02/11/15 Task Force Meeting: Presentations and Public Testimony

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Legislative Task Force on Unmanned Aircraft Systems
February 11, 2015 Meeting
State Capital, Juneau Alaska, Room 13

1:00 – 3:00pm

Task Force Members:

- Representative Shelley Hughes, Co-Chair
- Joe Jacobson, Commissioner Designee, Department of Commerce, Community Economic Devel.
- Mike O'Hare, Commissioner Designee, Department of Military and Veterans' Affairs
- Lieutenant Steve Adams, Commissioner Designee, Department of Public Safety
- Ro Bailey, University of Alaska Fairbanks
- Steve Colligan, Representative Member for the Academy of Model Aeronautics
- Steve Wackowski, Tulugaq II
- Bob May, Gallery Lodge, Kasilof
- Ginger Blaisdell, Staff to Rep. Hughes

Not in attendance:

- Senator Peter Micciche, Co-Chair
- John Binder, Commissioner Designee, Department of Transportation, Public Facilities
- John Parker, Integrated Robotics Imaging Systems
- Steve Strait, Aviation Advisory Board, Governor's Office and DOT/PF

MEETING SUMMARY

1:00pm Welcome and Introductions .....Representative Shelley Hughes

- Thank you all for coming to Juneau and attending the Lunch and Learn hosted by the University of Alaska Fairbanks and contributors

Items in meeting packets:

- Dec 5 meeting minutes – to be emailed
- Letters to department heads
- Letter to delegation
- Congressional bills introduced by Young and Murkowski – encourage public private partnerships to provide funding

- KBYF safety guidelines and the alaskadrones.org web site
- FAA is trying to ramp up drone education and regulation process
- You tube link to Swiss team 'cage' that won $1m from UAE
- FAA issued guidance for law enforcement
- UAS improvement act 2015 congressional legislation – procurement, homeland security, etc.
- Young and Murkowski bill
    a. Ro Bailey worked with congress on this legislation (Allison/Murkowski)
    b. Test sites are experiencing issues where the FAA is interpreting aspects of UAS research that makes the work they are doing very difficult
    c. Trying to break the FAA lose from restricting operations at the test sites
    d. Can't be paid to fly but can receive money for milestones

Joe Jacobson, Department of Commerce, Community and Economic Development

Update: final report on UAS economic advantages for Alaska is in today's packet

- Cultivating a resource, workforce, university program
- Entrepreneurial focus to attract them
- Canada forming alliances across industries (maritime and UAS)
- Recommending incentives to attract business without increasing cash outlay
- Job creation and revenue to the state

Barbara Johnson (past position with FNSB)

- Economic development work to establish military development zones
- Looked at a tech park near Salcha, now considering Hightop Park using University lands about 20 miles outside Fairbanks
- NOAA is very interested in what Alaska is doing
- Great opportunities in the Arctic

Steve Colligan, Academy of Model Aeronautics

- Hobby industry has the best you tube information on flying UAS you might want to see
- Safety is directly related to skills and knowledge
- "We" need to get information out there virally
- Know Before You Fly campaign
- Asks Task Force (alaskadrone.org) to "sign on" to national campaign Know Before You Fly – send a letter and a logo to the national campaign
- Discussion: letter to campaign, recommendation from Gov/Task Force?, what logo?, want all Alaska communities-agencies-vendors to 'sign on' to alaskadrones.org?, wants Gov to endorse, ask congressional delegation to draft letters
    - Joe and Steve Colligan will work with Gov office to request a letter
    - Knowbeforeyoufly.org

Bob May, Public member - Very interested in the privacy for Alaskans

Steve Wackowski, Fairweather Inc. – Top 40 Under 40

Mike O'Hare, Department of Military and Veterans' Affairs

- Offer to host next meeting on base
- Update on how military plans to use UAS

Ro Bailey, University of Alaska Fairbanks

- Interest Group Meeting
  - Interest group meeting begins on September 1, she would like the task force meeting to coincide with the interest group, consider meeting September 3 or 4 in Fairbanks
- Ro Bailey also noted that the Test Site now includes operations in Kansas and Tennessee for test site operating locations but not as a key partner

