths are:

- Representatives from the local community, elected officials and MANG and MANG leadership share the common goals of maintaining and growing the missions at the military installations.
- The Great Falls area has physical assets that can potentially support new missions at MAFB and MANG and EULS. These include:
 - Abundance of clear operating space for airspace training
 - Additional land, building and runway capacity at the Great Falls International Airport
 - Land and building capacity for new businesses and expansion of existing businesses
 - Mountainous topography and climate suitable for special operations training
- MSU Great Falls has an existing relationship with MAFB and provides online courses in health information technology, medical billing and coding, and medical transcription.
- An engaged economic development and business sector interested in bringing new economic activities to the Great Falls area.

The key constraints are:

- The missions at both bases are subject to change
- Incompatible development to the military missions increases the chance of current mission reassignment

Section 2 Best Practices/Case Studies

Many military bases and communities have explored and successfully implemented Enhanced Use Leases (EULs) resulting in sustainable economic development in the areas of: energy production, housing privatization, commercial and residential property development, jobs creation, and business attraction and expansion. While no community provides a precisely comparable context to that which the Great Falls area faces, there are communities that have faced similar issues to Cascade County's critical needs and that have targeted opportunities with success.

The following five military bases have been selected as cases studies of successful and unsuccessful EUL examples based on their EUL history and applicability to the situation at both MAFB and MANG:

1. Whiteman AFB
2. Francis Emroy Warren AFB (F. E. Warren AFB)
3. Travis AFB
4. Edwards AFB
5. Nellis AFB

Whiteman AFB

Context and Similarities

Whiteman AFB in Missouri houses the 509th Bomb Wing which flies the B-2 Spirit stealth bomber. The B-2 Spirit stealth bomber unit at Whiteman AFB is capable of launching combat ready sorties from Missouri to any place on the globe. It is a forward deployment base, and flying round-trip from Missouri, the B-2 bombers were the first U.S. aircraft to enter Afghanistan in October 2001. The B-2 Spirit stealth bomber is capable of carrying nuclear weapons.

Similar to MAFB, Whiteman AFB is also home to the Army National Guard's 1/135th Aviation Battalion. In addition, until deactivation in 1995, Whiteman AFB was the home of the 351st Missile Wing. The 351st oversaw 150 Minuteman II missile launch facilities and 15 launch control facilities throughout a 10,000 square mile area. All missiles were removed by May of 1995.

*EUL Opportunity*¹⁶

Whiteman AFB was selected as a Tier 1 bio-fuels opportunity due to its proximity to ample feed corn production. Additionally, a local animal rendering facility made Whiteman AFB an attractive candidate for biodiesel development as the tallow and yellow grease generated by the rendering facility could be used as feedstock for a biodiesel refinery. Initial assessment data indicated there was a 200 acre parcel of land owned by the base adjacent to their wastewater treatment plant that was not in conflict

¹⁶ *Renewable Energy Enhanced Use Lease Opportunity Summary Report*, Booz Allen Hamilton, 2007.

with runway height restrictions or other critical base mission functions. Water resources were also present at the base and not considered a limitation for site development. However, upon further investigation, it was discovered that the rail spur identified in the initial GIS base review had been abandoned due to deterioration of a trestle. Natural gas and road access to the 200 acre parcel were also limited. The existing road access is unimproved and crosses small bridges which would most likely need widening and possible strengthening to accommodate large trucks.

Market constraints were also present. Apart from the existing known plants, there are multiple planned ethanol plants and a large biodiesel plant in the initial stages of development. These plants will cause an increase in the price of feedstock in the area, making operations more costly. Additionally, there was a large demand for feed resources from local chicken farms. Production of agricultural resources does not guarantee availability, and some of the existing ethanol plants have already expanded their grain collection radius due to possible grain shortages in the local area.

Tallow from the nearby rendering facility could provide feedstock for a small scale biodiesel facility. However, tallow is a globally traded commodity, so a biodiesel plant on Whiteman would have to compete for this resource in the marketplace. Consumers of tallow include the cosmetics industry, the prepared food industry, and animal feed producers. Tallow is traded on the Chicago Mercantile Exchange and presently commands about \$0.26 per pound. Prices have increased sharply to that level in recent years as grain corn has been diverted from cattle feed to ethanol production. Given the diverse incentives for bio-fuels production and the competing uses for tallow, prices are sustainable at that level and may continue to rise. A common alternative feedstock for a biodiesel refinery is foreign palm oil. Given Whiteman AFB's lack of port access, a biodiesel refinery at the base would be at a competitive disadvantage to its peers because it would not be able to easily import alternative feedstock.

Lessons Learned

Although the EUL opportunity at Whiteman AFB was not realized, several lessons were learned through the evaluation that can be applied to Cascade County.

- Local industry strengths can lead to EUL opportunities;
- Up to date infrastructure (roads, railroad, transmission lines, natural gas lines, etc.) can increase EUL opportunities;
- Access to the EUL activity is critical for delivery of the product; and
- There must be a market need for the supply created by the activity occurring at the EUL.

F. E. Warren AFB

Context and Similarities

Located near Cheyenne, WY, F.E. Warren AFB is home to the 90th Missile Wing. Like MAFB's 341st Missile Wing, the 90th falls under the Air Force Global Strike Command. The 90th maintains 150 Minuteman III missiles and 15 launch facilities on full alert 24 hours a day. Also similar to MAFB, F. E. Warren AFB does not have a flying mission. The 90th employs slightly more military and civilian personnel than MAFB (approximately 212 more military and 345 more civilians). Topographically, the base is on top of a ridge in a Class 4 wind region.

In 2005, officials at F.E. Warren approved plans to construct wind turbines to reduce energy costs. By 2009, three turbines were erected within the fence at the Base. Funding for the project came from the Department of Defense Energy Conservation Investment Program. The turbines were strategically placed in a location that ties into existing infrastructure and the base's power grid as well as an area that does not interfere with the Cheyenne Regional Airport operations.

*EUL Opportunity*¹⁷

F.E. Warren, located near Cheyenne, Wyoming, was initially considered for a wind EUL. In 2005, Warren became the first AF base to build utility-scale wind turbines inside the fence line. The AF operates two 660 kW machines which generate over 4.4 million kWh of electricity annually for on-base demand.¹⁸ Wind resource and height restriction analysis suggested that class 4 resources were available beyond buffer zones. However, upon contacting the MAJCOM and installation staff it was quickly determined that there is no underutilized land to support additional wind energy on F.E. Warren and height restrictions pose challenges to operations.

Lessons Learned

The EUL opportunity referenced in this document at F.E. Warren AFB was not realized. However, wind turbines were constructed in 2009 at FE Warren prior to the EUL opportunity. There are several lessons were learned through the evaluation that can be applied to Cascade County.

- The availability of underutilized land and/or buildings is critical to supporting and EUL;
- Height restrictions can present challenges to EULs; and
- Precedent has been set for erecting wind turbines at AF Bases with ICBMs.

Travis AFB

Context and Similarities

Travis AFB in Fairfield, CA is home to the 60th Air Mobility Wing. The 60th Air Mobility Wing is primarily responsible for strategic airlift and air refueling missions. The 60th employs substantially more military and civilian personnel than MAFB (approximately 2,651 more military and 781 more civilians).

¹⁷ *Renewable Energy Enhanced Use Lease Opportunity Summary Report*, Booz Allen Hamilton, 2007.

¹⁸ Air Force Center for Environmental Excellence. *First Air Force wind farm erected at Warren AFB*. Accessed April 2007. Website: <http://www.afcee.brooks.af.mil/ms/msp/center/Vol11No3/10.asp>

*EUL Opportunity*¹⁹

Travis AFB, located in Fairfield, California, was initially considered a candidate for biomass development. Its potential was considered strong because Travis is located in a state with high energy costs, a renewal portfolio standard driving renewable projects, an active renewable energy credit market, and availability of significant biomass feedstock resources. While Travis had a few suitable parcels for biomass, base personnel indicated that siting a large-scale biomass facility on the base would be impossible due to community involvement and concerns generated from biomass combustion around the installation. In addition, air pollution restrictions in the region may make biomass power infeasible.

Lessons Learned

The EUL opportunity at Travis AFB was not realized. However, there are several lessons were learned through the evaluation that can be applied to Cascade County.

- EUL opportunities for energy projects are strengthened by states with high energy costs;
- Community support for EUL opportunities is important for the approval process; and
- An active renewable energy credit market is appealing for private sector companies looking at energy EUL opportunities.

Edwards AFB

Context and Similarities

Edwards AFB in southern California is hosted by the 95th Air Base Wing and is the second largest base in the Air Force. The 95th provides support for over 10,000 military and civilian personnel. Edwards AFB is adjacent to Rogers Dry Lakebed, the largest dry lakebed in North America. Edwards is designated as the Air Force Flight Test Center and is also where the United States Air Force Test Pilot School and NASA's Dryden Flight Research Center is located.

EUL Opportunity

An agreement to lease land located on the northwest corner of Edwards AFB for a solar energy generation project was just signed. The EUL opportunity has a potential production capacity of up to 600 MW and is adjacent to existing transmission corridors. Interested developers had the option of leasing the entire 3,288 acre parcel for development or they could propose development of smaller sections of the parcel. The Rosamond Community Services District which provides water, sewer, street lights, parks and recreation and graffiti abatement to the Community of Rosamond, agreed to contribute 20% of the costs to provide water service to the Edwards Solar EUL project.

¹⁹ *Renewable Energy Enhanced Use Lease Opportunity Summary Report*, Booz Allen Hamilton, 2007.

Lessons Learned

The Edwards AFB Solar Energy EUL was successful for a number of reasons:

- Energy costs are high in southern CA and this EUL will decrease electrical energy costs;
- Utilizes renewable energy applications;
- Met private sector and market demand; and
- Cost-sharing from the local community.

Nellis AFB

Context and Similarities

Nellis AFB located northeast of Las Vegas covers more than 14,000 acres and provides 15,000 square miles of airspace for flying operations. There are over 12,000 military and civilian personnel at Nellis. It is assigned the USAF Warfare Center, 57th Wing, 98th Range Wing and the 99th Air Base Wing as well as over ten tenant units.

EUL Opportunity

An EUL agreement was recently signed for a wastewater treatment plant to be built at Nellis AFB. The plant will provide waste water treatment for the City of North Las Vegas and water for irrigation. The plant will be owned by the City saving the City money that would otherwise be spent on outsourcing the water treatment to other entities. The location of the site is advantageous to the City because the topography of the land allows waste water to flow directly to the plant via gravity and in turn eliminates the need for additional infrastructure development. In exchange for the use of Air Force land, the City of North Las Vegas has agreed to renovate and expand the Nellis fitness facility as an in-kind consideration worth \$25 million. Expansion of the fitness facility will improve the quality of life of the Airmen at Nellis.

Lessons Learned

The Nellis AFB Wastewater Treatment Plant EUL is a good case study for the following reasons:

- Brings value to both the base and the surrounding community;
- The community contributed in-kind consideration; and
- The EUL agreement was between the local community and the military base.

Summary

The Air Force Real Property Agency researches and promotes EUL opportunities at U.S. Air Force bases. Many programs and resources are available to leaders in the Great Falls area through this Agency to further EULs at MAFB.

Through the evaluation of the above case studies several lessons are applicable to identifying future EULs at MAFB:

- Local industry strengths can lead to EUL opportunities;
- Up to date infrastructure (roads, railroad, transmission lines, natural gas lines, etc.) can increase EUL opportunities;
- Access to the EUL activity is critical for delivery of the product;
- There must be a market need for the supply created by the activity occurring at the EUL;
- The availability of underutilized land and/or buildings is critical to supporting and EUL;
- Height restrictions can present challenges to EULs;
- EUL opportunities for energy projects are strengthened by states with high energy costs;
- An active renewable energy credit market is appealing for private sector companies looking at energy EUL opportunities.
- Community support for EUL opportunities is important for the approval process;
- Utilizes renewable energy applications;
- Cost-sharing from the local community makes an EUL more feasible;
- The EUL should bring value to both the base and the surrounding community; and
- A EUL agreement can be between the local community and/or the private sector and the Department of Defense.

Section 3 Ranked Listing of Mission Opportunities

The overall purpose of this assignment is to identify potential mission opportunities, enhanced use lease (EUL) opportunities and other private company opportunities to help diversify the Great Falls economy and strengthen the position of the Malmstrom Air Force Base (MAFB) and the Montana Air National Guard (MANG). This section of the report presents those opportunities, identifies the ranking criteria by which they have been evaluated and presents the findings in a ranking matrix.

The consultant team reviewed a number of previous reports and studies, including the SAIC report and the Quadrennial Defense Report (QDR). A best practice analysis of similar communities, other Air Force bases with a nuclear mission and Air National Guard bases was conducted and was presented in the previous section.

We have identified fifteen (15) existing mission opportunities from the SAIC draft report of 2005 and an additional thirteen (13) opportunities through research, best practice analysis and key stakeholder interviews.

Opportunities

The mission enhancements, EUL and diversification opportunities BBP has researched for this report have come from two different sources.

The first source is the SAIC report commissioned by Malmstrom Air Force Base and completed in 2005. That report identified 15 mission opportunities. Our analysis looked at each opportunity, now five years later, and assessed its potential.

The second source of opportunities was identified by BBP through research, analysis and key stakeholder interviews. BBP identified an additional 13 opportunities to analyze. The paragraphs below briefly describe 28 opportunities. The descriptions of the SAIC opportunities are in their original language taken from the Executive Summary of their report.

SAIC Identified Opportunities²⁰

“Based on these strategic issues and the natural advantages of MAFB and its surrounding environs, this report makes the following recommendations:

- **Maintain current missions and facilities at both the MANG base at the International Airport and at MAFB.** The infrastructure, capabilities, and support to the national security strategy are too important to abandon during this critical period when our security is being challenged by new forces and methods.
- **Execute the Runway Activation Strategy** that is provided within the report. Many of the proposals provided by this study would require at least some enhanced use of the runway.

²⁰ SAIC. “Opportunity Assessment Malmstrom Air Force Base”. 2005.

- **Proceed with Annexation of the MAFB property by the City of Great Falls.** Statutory action by the Montana legislature might be required to ensure that residents of the base are not subjected to additional taxation burdens or other financial costs.
- **Enhance MAFB's already close association with US Strategic Command and USAF Space Command.** These organizations are growing in importance and MAFB has many natural advantages (e.g., strong security philosophy and infrastructure, extraordinary communications capabilities) that will be required for new missions, including Global Intelligence, Surveillance, and Reconnaissance (GISR); and Information Operations (including Computer Network Operations (CNO)).
- **Position MAFB to acquire currently operational forces that are being withdrawn and reconfigured from forward areas** because of the Bush Administration's ongoing strategy-based assessment of forward presence of all our armed forces. Forward based fighter, reconnaissance, refueling, and surveillance assets could well make use of the base's natural training and life style advantages by relocating to Montana.
- **Position Malmstrom AFB to stand up a combined Air Guard/Active Duty Fighter Wing** which could result from the previous recommendation to prepare for a redistribution of U.S. forces. This Fighter Wing should also be considered as a location for a future F-22 and F-22B airwing because of the unique airspace and training opportunities available in Montana.
- **Enhance the joint-use nature of MAFB by increasing the Army footprint within the base.** This could be accomplished by collocation and consolidation of MANG Combat Service Support forces and establishment of vehicle maintenance support facility on the base.
- **Enhance the joint-use nature of MAFB by inviting the Navy** to use this site as a surge training facility to help support its new deployment strategy.
- **Establish a Close Air Support (CAS), Blue Force Tracking, Combat 10 Center of Excellence.** This would entail the establishment of a school for Joint Tactical Air Controllers, the opening of additional air to ground training facilities in the Montana Air Operating Centers, establishing additional cold weather high altitude training facilities for Special Operations Forces (SOF) in the mountains adjacent to the Montana training airspace. These activities would complement and build upon the increased footprint of Army and Navy activities on the enhanced joint-use MAFB as described above.
- **Establish MAFB as a key node in the new Joint National Training Capability a NTC) Program that is being established by U.S. Joint Forces Command.** This would build upon and enhance several of the above recommendations such as enhanced joint use of the base and establishment of a CAS Center of Excellence. MAFB would be one of only two elements of the JNTC in the northern half of the country and the only location that could combine high altitude cold weather ground force training with almost unlimited air training. It would concentrate now on developing the "Live" portion of the "Live, Virtual, and Constructive" training regimen envisioned for the JNTC with eventual expansion of the virtual training capability in the future.
- **Establish an Unmanned Air Vehicle (UAV) Center of Excellence at MAFB** that would take advantage of the low density of commercial aircraft in Montana. This would enhance UAV development which is currently being constrained by concerns about their operations in the midst of heavy commercial air traffic that is standard in most of the rest of the country. UAVs to be considered now are those used currently by DoD, including Predator and Global Hawk aircraft, as well as those employed by the Department of Homeland Security (DHS) today on our southern border. UAVs for future consideration are the Unmanned Combat Air Vehicle (UCAV) which is expected to be available by 2020 and the Lighter than Air (LTA) airships that are currently being evaluated in an Advanced Concept Technology Demonstration (ACTD).
- **Establish a joint DoD-DHS operating base at MAFB.** In this vision, DHS would operate aircraft and UAVs from the runway to facilitate its growing mission of northern border security. It would also establish a ground surveillance center within Malmstrom that would enable monitoring of remote ground sensors and close collaboration with the airborne sensors. This base could also house a Northern Environment Test Center, a concept currently being evaluated by DHS.