PRIVACY DOCUMENT _____

Privacy considerations for Alaskans

- Most privacy issues around the USA have been with regard to law enforcement privacy
- Ro Bailey: once we put the privacy document out, we should include the "who to call" info

Creating a document:

- Want the privacy document to fit on one page (similar to KBYF)
  - Who is the target audience?
  - How will this document be used?
  - Might be different audiences with different needs?
  - Hobby Use – Commercial Use – Law Enforcement
    - Semi-professional videographers occurring in Alaska already
    - Section 333 exemptions in the FAA reform act of 2012
- Guidelines vs Law?
- **FAQ version** of common questions to add to the web site – FAQ's would allow ginger to research statutes with legal services – questions provided to Ginger by Feb 15 - Generic or specific examples to use in the FAQs?
  - Who owns the airspace above your house?
  - How to apply the protections that Alaska already has in statute?
  - Reasonable expectation of privacy
  - How is data going to be used, stored and maintained?
  - Can I shoot it down if it's flying over my house? Destruction of another's property.
  - Circumstance: is it private or not?
  - What do I do if there's a drone flying over my house?
  - Can I use this for my business?
  - Noise ordinance?
  - Chasing my dog?
- "**Cartoon**" some of the scenarios to grab everyone's attention

Timing

- Get the information out to the public quickly and we can continue to refine
- Get our web site to the national level

New information to put on website

- Put the 5-page excerpt on the alaskadrones.org web site
- Why Alaska? Joe Jacobson has a great flyer developed
- Who do you contact and how do you contact re inappropriate drone flights?
    - Jay Skaggs – call me…
    - Get contact information on alaskadrones.org
    - Can individuals contact local police? – yes
    - DPS form/content to be made available on alaskadrones.org so individuals know what information to provide to local police (or forwarded on to FAA)
    - Don't dial 911

Public Testimony _____

Bill Tart, Arctic Slope Regional Corp – no testimony provided

Next meeting _____

- **June 19 in Anchorage on Base coordinated by Mike O'Hare – would like a UAS demo**
    - Would not be able to get the public on the base for a general meeting – look into the rules for this.
- FAA should kick out some rules by June
- Letter to congressional delegation regarding test site funding
- Matrix and Education plan to be worked on by Steve Strait and Ginger
    - KBYF one page document (and this privacy document) really delivers the education plan
- Military update
- Unmanned Traffic Management System – how do they fly, where do they fly, communication capabilities
    - Steve Colligan is aware of the relationship with NextGen, detect and avoid technology
    - Ro Bailey is under contract with NextGen working on airspace reservation information and ultimately integrate with manned aviation
    - Steve Wackowski is working with major entities and University, on the slope to be first to integrate the UTM in Alaska

Legislative Task Force on Unmanned Aircraft Systems
February 11, 2015 Meeting
Capitol Building Room 17

1:00pm – 3:00pm

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- Bob May, Gallery Lodge, Kasilof

Task Force Responsibilities per HCR15

The duties of the task force shall include

1. reviewing regulations and guidance from the Federal Aviation Administration regarding unmanned aircraft systems;
2. providing written recommendations, together with suggested legislation, for a comprehensive state policy for unmanned aircraft that protects privacy and allows the use of unmanned aircraft systems for public and private applications;
3. evaluating complaints and concerns expressed to the task force;
4. identifying potential privacy and public safety concerns associated with unmanned aircraft systems and determining whether legislation is necessary to address them;
5. considering recommendations for public education related to unmanned aircraft systems;
6. studying the Federal Aviation Administration's "Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System Roadmap," issued November 7, 2013 (1st ed. 2013) and its application to the development of unmanned aircraft systems in the state;
7. conducting a public hearing concerning privacy and the capture of data by unmanned aircraft systems at the University of Alaska's test site;
8. further studying the nonpublic use of unmanned aircraft systems to encourage development of the private sector unmanned aircraft system industry; and
9. further studying and making recommendations with respect to ensuring unmanned aircraft users comply with applicable laws.