- **Establish a DHS Logistics Center at MAFB.** This would take advantage of Malmstrom's central geographic location along our northern border and its excellent ground and air transportation linkages to stockpile assets for use in either natural or terrorist-induced disasters. MAFB could also take advantage of ongoing DHS programs such as the Weapons of Mass Destruction Civil Support Teams (WMD-CST) and Pre-positioned Equipment Program (PEP). This concept would also allow DHS to take advantage of surplus medical capability, the unlimited federal lands with low population density available in Montana, and superb transportation linkages to establish a relocation and/or quarantine facility for persons dislocated as the result of CBRNE terrorism.
- **Establish a commercial launch and/or DoD Rapid Response Launch facility at MAFB.** The recent SpaceShipOne launch was the dawn of commercial space use which many believe is about to grow dramatically. DoD is also strongly drawn to having a responsive, flexible, rapid capability launch relatively small command and control and surveillance satellites into space during a crisis. MAFB, due to its geographic location, low population density, strong security posture, superb C2 linkages, and ability to rapidly configure launch vehicles and maintain them in high alert status would be an ideal location for either a commercial launch or a DoD Rapid Response Launch facility.
- **Establish a Hypersonic Test Facility within MAFB.** The Mariah II hypersonic test program has been under development since 1998. It is a high technology consortium led by MSE Technology Applications of Butte, MN. This will be a critical test facility for future advances in aerospace. It is currently at the stage in development where a mature test facility must be developed. Ideally this test facility would be located on a DoD installation because of the potential danger of the facility and the highly classified nature of its work. Similar arrangements have been made for the Air Force's directed energy capability which is located at Kirtland AFB in Albuquerque, New Mexico. Because Montana is the center of technological development for this capability and the infrastructure is available to support such a facility at MAFB, it would be logical to establish such a facility there.”

BBP Identified Opportunities

As noted above, the opportunities presented here are the result of best practice research, document review and key stakeholder interviews. Each opportunity is briefly described in the paragraphs that follow.

- ***Advance Remotely Piloted Aircraft (RPA), Unmanned Aerial Vehicles (UAVs) and other Intelligence, Surveillance and Reconnaissance (ISR) Systems.*** This opportunity is similar to SAIC opportunity “Establish an unmanned air vehicle (UAV) center of excellence at MAFB” in that it focuses on RPAs. However, the focus of this opportunity is the private sector and private contractor attraction. The combination of the Montana Air National Guard, Hays MOA and minimal commercial flight patterns makes this opportunity important to pursue. If any of the Hays MOA could be designated “restricted”, (this opportunity is described below), the RPA/UAV/ISR opportunity would be that much more valuable. This opportunity would diversify the economy while at the same time strengthening the mission of MANG and providing for both military and civilian job growth. The Chamber of Commerce and the CMDA are currently working with a private company interested in the Great Falls area.
- ***Attract E-Medical Records Missions.*** Health records for all military beneficiaries (service members, retirees and their families) are now part of a global electronic health record system. The E-Medical Records opportunity is an opportunity for MAFB and could bring approximately 250 civilian jobs and 12 military jobs to the Great Falls area. Training and infrastructure for the

mission could be tied into MSU Great Falls health information courses. The opportunity at MSU Great Falls is an advantage for attracting this mission. Congressional support for this opportunity has been identified.

- ***Expansion in the Bio-Fuel Industry.*** Bio-fuels projects are of great interest to the Air Force in the production of jet fuel. By the same accord, this would likely also be of interest to the Air National Guard for use in their operations. The Air Force has set an aggressive goal to get 50% of their fuels from bio-fuel by 2020.²¹ The vast land availability and agricultural nature of the surrounding communities makes this a strong opportunity going forward.
- ***Increase Energy Production Companies (wind).*** Like bio-fuels with the Air Force, the federal government is increasingly looking to the use of renewable energy sources. The U.S. General Services Administration is requiring that at least 7.5% of purchased electricity be from renewable energy sources. With its famous Chinook winds, Great Falls is well situated to provide those electricity needs through wind energy.
- ***Increase Role in Global Strike Initiative/Upgrade Weapons Base (nuclear depot).*** The Air Force Global Strike Command (AFGSC) is the newest command in the Air Force. The mission is to develop and provide combat ready forces for nuclear deterrence and global strike operations. Headquarters are at Barksdale Air Force Base, LA. One of the six AFGSC wings (341st Missile Wing) is located at MAFB. There could be opportunities for expansion of MAFB's current role in the AFGSC such as providing a facility for centralized weapons storage.
- ***Expansion of Department of Homeland Security (DHS) Presence.*** DHS currently has operations in Great Falls; air and marine operations are already at the airport. Also, the Center for Border Patrol has a service port at the airport. DHS sector headquarters are already located elsewhere in Montana and moving these offices to Great Falls could be a conflict of interest for State of Montana representatives. However, other opportunities for expansion of DHS' presence could be related to Montana's proximity to the Canadian border and central location in the continental United States.
- ***Attract U.S. Border Patrol/DHS with RPAs.*** DHS is improving its border security infrastructure along the northern border and is building its surveillance and monitoring capabilities. One method the DHS is improving its surveillance and monitoring capabilities is through the use of RPAs. In fact, in spring of 2010 RPAs were given the authority to be used along the U.S. border in Texas. This supplements the RPAs that are already in use along the U.S. border in Arizona. Due to Great Falls' proximity to the northern border it has potential for development, maintenance and training for RPA monitoring of the border.
- ***Increase Training at MANG.*** Training of airmen from both the AF and ANG at the Great Falls Airport is an opportunity because of excess warehouse and runway space. Training could be in rotary aircraft, general aircraft engine maintenance and repair, and other areas.
- ***Attract AF Special Operations Training.*** Air Force special operations airmen are highly trained, rapidly deployable and equipped with specialized aircraft. Special Tactics is the AF

²¹ QDR

Special Operations ground force. Special Tactics training is one of the most demanding in the military. Because of Great Falls's proximity to mountains (higher altitude and climbing opportunities) and a climate similar to that in Afghanistan, bringing AF Special Operations Training, such as Special Tactics, to the Great Falls area is an opportunity.

- **Establish EUL Projects (battery storage, harnessing steam off heat plants).** EUL projects are any private projects on federal land in which a private contractor pays for the space they are using, or provides an in-kind contribution to the host federal facility. In this case, an example might be a RPA/UAV contractor locating on either the MANG or MAFB properties, the latter requiring use of the runway. Other EULs could include bio-fuels, the commercial launch facility or the hypersonic test facility, to name a few.
- **Attract National Security Agency (NSA) Data Center.** The NSA has several scattered data center sites throughout the continental U.S. and is looking for additional sites. However, the extent of where, when and how large of a site the NSA is seeking is unknown. It is important for any new NSA data center to be located in a secure area such as a military base to lessen the chance for a truck-bomb style attack.²²
- **Designate Restricted Airspace at Hays Military Operations Area (MOA).** While not an opportunity in and of itself, the designation of some portion of the Hays MOA as "restricted air space" would have a strong impact on the attractiveness of Great Falls, the MAFB and MANG for future opportunities. Restricted airspace is hard to come by and allows for a much wider range of testing of manned and unmanned aircraft. Specifically, restricted airspace would greatly enhance the RPA/UAV opportunity by removing the restriction of require chase planes and other Federal Aviation Administration restrictions.
- **Attract MC-12W Program at MANG.** The MC-12W is a small fixed-wing, intelligence gathering aircraft. The Air Force is currently looking for a base to house up to 37 aircraft. The program could bring an additional 700 airmen to a base. However, the Air Force has already identified its top five installations to examine for housing the program: Altus AFB, Beale AFB, Key Field Air Guard Stations, Langley AFB and Whiteman AFB. Should these fail to meet the basing criteria of the program, MANG in Great Falls could be a candidate.

Ranking Criteria

BBP identified the opportunities through a review of past reports, including the 2005 SAIC report, Best Practice research, key stakeholder interviews independent and data collection. Through all of these sources, coupled with our experience in the field, we identified the selection criteria described below. Each of these criteria was then applied to the opportunities and judgments made by BBP in the level of effort each opportunity would take for each criterion.

- **Compatible with Current Missions.** This criterion assesses whether or not the opportunity is likely to be inconsistent or incompatible with the current MAFB or MANG missions.

²²"NSA sites to move for more security; Sensitive operations to relocate inside Fort Meade as part of BRAC" <http://www.globalsecurity.org/org/news/2005/051112-nsa-move.htm> 2005.

Opportunities that are not compatible with either mission will be disqualified from further analysis.

- **Ease of Implementation.** This criterion relates to how difficult, politically or financially, the given opportunity is likely to be. The key stakeholder interviews were important inputs in this factor.
- **Existing Relationship to Current Missions.** Different from the first criterion, this factor identifies any existing missions or commands that have an ongoing relationship or interest in the opportunity. This can be in the form of mission enhancement, EUL or other contractor relationships.
- **Dependent Upon the MAFB Airstrip.** Many of the SAIC recommendations are dependent upon the MAFB airstrip being reopened for service. While it is currently closed, the Air Force has indicated that all facilities are now evaluated for all mission bed downs regardless of the status. However, it was important to identify which opportunities were reliant or enhanced to a significant degree on the reopening of the airstrip.
- **Meets a Known DoD (QDR) Need.** Another source of opportunities, and one that would have a higher likelihood of funding, are those needs identified in the QDR. This rating identifies which of the opportunities are so named.
- **Diversifies the Local Economy.** One of the important goals of this assignment was to find opportunities that diversity the local economy. Currently nearly 50% of the employment and economic base is associated with the military operations. With the future of flight missions and nuclear missions unclear, diversifying the local economy with private employment opportunities has become even more critical.
- **EUL Opportunity.** Enhanced Use Lease opportunities are those activities that will involve a non-MAFB/MANG entity and will provide revenues or in-kind contributions. Different from the mission enhancement, (internal diversification), EUL opportunities will seek to partner MAFB/MANG assets with Great Falls strengths and other opportunities for external diversification.
- **Has an Existing or Likely Funding Source.** Another important factor, especially as the analysis moves into the implementation phase, is the likelihood of funding. An opportunity that has a known funding source ranks higher than one where funding is not available or is unknown.
- **Creates Jobs/Positive Fiscal Impact.** The final criterion is whether or not the opportunity is expected to increase private employment, thus diversifying the local economy. While increases in military jobs are important, a key focus is reducing the community's dependence on DoD/federal entities.

Ranking the Opportunities

Weighting. Each of the criterion was also weighed against the others. While all of the criteria selected are important in ranking the opportunities, we felt some deserved a higher weight in the overall analysis. Four of the nine criteria are weighted more heavily than the others (compatible with current missions, dependent upon the MAFB Airstrip, diversifies the local economy, and ease of implementation). Through interviews and additional research, these four were determined to be of greater importance to implementing the opportunity. The table below shows the ranking criteria and their associated weightings:

Criterion	Weight
Compatible with Current Missions	2
Dependent Upon the MAFB Airstrip	2
Diversifies the Local Economy	2
Ease of Implementation	2
Existing Relationship to Current Missions	1
Meets a known DOD (DQR) Need	1
EUL Opportunity	1
Has an Existing or Likely Funding Source	1
Creates Jobs/Positive Fiscal Impact	1

Ranking. The ranking table on the following page shows the opportunities ordered by highest probability to lowest. The darker colors in the table indicate a higher score. As is shown in the table on the following page, the top ten opportunities are:

- Expansion of DHS Presence;
- Attract U.S. Border Patrol/DHS (with RPAs);
- Expansion in the Bio-Fuel Industry;
- Establish MAFB as a UAV/LTA Center of Excellence;
- Establish a Joint DoD/DHS Facility at MAFB to Support Northern Border Security;
- Establish DHS as an Emergency Logistics and Preparedness Center;
- Advance Remotely Piloted Aircraft and Other ISR Systems;
- Attract E-Medical Records;
- Maintain Current Mission; and
- Increase Role in Global Strike Initiative/Upgrade Weapons Base (nuclear depot).

Several of the top opportunities overlap. Four of the opportunities involve expanding the DHS role in Great Falls and three of the opportunities involve the RPA industry. As a result, BBP grouped the four DHS opportunities into one combined opportunity and the three RPA opportunities into another combined opportunity. The top five opportunities, and those that will be examined in the implementation strategy, are:

1. Expansion of DHS’ role in the Great Falls Area;



- 2. Expansion into RPAs;**
- 3. Expansion in the bio-fuel industry;**
- 4. Attract E-Medical records missions; and**
- 5. Maintain/Upgrade the current missions.**



Figure 2 Opportunity Ranking Matrix

Rank	Opportunity	Compatible with Current Missions	Dependent Upon the MAFB Airstrip	Diversifies the Local Economy	Ease of Implementation	Existing Relationship to current missions	Meets a known DOD (DQR) Need	EUL Opportunity	Has an Existing or Likely Funding Source	Creates Jobs/Positive Fiscal Impact
1	Expansion of Department of Homeland Security Presence	10	10	10	8	3	5	1	5	5
1	U.S. Border Patrol/DHS (w/ RPAs)	10	6	10	10	5	5	1	5	5
3	Bio-Fuel	4	10	10	6	4	5	5	5	5
4	Maintain Current Mission	10	10	2	10	5	5	1	5	5
4	Establish MAFB as a UAV/LTA Airship Center of Excellence	10	6	10	6	3	5	5	3	5
4	Establish a Joint DoD/DHS Facility at MAFB to Support Northern Border Security C	10	10	10	6	1	5	1	5	5
4	Establish MAFB as a DHS Emergency Logistics & Preparedness Center	10	10	10	6	1	1	5	5	5
4	Remotely Piloted Aircraft and other ISR Systems (2/)	10	6	10	4	5	5	5	3	5
9	E-Medical Records	10	10	10	8	1	1	1	5	5
10	Global Strike Initiative/Upgrade Weapons Base (nuclear depot)	10	10	2	6	5	5	1	5	5
11	Establish a Hypersonic Test Facility within MAFB	10	10	10	2	1	1	5	3	5
11	Training Increase at MTANG	10	10	2	10	5	1	1	3	5
11	NSA Data Center	10	10	10	4	1	1	5	5	1
14	Establish a Commercial Launch and/or DoD Rapid Response Launch	10	10	10	2	1	1	5	1	5
14	Designation of Restricted Airspace at Hays MOA	10	6	2	6	5	1	5	5	5
16	Energy Production (wind)	2	10	10	4	1	1	5	5	5
16	AF Special Operations Training	10	6	2	6	3	5	1	5	5
16	EUL Projects (battery storage, harnessing steam off heat plants)	6	6	10	4	1	3	5	3	5
19	Enhance MAFB Association with US Strategic Command	10	10	2	6	5	1	1	5	1
19	MC-12W Mission at MTANG	10	6	2	6	5	1	1	5	5
21	Execute Runway Activation Strategy	10	2	10	2	1	3	5	1	5
22	Establish MAFB as a Key Node in the Joint National Training Capability	10	2	2	4	1	5	1	5	5
23	Position MAFB to Acquire Forward Areas Being Withdrawn	10	2	2	6	5	1	1	5	1
23	Position MAFB to Stand Up a Combined Active Duty/Air Guard Fighter	10	2	2	6	5	1	1	5	1
23	Enhance Army Footprint	10	2	2	6	5	1	1	3	3
23	Enhance Navy/Marine Footprint	10	2	2	6	5	1	1	3	3
27	Establish Close Air Support, Blue Force Training	6	2	2	4	1	5	1	5	5
28	Annexation of MAFB by City of Great Falls	2	10	2	2	1	1	1	1	1

Section 4 Implementation Strategies

The Strategy

Implementation Strategies presents a path for executing the top mission opportunities identified through the ranking matrix in the previous section. The action strategies for implementing the mission opportunities are designed to be easily implemented at the local government level and to achieve the maximum benefit. Implementation of the top opportunities is based on the following recommendation structure:

- **Action:** Specific action strategy to implement the opportunity;
- **Outcome:** Anticipated result from successful implementation of action;
- **Lead & Partner Agencies:** Entity(s) who will serve to lead the action and those who will provide support for the implementation;
- **Time Frame:** Anticipated time to implement the action (short term (1-3 years), long term (4-10 years) and ongoing);
- **Cost:** Order of magnitude cost estimate to the local partner for implementation:
 - Low: \$0 to \$5,000
 - Medium: \$5,000 to \$50,000
 - High: \$50,000 and above
- **Potential Funding Sources:** Financing/Funding strategy for implementing actions with cost levels medium and higher.

The Mission Opportunities

Using the results from the ranking of opportunities, BBP looked at the top five opportunity areas. Each is examined in more detail in the following subsections. The five opportunity areas are:

- Expansion of DHS' role in the Great Falls area;²³
- Expansion into RPAs;²⁴
- Expansion in the bio-fuel industry;
- Attraction of E-Medical records missions; and
- Maintain/Upgrade the current missions.

²³ Expansion of DHS' role in the Great Falls area was included in four of the top ten opportunities.