AGENDA

1:00pm Welcome and Introductions .....Representative Shelley Hughes

- Review of Meeting Summary from December 5, 2014
- Introduction of Guests
- Letters sent to Department heads
- Current Events: News Articles (attached list)
  - Pages 1-40
  - Sen Murkowski drone bill
  - National Journal article

AGENDA

Five-Minute Updates:

- Joe Jacobson - Unmanned Aircraft Systems: An Economic Development Strategy for Alaska
- John Binder - Alaska Airports and Aviation 2014 Annual Report
- Steve Colligan – Know Before You Fly national campaign
- Shelley Hughes – HJR 5 hearing update and who will testify

Personal Privacy in Alaska

- One page document review on Drone Privacy

Future Meeting Agenda:

- Next meeting:
  1. Letter to Alaska Congressional delegation for test site funding and issues of underfunding
  2. Matrix
  3. Education Plan

Follow Up – To Do

Mike OHara

1. Military mission in Alaska – process and plans — next meeting DoD and Natl Guard
2. ~~Italy data protection laws~~
3. Who to contact? Complaint / enforcement system / responses — call local police
4. ~~UTMS – unmanned traffic management system~~ updates

June 19 UAS TF on base military

Sept 1-2 Interest Group - PDX
Tu We.
UAS TF Sep 3-4

Scenario 1

If data is gathered by a government agency, it is a public record. However, AS 40.20.120 provides certain protections for private information. Use of inadvertently captured information in a criminal prosecution may depend on who captures the information and whether the person whose actions have been captured has a reasonable expectation of privacy.

Government data capture is more clearly defined in statute and its intended use for public purpose. Data captured by a government-operated UAS would be treated similarly to data captured by other technology such as cell phones, manned aircraft, satellite images, voice recorders, etc. Case law is substantial in determining if the person would be considered to have a reasonable expectation of privacy and when a warrant would be required to obtain and use any data collected.

CH 48 (HB65) SLA08 Personal Information Protection Act also addresses the collection, storage, and breach of privacy. This act would include any data captured by a UAS.

Scenario 2

Can my neighbor fly his model aircraft over my fence and photograph my family?

The fear of being unknowingly watched and/or photographed is a legitimate public concern. "Reasonable expectation of privacy" is the term where you can self-analyze the public perception of your actions.

You would certainly have a reasonable expectation of privacy if you were inside your home with curtains drawn. If someone climbed the fence surrounding your home, stood outside the window and recorded your image or voice while you were inside, it is likely that person would be considered to have breached your "reasonable expectation of privacy".

What if the neighbor flies his model aircraft over my backyard during my child's birthday party? You might be able to argue that your fence creates a boundary identifying your personal space but it does not govern the air above your property. We could expect that aircraft hovering 10 feet above your head is more invasive than a manned airplane passing overhead but in reality, it's the level of technology that is in use that should be considered. We tend to accept satellite imagery as "part of life" even though it produces technologically advanced detailed imagery. The neighbor's quadcopter might just be an irritant (like a barking dog) or it could be recording your every move with high definition video and sound ~ this is a decision to be made by the courts if it comes to that.

A significant piece to this equation is "what is that person doing with the data captured"? Remember that it's not the aircraft at fault, but the operator who may be flying with suspicious intentions.

The tie between safety and privacy is tightest with respect to rules requiring the operator of a UAS to be able to see the aircraft at all times. Public UAS operated in association with the expedited authorizations in Section 334(c)(2)(C) of the FAA Modernization and Reform Act of 2012 (FMRA) have a "line of sight" requirement.