²⁴ Three of the top ten opportunities identify the use of RPAs as an area for expansion

Opportunity Area 1: Maintain/Upgrade the Current Missions

Figure 3 Maintain/Upgrade Current Mission Action Strategy

Opportunity	Action	Outcome	Lead & Partner Agencies	Time Frame	Cost	Potential Funding Sources
Maintain/ Upgrade the Current Missions	Continue open communication with MAFB and MANG leadership	Maintain positive relationship with Base leadership	CMDA	Ongoing	Low	Chamber/ Local Government
	Continue efforts to show the capabilities of the Great Falls area to Air Force and Air National Guard leadership	Build contacts and keep MAFB and MANG on the radar of DoD leadership	CMDA	Ongoing	Low	Chamber/ Local Government
	Continue communication with Congressional delegates	Keep MAFB and MANG needs in the forefront of Congressional delegates	CMDA	Ongoing	Low	Chamber/ Local Government
	Expand efforts to show DoD leadership the weapons storage capabilities of MAFB	Upgrade to current ICBM storage	CMDA	Short Term	Low	Chamber/ Local Government

Important Next Steps:

- Continue open communication with MAFB and MANG leadership: Continue to inform MAFB and MANG leadership of community actions which may impact base operations and community concerns.
- Continue efforts to show the capabilities of the Great Falls area to Air Force and Air National Guard leadership:²⁵
 - Make strongest possible case to Air Force officials and BRAC Commission regarding the tremendous capabilities of MAFB and MANG, the extraordinary training capabilities and the strong support for these missions of the local populace.
 - Ensure that decision makers are aware of the dependence of the local economy upon the existence of the MAFB and MANG.
 - Ensure decision makers are aware of the strong university and healthcare systems in MT. Ensure they understand the ready availability of high quality labor.
 - Continue currently planned base upgrades.
 - Emphasize the joint nature of the current base and its increased emphasis on this characteristic in the future.
 - Ensure Lt. Gen. William T. Lord and his staff is fully aware of the capabilities of MAFB. Ensure Gen. Craig R. McKinley and his staff is fully aware of the capabilities of MANG.
 - Ensure that Lt. Gen. Frank G. Klotz is fully aware of MAFB capabilities and support to the Global Strike Command. Send a delegation to Barksdale AFB to brief Lt. Gen. Klotz about MAFB as soon as possible.

²⁵ The sub-bullets are primarily taken from the 2005 SAIC report Appendix I: Roadmaps to Execute Recommendations.

- Continue communication with Congressional delegates: continue to include Baucus, Tester and Rehberg Field Directors as well as aides in DC in discussions regarding ideas for new MAFB and MANG operations.
- Expand efforts to show DoD leadership the weapons storage capabilities of MAFB: Determine MAFB storage capabilities and excess space. Ensure that Lt. Gen. Frank G. Klotz is fully aware of MAFB capabilities and support to the Global Strike Command. Send a delegation to Barksdale AFB to brief Lt. Gen. Klotz about MAFB as soon as possible.

Opportunity Area 2: Expansion of DHS’ role in the Great Falls Area

This opportunity area includes the following mission opportunities:

- Expansion of DHS presence;
- Establish MAFB as a DHS emergency logistics and preparedness center;
- Establish a joint DoD/DHS facility at MAFB to support northern border security; and
- U.S. border patrol/DHS with RPAs.

Figure 4 DHS Action Strategy

Opportunity	Action	Outcome	Lead & Partner Agencies	Time Frame	Cost	Potential Funding Sources
Expansion of DHS's Role in the Great Falls Area	Gain support of key federal government/DoD officials	Build contacts and connections	CMDA	Short Term	Low	Chamber/ Local Government
	Work with Congressional delegation	Build contacts and connections	CMDA	Short Term	Low	Chamber/ Local Government
	Identify feasible site locations for DHS activity centers	Have site information ready when DHS looks for new opportunities	CMDA & Great Falls Montana Development Authority	Short Term	Low	Chamber/ Local Government, Private Sector
	Prepare a marketing package that includes a list of the Great Falls area advantages for DHS operations	Attract DHS to Great Falls	CMDA & Great Falls Montana Development Authority, City of Great Falls, and Cascade County	Short Term	Low	Chamber/ Local Government
	Determine appropriate public incentives to attract regional DHS operations	Create an attractive incentive package	City of Great Falls, Cascade County, State of Montana	Ongoing	Medium to High	TIF, land & infrastructure contribution

Important Next Steps:

- Gain support of key federal government/DoD officials: these could include Deputy Secretary of Defense, Under Secretary for Personnel and Readiness, Deputy Secretary of Homeland Security,

Deputy Commissioner U.S. Customs and Border Protection, Chief Office of Border Patrol (CBP), and Commander for the US Northern Command.

- Work with Congressional delegation: continue to include Baucus, Tester and Rehberg Field Directors as well as aides in DC in discussions regarding ideas for new DHS operations.
- Identify feasible site locations for DHS activity centers: work with real estate brokerages to determine available and upcoming availabilities of site that are feasible for DHS activity centers.
- Prepare a marketing package that includes a list of the Great Falls area advantages for DHS operations: the package could include proximity to the northern border and Canada, minimal air traffic, access to a high quality work force and health care system, and training partnerships with the MT university system.
- Determine appropriate public incentives to attract regional DHS operations: determine a favorable incentive package to attract DHS to the Great Falls area that meets community objectives. The incentive package could include providing or contributing to the necessary infrastructure (such as roads, utilities, security and data transfer) to support the operations and leasing publically owned space at reduced rates.

Opportunity Area 3: Expansion into RPAs

This opportunity area includes:

- U.S. border patrol/DHS with RPAs;
- Establish MAFB as a RPA Center of Excellence; and
- Private sector expansion into RPA and other ISR systems.

Figure 5 RPA Action Strategy

Opportunity	Action	Outcome	Lead & Partner Agencies	Time Frame	Cost	Potential Funding Sources
Expansion into RPAs	Perform a RPA industry analysis to determine site and research and development needs	Knowledge on the RPA industry	CMDA	Short	Low	Chamber/ Local Government
	Investigate degree to which MAFB runway would need to be reopened to support RPA operations	Determine if the runway needs to be reopened to allow for both private and DoD RPA use	CMDA	Short Term	Low	Chamber/ Local Government
	Investigate the use of the Great Falls International Airport to support RPA operations	Determination of Airport’s ability to support RPA operations	CMDA and Airport Authority	Short Term	Low	Chamber/ Airport Authority
	Designate restricted airspace at Hays MOA	Designated training area for RPAs	CMDA	Short Term	Medium	Chamber, local contributions
	Gain support from the Air Force ISR Agency	Build contacts and connections	CMDA	Short Term	Low	Chamber
	Build partnerships with RPA affiliated private contractors	Build contacts and connections	CMDA	Short Term	Low	Chamber

	Contact DHS Northern Border officials to explore partnerships with MAFB and MANG	Build contacts and connections and determine need	CMDA	Short Term	Low	Chamber/ Local Government
	Determine appropriate public incentives to attract private contractors	Attract private RPA industry contractors	Great Falls, Cascade County & State	Short Term	Medium to High	State, TIF

Important Next Steps:

- Perform a RPA industry analysis to determine site and research and development needs: Understand the private sector site needs for a RPA research and development and/or manufacturing facility. Begin by contacting private sector contractors such as BAE Systems, Northrop Grumman, Boeing, and Textron.²⁶ . Important topics to cover include security needs, runway needs, facility needs, and workforce needs.
- Investigate degree to which MAFB runway would need to be reopened to support RPA operations: RPA research, development, manufacturing and training is not dependent on the re-opening of the runway at MAFB because of the runway availability at the Great Falls International Airport. However, RPA operations could be enhanced by the opening of the MAFB runway.
- Investigate the use of the Great Falls International Airport to support RPA operations: Discuss with the Airport Authority to determine the runway availability for private and public sector RPA training needs.
- Designate restricted airspace at Hays MOA: Contact and lobby the Federal Aviation Administration to restrict the airspace at the Hays MOA for RPA flight training from Great Falls.
- Gain support from the Air Force ISR Agency: Contact the ISR Commander (Maj. Gen. Bradley A. Heithold) and/or the Vice Commander (Brig. Gen. John D. Stauffer) to determine the future needs of the Agency and to put the Great Falls area in the forefront of their training needs.
- Build partnerships with RPA affiliated private contractors: Using the data in Appendix A as a starting point, identify “best fit companies” based on those companies that could benefit from the advantages of locating in the Great Falls area, companies looking to expand or relocate, and companies with recent contract awards.
- Contact DHS Northern Border officials to explore partnerships with MAFB and MANG: explore the possibility of using the MAFB/MANG as an operations and maintenance facility for RPA use on the northern border. Contacts include: David Aguilar Chief Office of Border Patrol (CBP), and Admiral James A. Winnefeld, Jr. Commander US Northern Command.
- Determine appropriate public incentives to attract private contractors: incentives could include property tax abatements and infrastructure and/or land contributions.

²⁶ Other RPA manufacturers and component manufacturers are listed in Appendix A: UAV/RPA Data Sources.

Opportunity Area 4: Expansion in the Bio-Fuel Industry

Figure 6 Bio-Fuel Action Strategy

Opportunity	Action	Outcome	Lead & Partner Agencies	Time Frame	Cost	Potential Funding Sources
Expansion into the Bio-Fuel Industry	Perform a bio-fuels industry analysis	Determination of crop and refinement needs	CMDA, Great Falls Development Authority	Short Term	Low	Chamber/ Development Authority
	Identify sites for crop production and for refinement of crop into fuel	Identification of sites suitable for growth and refinement of bio-fuels	CMDA, Great Falls Development Authority	Short Term	Low	Chamber/ Local Government
	Provide incentives for local production of bio-fuel crops and refinement	Sale of local bio-fuel crops to fuel producers	Cascade County, State of Montana	Long Term	Medium	DOE, USDA, IRS, State Legislative Earmark
	Identify and contact private producers of bio-fuels	Identify partnerships between bio-fuel crop producers, bio-fuel producers and end-users	CMDA	Short Term	Low	Chamber/ Local Government
	Contact Defense Advanced Research Projects Agency (DARPA) and AF Under Secretary	Build contacts and connections	CMDA	Ongoing	Low	Chamber/ Local Government

Important Next Steps:

- Perform a bio-fuels industry analysis to determine crop and refinement needs/ Identify sites for crop production and for refinement of crop into fuel: Obtain information on the types of agricultural products currently being used to develop bio-fuels and match those with those that are supportable in the Great Falls area (camelina, etc.). Those that are supportable include those that could be grown and/or those that could be refined in Great Falls. Produce an inventory analysis that provides the current agricultural products being grown, the amount of available land for future growth of bio-fuel crops, as well as the available refinement facilities that could be used or expanded to produce the bio-fuel. Use the Economic Diversification Study as a starting point for an inventory analysis of the agricultural products being grown in the area.
- Provide incentives for local production of bio-fuel crops and refinement: to encourage production of bio-fuel crops in the Great Falls area, identify a list of incentives that could attract both existing and new private companies to grow bio-fuel crops. Identify federal and state incentives and make those available to local farmers (tax credits, bio-refinery development grants, and loans). Local incentives could include property tax reductions, infrastructure contributions and grants.
- Identify and contact private producers of bio-fuels: check the IRS for companies that are currently receiving tax credits for producing bio-fuels. Contact these companies to determine their interest in relocating to the Great Falls area and their interest in supplying the DoD. Participate in bio-fuel trade shows to network and develop relationships with producers.

- Contact the Defense Advanced Research Projects Agency (DARPA) and AF Under Secretary, Erin Conaton: DARPA is leading an effort to explore energy alternatives and fuel efficiency for military aviation.

Opportunity Area 5: Attraction of E-Medical Records Missions

Figure 7 E-Medical Records Action Strategy

Opportunity	Action	Outcome	Lead & Partner Agencies	Time Frame	Cost	Potential Funding Sources
Attraction of E-Medical Records Missions	Prepare a marketing package of area strengths for attracting e-medical records missions and private companies	Proactive approach to attracting mission	CMDA, MSU Great Falls	Short Term	Low	Chamber/ MSU Great Falls
	Contact DoD medical departments	Building contacts and connections	CMDA	Short Term	Low	Chamber
	Identify private e-medical record companies	A list of potential private partners	CMDA	Short Term	Low	Chamber/ Local Government

Important Next Steps:

- Prepare a marketing package of area strengths for attracting e-medical records missions and private companies: the marketing package could include the University of Montana Great Falls medical education and training opportunities, favorable business climate, and building availability.
- Contact DoD medical departments: start building contacts at the Air Force Surgeon General’s Department, Army Medical Department, Veteran’s Affairs, etc.
- Identify private e-medical record companies: develop a list of electron medical records companies and identify which companies already serve the DoD. As of January 2009, the top ten vendors of electronic health records are:²⁷
 - Meditech
 - McKesson Provider Tech
 - Cerner
 - Siemens Medical
 - Self-developed (developed by the medical institution itself)
 - CPSI
 - Epic Systems
 - Eclipsys
 - Healthcare Management Systems
 - Healthland

²⁷ David P. Hamilton. BNET. “Top Ten Electronic Medical Record Vendors” February 3, 2009. <http://industry.bnet.com/healthcare/1000350/the-top-ten-electronic-medical-record-vendors/>

Appendix A: Unmanned Aerial Vehicles/Remotely Piloted Aircraft Data Sources

The following lists contain information on Unmanned Aerial Vehicles (UAV)/Remotely Piloted Aircraft (RPA) research and development companies, manufacturers, components and systems developers, and forums.²⁸ This information will help the CMDA to develop the industry knowledge required to successfully attract private sector contractors in the RPA industry to the Great Falls area.

Unmanned Aerial Vehicle Manufacturers

- **AAI Corporation:** The subsidiary of **United Industrial Corporation** which produces unmanned air vehicles (UAVs), including the Shadow 200 and Shadow 600 models. <http://www.aaicorp.com/>
- **Advanced Ceramics Research:** Producer of the Silver Fox, a small, lightweight, inexpensive and expendable unmanned aerial vehicle (UAV) that can fly autonomously for long durations and is capable of providing low cost aerial surveillance imaging and carry sensor payload packages. <http://www.acrtucson.com/>
- **Aerial Information Systems Corporation:** AISC provides a range of remote sensing and advertising products and services using small UAVs. AISC also builds its own line of small UAVs and payloads. <http://www.aisc.aero/>
- **The Aerosonde Robotic Aircraft:** A small, economic, and operationally flexible UAV with a flight capability in excess of 30hrs/3000km and designed for meteorological and environmental observations, and surveillance over oceanic, remote, and hazardous areas. <http://www.aerosonde.com/>
- **Aero Telemetry Corporation:** Designs and manufactures full-sized unmanned air vehicles, as well as integrated telemetry systems and related subsystem components for military and commercial applications. Also, they sell and service Microdyne telemetry related products. <http://www.aerotelemetry.com/>
- **AeroVironment:** Develops breakthrough aerial vehicles for a wide range of applications, including unmanned aircraft for communications, reconnaissance and research, as well as high-altitude unmanned solar-electric airplanes. <http://avinc.com/>
- **Airborne Autonomous Systems:** AAS's primary focus is pursuing the civil and commercial UAV market with a proprietary aircraft (HOVTOL). AAS expects to make manned versions in addition to UAV's. <http://www.unmannedaircraft.org/page/page/1357249.htm>
- **Army Technology: Unmanned Aerial Vehicles:** A good source for detailed data and reference information about UAVs. <http://www.army-technology.com/projects/category/unmanned-aerial-vehicles/>

²⁸ Much of the information presented in Appendix A was sourced from "Thirty Thousand Feet Aviation Directory". BBP selected relevant websites for this purposes of this project. <http://www.thirtythousandfeet.com/>

- **Aurora Flight Sciences:** Develops robotic aircraft, rapid prototyping of Unmanned Aerial Vehicles (UAVs), composite and metal manufacturing, fault-tolerant software, and UAV flight services. <http://www.aurora.aero/>
- **BAI Aerosystems, Inc.:** A full-service UAV manufacturer that offers a complete family of aircraft (ranging from back-packable electric to ultra-light in class), digital flight controllers (autopilots), datalinks (command/control, video/telemetry), EO/IR/ChemBio/Radar/Psypops payloads, and many support equipment items, including pneumatic launchers and starters. The company has produced over 1,000 small UAVs, mostly for the U.S. DOD. BAI also supplies equipment to other UAV manufacturers worldwide. <http://www.bai.aero/>
- **Bell Eagle Eye TiltRotor UAV:** A small scale tiltrotor demonstrator designed and fabricated by Scaled Composites, with potential for future applications to VTOL UAV missions. <http://www.scaled.com/projects/eagleeye.html>
- **Bombardier Aerospace / Unmanned Aerial Vehicle:** The CL-327 advanced vertical takeoff and landing surveillance system designed for intelligence gathering. <http://www.aerospace.bombardier.com/en/corporate>
- **Bosch Aerospace:** Developer and manufacturer of several unconventional Unmanned Air Vehicles (UAV's). <http://www.boschaero.com/rpv.htm>
- **Brock Technologies Inc.:** Offers a broad range of innovations for the Unmanned Systems market, including aerial and ground systems, sensors, custom composites, field support equipment, and software. The team of engineers and technicians focus on supporting customers in the research, military, and commercial arenas by providing integrated solutions. They produce the AV8-R and EEL UAV along with a variety of support equipment for unmanned systems. <http://brocktechnologies.com/>
- **buse-zobflyer drones:** French web site for engineering drones. Conception and manufacture of remotely-piloted aircraft for photographs, video, monitoring, etc. <http://buse-zobflyer.blog4ever.com/blog/index-125779.html> (website in French)
- **Challis-Heliplane UAV:** Smooth easy transition from hover to cruise, excellent control in the hover, capable of autorotation-engine off emergency landing, capable of high rate of descent, can be scaled to meet various civilian or military needs. <http://www.challis-heliplane.com/v3/>
- **CMS Race Performance:** A manufacturing, design, and supply business which specializes in manufacturing products for many industries, including the KAHU Unmanned Aerial Vehicle. <http://www.cmsraceperformance.com.au/>
- **Draganfly Innovations Inc.:** A designer and manufacturer of small UAV's, including the Draganflyer X6, a GPS-guided, hi-definition, aerial video and digital photography platform. There is an X6 package for photographers, video production, police, military and education use. <http://www.draganfly.com/>
- **DRS Unmanned Technologies, Inc.:** Close-range, low-weight, low-noise, medium-duration UAVs supporting military special operations missions. Applications for these products include tactical short-range surveillance, radio relay, and command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR). Formerly

the U.S.-based Unmanned Aerial Vehicle (UAV) business of Meggitt Defense Systems - Texas, Inc., a unit of **Meggitt plc**. <http://www.drs.com/>