- **Public Navigable Airspace:** The question of what constitutes "public navigable airspace" for UAS operated by the government is central to privacy policy. The Task Force found that almost every law enforcement scenario discussed was already protected by existing law.
- **Role of Imaging Technology:** Rules and case law exist that protect citizens from inappropriate use of capturing data that is "more than the human eye could ever see."
- **Extended Surveillance:** Law enforcement does not intend to use UAS for standard patrol activities at this time. Limiting flight hours was not seen as an acceptable control because long flights may be necessary in the event of search and rescue or natural disaster remediation operations.
- **Obtaining a Warrant:** After much discussion, it was decided that using UAS to gather data would require a warrant in similar situations as using any other data gathering device (such as voice recording, photography, and thermal imaging with manual technology). No additional laws are required to obtain a warrant for UAS data gathering.

Legal Services

Constitutional Protection of Privacy: *The Constitution of the State of Alaska explicitly protects the right of privacy against government intrusion. Art. I, sec. 22 provides: "The right of the people to privacy is recognized and shall not be infringed. The Legislature shall implement this section."*

Alaska Statutory Protections:

AS 11.41.270 Stalking, nonconsensual conduct prohibits monitoring by technical means

AS 11.61.116 Sending an explicit image of a minor

AS 11.61.120(a)(6) Harassment: publishing or distributing certain images

AS 11.61.123 Indecent viewing or photography

AS 11.76.113 Misconduct involving confidential information in the first degree

AS 11.76.115 Misconduct involving confidential information in the second degree

The State of Alaska and its local governments cannot dictate the use of the NAS but can consider rules that better define the FAA guidelines, can consider legal repercussion for entities found in violation of adopted laws, and can provide for specific privacy laws regarding the use of UAS in Alaska.

The State of Alaska Constitution provides privacy protection, "although not unlimited, has been held to be broader than the protection afforded by the United States Constitution. Both the Alaska Constitution and the Fourth Amendment to the United States Constitution require a warrant by a governmental agency for the search of a place where a person has a reasonable expectation of privacy."

1. ALASKA STATE LAW—SAFETY AND PRIVACY

The LTFUAS is confident that the FAA will regulate safety of UAS flights in Alaska. While safety is critically important, the LTFUAS also recognizes that certain codes of conduct must be followed to ensure harmonious UAS operations in Alaska.

1.1.1 Self-Regulation by Three National Organizations

The LTFUAS considered the recommendations of the following three national organizations that have adopted rules and codes of conduct regarding UAS operations. The LTFUAS adopted the IACP rules in the legislation introduced during the legislative session. During the committee process, the decision was made that it would be ill advised to adopt a dated publication. Instead the bill incorporated applicable guidelines from the publication.

- **IACP:** International Association of Chiefs of Police Recommended Guidelines (Appendix B) for the use of Unmanned Aircraft was adopted in August 2012. The Alaska Department of Public Safety has also adopted these guidelines as their doctrine with the exception of increasing the flight approval responsibility from a "supervisor" to the director's office.

- **AUVSI:** Association for Unmanned Vehicle Systems International states: "As an industry, it is incumbent upon us to hold ourselves and each other to a high professional and ethical standard. As with any revolutionary technology, there will be mishaps and abuses; however, in order to operate safely and gain public acceptance and trust, we should all act in accordance with these guiding themes and do so in an open and transparent manner. We hope the entire UAS industry will join AUVSI in adopting this industry Code of Conduct."[1]

- **AMA**: Academy of Model Aeronautics' *AMA Policies for Radio Controlled Model Aircraft Operations Utilizing First Person View, Failsafe, Stabilization and Autopilot Systems* guides model aircraft operators.[2]

In the same manner that the FAA does not regulate model aeronautics, the LTFUAS does not intend to adopt requirements of hobbyist activities using UAS.

1.1.2 Model Aircraft Rules and Definitions

The technology differences between UAS and model aircraft used for sport or recreation use is narrowing each day. Technology is advancing by leaps and bounds, while at the same time becoming more affordable and integrated into off-the-shelf-systems for consumers and hobbyists. While there are many technical documents and references through the FAA Modernization and

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[1] Unmanned Aircraft System Operations Industry "Code of Conduct." Accessed January 13, 2014. Available at http://www.auvsi.org/conduct

[2] AMA Policies for Radio Controlled Model Aircraft Operations Utilizing First Person View, Failsafe, Stabilization and Autopilot Systems. Revision 07/20/2013. AMA Advanced Flight Systems Committee Report 101. Available at http://www.modelaircraft.org/files/AFSCREPORT101.pdf

Reform Act, the general difference between UAS and model aeronautics is the operation and intent of the operator not the aircraft.