- **Falxair Ltd:** Developing advanced hybrid-electric powered UAVs and manned aircraft with benefits in cost, durability and environment areas. Based around proprietary technology, the platforms enable exploitation of air vehicles in a way that allows UAV's and manned platforms to exceed current performance. <http://www.falxair.im/>
- **FireScout VTUAV Unmanned Aerial Vehicle:** In February 2000, the US Navy chose the Model 379 FireScout as its vertical take-off and landing tactical unmanned air vehicle (VTUAV). <http://www.naval-technology.com/projects/firescout/>
- **General Atomics Aeronautical Systems, Inc.:** Dedicated to the design, development, and manufacture of unmanned aircraft surveillance systems and associated hardware. <http://www.ga-asi.com/>
- **Global Aerial Surveillance:** Providing Unmanned Aerial Vehicles (UAV's) to the civilian and military markets for a myriad of potential applications. Global intends to concentrate its development and marketing efforts in small, underserved niches where it can compete aggressively with pricing and service exceeding the competition. <http://www.globalaerialsurveillance.com/>
- **Integrated Dynamics:** Design, consultancy, and turn-key project commissioning for Unmanned Autonomous Vehicle (UAV) and Remotely Piloted Vehicle (RPV) systems. Target and decoy UAVs, surveillance UAVs, flight control and navigational systems, ground control stations, and more. <http://www.idaerospace.com/>
- **intelliDrones:** Supplies aerial photography and surveillance systems in the commercial space: from single drone aerial photography to multi-mission surveillance and monitoring services for companies, organizations, and even individuals. <http://www.intelldrones.com/>
- **Lonsan Aircraft:** Unmanned RPV RC airships with a 1000 meter control range, 30 KM range UAV airships, one-man airships, and tethered airships. <http://www.lonsan.com.cn/english/index.asp>
- **Marcus UAV Systems:** Manufacturer of the low-cost Marcus UAV systems for distribution to the private sector. These offer video and sound on demand, and are an alternative to flying traditional aircraft for surveillance, aerial photography, exploration, disaster recovery, and other uses. <http://www.marcusuav.com/>
- **Mist Mobility Integrated Systems Technology Inc.:** MMIST produces the SnowGoose UAV, an aerial cargo delivery UAV with up to 575 pounds of autonomous cargo delivery. Safe and accurate delivery of critical supplies and aerial services in support of search and rescue, humanitarian relief, and military operations in hostile environments. Also, they produce GPS-guided parachute delivery systems in use by various national military organizations. <http://www.mmist.ca/>
- **MLB Company:** A manufacturer of small, low-cost UAV's. Complete turn-key systems, UAV flight services, instruction, and custom UAV's including VTOL designs. <http://www.spyplanes.com/>

- **Proxy Aviation Systems, Inc.** Develops advanced Unmanned Aircraft Systems (UAS) for use by the United States military, the Department of Homeland Security, and in emerging civil and international applications. Proxy offers two unmanned air vehicle platforms: the SkyWatcher and the SkyRaider heavy payload UAV. The aircraft operate concurrently in flight, with as many as 12 air vehicles, to achieve Group Tactical Goals, under the SkyForce Distributed Management System (DMS). <http://www.proxyaviation.com/>
- **Rotomotion:** Designs, manufactures, and operates helicopter robots (UAV) and aerial robotic systems designed to be affordable aerial platforms for small cameras and other sensor payloads for aerial photography, surveillance, and research. <http://rotomotion.com/>
- **Silvertone UAV:** This UAV design comes from a need for a low capital cost surveillance tool for large farm and property owners. It has a mission duration of 10 hours and a quick change payload panner that can be replaced to re-configure the aircraft quickly for different missions. <http://www.silvertoneuav.com/>
- **Skycamera:** This Lithuanian company provides a very small, low cost UAV for observation, video and audio recording, measurement of air pollution, evaluation catastrophes, broadcast reports through loudspeakers, etc. <http://www.skycamera.lt/> (website in Lithuanian)
- **Soko Z.I.:** An aerospace company located in Zagreb, Croatia with a multidisciplinary team developing high-tech products such as unmanned aerial vehicles and flight simulators. <http://www.soko.hr/> (website in Croatian)
- **Tactical Aerospace Group:** High performance UAV VTOL technology for advanced applications and payloads. (Tactical unmanned helicopters.) <http://www.tacticalaerospacegroup.com/>
- **UAV Airframes Australia:** They design and build an airframe to your required specs or build from your own design. Production runs on airframes or one-offs. <http://www.uvairframesaustralia.com.au/>

UAV Components and Systems

- **A2TECH - Advanced Aviation Technology:** Their primary focus is the development of a new generation of unmanned vehicle Ground Control Cockpits and avionic solutions for civil applications. <http://www.a2tech.eu/>
- **Advanced Microwave Products:** AMP designs and manufactures rugged RF and microwave products for UAV, military, and surveillance applications, including compact UHF, L-band, S-Band, and C-band video transmitters and receivers. <http://www.advmw.com/>
- **Aegis Electronic Group, Inc.:** A distributor for cameras and peripherals for UAVs and other related applications. Experienced with imaging, technical support, and integration of imaging equipment for technical applications. <http://www.aegis-elec.com/>
- **Aerosight Innovations:** Offering video and still camera solutions for remotely piloted vehicle applications, including aerial photography, airborne media presentations, and surveillance. <http://www.aerosight.com/>

- **Airborne Innovations:** A supplier of advanced UAV systems including SatCam imaging for UAV's, and Aircraft Icing Conditions Detection systems. SatCam is a miniature satellite communications imaging solution, compatible with the Iridium satellite network, that enables remote imaging anywhere in the world, anytime, for small over the horizon capable UAVs. The system combines the best available low bandwidth optimized image compression technology with a robust image transmission protocol capable of transmitting streaming still images over ultra low bandwidth links. <http://www.airborneinnovations.com/>
- **Athena Technologies, Inc.:** A leading developer and manufacturer of control and navigation solutions for unmanned aerial vehicles (UAVs), unmanned ground vehicles (UGVs,) and military and civilian manned aircraft. <http://www.rockwellcollins.com/athena/>
- **Automation Technologies, LLC:** Orientation and inertial sensors, and embedded hardware and software for unmanned air vehicles. <http://www.iat-llc.com/>
- **Avalon RF:** State-of-the-art wireless links that include receivers, transmitters, remote display units (RDU's) and a variety of specialized antennas. Applications include unmanned vehicles, as well as security, broadcasting and cinematography, and consumer (fast H.264 over POTS Lines). <http://www.avalonrf.com/>
- **CDL Systems:** Develops Vehicle Control Station Software (VCS), an integrated command control and information system for the control and monitoring of unmanned aerial, land, and sea based vehicles. The VCS 4586 complies with NATO's 4586 UAV interoperability standards and is currently being utilized in the US Army's "One System." <http://www.cdlsystems.com/>
- **Cloud Cap Technology:** Specializes in sophisticated autopilots for small unmanned aircraft, and hardware and software development for embedded systems. <http://www.cloudcaptech.com/>
- **Controp USA:** A privately owned company specializing in the development and production of Electro-Optical and Precision Motion Control Systems, including stabilized observation payloads for surveillance and directional antenna pedestals for UAV's. <http://www.controp.com/>
- **Custom UAV:** CUAV flight control system is an open source flight controller which can use a 3-axis magnetometer and accelerometer to determine attitude. There is provision for more sensors for higher order flight control. The site has forums, an editable event calendar, live chat, links, and projects. <http://www.uavdev.com/>
- **Eagle Tree Systems:** Manufacturer of data logging and wireless telemetry for the RC model enthusiast, serious RC competitor, UAV designer, or professional platform operator. USB data recorders capture airspeed, altitude, RPM, temperature, servo channel movements, and receiver voltage. Google Earth real time and recorded GPS support. International shipping. <http://www.eagletreesystems.com/>
- **Electronic Concepts & Engineering, Inc.:** Design and manufacture of electronic and software solutions for UAVs, and other aerospace applications. <http://www.eceinc.com/>
- **Engineered Arresting Systems Corp:** ESCO is a manufacturer of aircraft arresting systems and UAV launch and recovery systems for use with aircraft weighing up to 1,225 pounds, and launch velocities to 80 knots. <http://www.esco.zodiac.com/>

- **Guided Systems Technologies:** Development and application of advanced guidance, navigation, and control system technology for a variety of fixed and rotary-wing UAV systems. Estimation, path planning, obstacle/collision avoidance products and technology, as well as R&D, engineering, integration, and flight services. <http://www.guidedsys.com/>
- **Hanley Innovations:** They develop software for the aerodynamics conceptual design and analysis of UAVs and other aircraft systems. <http://www.hanleyinnovations.com/>
- **Meggitt Defense Systems:** A designer and manufacturer of aerial towed vehicle systems and related equipment for special applications. (Threat simulation scenarios for combat readiness training, and weapon testing evaluation.) <http://www.meggitt.com/>
- **MicroPilot:** Low-cost miniature autopilots suitable for UAV and RPV use which provide airframe stabilization and autonomous GPS navigation. Many UAV experimenter's links. <http://www.micropilot.com/>
- **MosaicMill Ltd.:** Provides EnsoMOSAIC UAV software for automatic calculation of rectified image mosaics from digital camera imagery captured by UAV systems. EnsoMOSAIC processes accurate Google Earth and GIS-ready image maps. <http://www.mosaicmill.com/>
- **Northwest UAV Propulsion Systems:** NWUAV builds UAV engines and support systems to meet the high volume demands of companies that utilize Unmanned Engine Systems required in air, land and sea vehicles. <http://www.nwuav.com/>
- **Optical Alchemy Inc.:** Sensor systems that provide applications for reconnaissance, surveillance, target acquisition (RSTA), situational awareness, and force protection. Ultra-light inertial stabilized sensor systems <http://www.uavpayloads.com/>
- **R3 Scientific Corp:** A small company specializing in design, development, and manufacturing of next generation aerial robotic solutions. The Company has created a range of intelligent solutions, including unique control algorithms, data fusion methods, navigation and optical recognition systems, actuators, and complete vertical takeoff and landing vehicles. <http://www.r3si.com/>
- **RCAT Systems:** Manufacturer of wireless electronics and data acquisition/telemetry solutions for unmanned systems and experimental aircraft. <http://www.rcatsystems.com/>
- **Riverview Custom Cable:** UAV/UAS cable design and builds. <http://www.riverviewcustomcable.com/>
- **Robonic Ltd.:** Site for pneumatic UAV launchers. <http://www.robonic.fi/>
- **SpaceAge Control:** Miniature air data products that measure aircraft angle of attack (AOA, alpha), sideslip (AOS, beta), static pressure, total pressure (pitot static), outside air temperature (OAT), and total air temperature (TAT). Products include nose booms, wing booms, air data probes, pitot probes (pitot tubes), pitot-static probes (pitot-static tubes), trailing cones, and trailing bombs. These products provide pressure and airflow direction data to data acquisition and air data computers for computation of aircraft orientation, airspeed, altitude, and related information. <http://www.spaceagecontrol.com/Main/Home>
- **SRC Computers, LLC:** Reconfigurable computing systems provide high-performance on-board processing power for compute-intensive UAV visualization applications in compact

lightweight form-factors. For airborne or mobile applications, SRC Signal Data Processing solutions, Portable MAPstation systems, 2U MAPstation systems, and custom embedded solutions provide computing in small form factors for real-time, compute-intensive processing. <http://www.srccomputers.com/>

- **Teledesign Systems, Inc.:** A manufacturer of wireless modems and radio modems for commercial and industrial applications, including UAV operation. Their radio modem sends "radio data" across narrow band spectrum or narrow band licensed spectrum. <http://www.teledesignsystems.com/>
- **Teledyne Technologies:** Gas turbine engines for unmanned military aircraft, including remotely piloted vehicles, missiles and unmanned aerial vehicles (UAVs). <http://www.teledyne.com/>
- **Triad Semiconductor:** Provider of highly integrated mixed signal semiconductors that combine analog, digital, processor and memory requirements into single chip solutions to address size, weight and power requirements critical to UAV applications. Silicon proven and configurable IP means low NRE, rapid development cycles and support for low production volumes. <http://www.triadsemi.com/>
- **Trident World Systems:** This high-tech product development and engineering services company has aviation and unmanned vehicle experience. <http://www.tridentworldsystems.com/>
- **Unav, Inc.:** Low-cost INS/GPS autopilot systems for unmanned guidance and control. <http://www.u-nav.com/>
- **weControl:** Flight control systems for unmanned aerial vehicles. <http://www.wecontrol.ch/>

UAV Services

- **Composite Technology Team:** A small innovative firm with experience in design and manufacture of composite structures. The company offers full UAV service - design, prototyping, production, and testing of UAV's. Experience includes the NT150 UAV project for Swicopter and Higeeye helicopters. <http://www.compositeteam.com/>
- **Evergreen International Aviation:** Evergreen Unmanned Systems is a commercial unmanned systems operations provider supporting international deployments as well as payload testing flight operations in the US. <http://www.evergreenaviation.com/>
- **Flint Hills Solutions:** An advanced technology and services company with emphasis on the Aerospace and Unmanned Air Systems (UAS) market. They are a partner to many Original Equipment Manufacturers of Unmanned Systems as well as the Kansas National Guard. They offer a full range of UAS products and services focused on Homeland Security as well as State and Local Emergency Response. In addition, FHS specializes on integrating your payloads onto their UAV platforms to meet your unique requirements and needs. <http://fhslc.com/>

- **ISR Group, LLC:** Providing highly skilled manpower and contracted support for the development and deployment of unmanned vehicle systems in the areas of research and development, production, operations, maintenance, and training. <http://www.isrgroup.com/>
- **Navigator Development Group Inc.:** NDGI is a provider of contract support to the US Joint Forces Command's Joint UAS Center of Excellence and the US Army's UAS Center of Excellence. Navigator assists the development, evaluation, and integration of unmanned aircraft systems (UAS) operating standards, capabilities, concepts of operations, technologies, tactics, techniques, procedures, and training for the Department of Defense through coordination with the combatant commanders, service centers of excellence, and other UAS enterprise activity. <http://www.ndgi.com/>
- **Simlat Ltd.:** A provider of next generation mission-training solutions for the Unmanned Aerial Vehicle/System (UAV/UAS) and the Intelligence, Surveillance and Reconnaissance (ISR) industry. Simlat provides high-end ISR and UAV/UAS mission training systems and simulators and additional professional services and instructors. <http://www.simlat.com/>
- **UAV Technical Analysis and Applications Center:** TAAC is a business unit of the Physical Science Laboratory, New Mexico State University, and offers a wide range of services to its UAV customers, including R&D, engineering, flight and test planning and operations, analysis, and simulation. <http://www.psl.nmsu.edu/uav/>

Other UAV Sites

- **The Association for Unmanned Vehicle Systems International:** AUVSI is the world's largest non-profit organization devoted exclusively to advancing the unmanned systems community. AUVSI, with members from government organizations, industry and academia, is committed to fostering, developing, and promoting unmanned systems and related technologies. <http://www.auvsi.org/AUVSI/AUVSI/Home/>
- **FAS - Unmanned Aerial Vehicles (UAVs):** A very good source for UAV information with an overview, UAV categories, vehicle descriptions, photos, and specifications. Also links to sources and resources. From the **Federation of American Scientists** Intelligence Resource Program. <http://www.fas.org/irp/program/collect/uav.htm>
- **UAV Center:** Provides detailed information on unmanned aerial vehicles including historical perspectives, detailed technical data, and operating system overviews. <http://www.uavcenter.com/>
- **UAV Info:** The overall objective of this site is to make international UAV-related information (at system and sub-system level) available to the global UAV community, and to promote international awareness of UAV-related matters. Includes UAV Yearbook, photo library, specifications, projects, UAV terminology, datasheets, and links. <http://www.uvs-info.com/>
- **UAV Marketplace:** This web portal is focused principally on commercial (civil) UAV use and application, but it also has a significant set of military UAV airframe resources and links. You can spend a lot of time exploring this site and learning a great deal about this subject. <http://www.uavm.com/>

- **Unmanned Aerial Vehicles (UAVs):** A blog with "All things Unmanned Aerial Vehicles (UAVs), Aerial Robots and Robotics, Micro Aircraft and Helicopters" <http://www.livingroom.org.au/uavblog/>
- **Unmanned Vehicle Systems International:** This web site explains the UCARE (UAVs: Concerted Actions for required Regulations) Program. It also provides access to an online collection of international UAV-related airworthiness and air traffic management documents, a list of UAV-related terms and definitions, as well as a list of UAV-related acronyms. <http://www.uvs-international.org/>
- **Uvonline.com:** A global news and business information service for the unmanned systems community. <http://www.shephard.co.uk/news/uvonline-com/c1/>