If the activity or intent of the activity is used for commercial operations or contributing to the creation of a product or service, it is considered commercial activity, and it is subject to the FAA regulations and rule as stated in the FAA Modernization and Reform Act of 2012 and FAA UAS Road Map 2013.

If the activity is for sport and recreation use as defined by FAA SEC 336 SPECIAL RULE FOR MODEL AIRCRAFT of the Modernization Act, it is controlled by a cooperative agreement between the FAA and a Community Based Organization (CBO), such as the Academy of Model Aeronautics (AMA).

The AMA has been successful in self-regulating operations for hobbyists and aviation safety for over 77 years. During those 77 years, the AMA faced many challenges of new technologies such as analog to digital radio, coordinating operations within the airspace and the ever changing aircraft designs and capabilities not unlike the latest multi-rotor and First Person View (FPV) capabilities. To address the current safety requirements and interest of model aircraft operators, the AMA has developed and updated its general safety code AMA Publication 105-Safety Code and advanced aircraft rules publication 550-First Person View and 560-Autopilot effective January 1, 2014, to keep up with the FAA rule making and technology advances. Refer to Appendix C.

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It was discussed that a notice should be provided at the time of purchase of each model aircraft to review the AMA flight operation guidelines for appropriate use of model aeronautics. The LTFUAS did not adopt a requirement for notice regarding hobbyists since so many aircraft are purchased outside of Alaska and would not be required to provide the notice.

1.1.3 Alaska State Law and Personal Privacy

The State of Alaska and its local governments cannot dictate the use of the NAS but can consider rules that better define the FAA guidelines, can consider legal repercussion for entities found in violation of adopted laws, and can provide for specific privacy laws regarding the use of UAS in Alaska.

The State of Alaska Constitution provides privacy protection, "although not unlimited, has been held to be broader than the protection afforded by the United States Constitution. Both the Alaska

Constitution and the Fourth Amendment to the United States Constitution require a warrant by a governmental agency for the search of a place where a person has a reasonable expectation of privacy."[3]

Although much attention regarding UAS privacy focuses on government use and the Fourth Amendment, it is non-governmental use that is likely to raise some of the most significant privacy challenges in coming years. For private entities, the key constitutional question is the extent of their First Amendment privilege to gather information.

Civil use of unmanned aircraft will fall under the federal and state laws including such provisions as trespassing, invasion of privacy, intrusion upon seclusion, publication of private facts, stalking and harassment, and business privacy.

The LTFUAS, with guidance from Legislative Legal Services, considered many scenarios of possible violations of state and federal law that might occur with the use of unmanned aircraft. Legislative Legal Services provided the document, *Observations from Above: Unmanned Aircraft Systems and Privacy*.[4] that presented a variety of scenarios that have been tried in court and some that should be discussed as they pertain to UAS and personal privacy. The Legal Services memo outlining the areas of statute that protect personal privacy can be found in Appendix D.

Privacy protection considerations reviewed by the LTFUAS include but are not limited to the following.

1. **If data is gathered by a government agency, it is a public record. However, AS 40.20.120 provides certain protections for private information. Use of inadvertently captured information in a criminal prosecution may depend on who captures the information and whether the person whose actions have been captured has a reasonable expectation of privacy.**

It was discussed that data captured by a government-operated UAS would be treated similarly to data captured by other technology such as cell phones, manned aircraft, satellite images, voice recorders, etc. Case law is substantial in determining if the person would be considered to have a reasonable expectation of privacy and when a warrant would be required to obtain and use any data collected.

CH 48 (HB65) SLA08 Personal Information Protection Act also addresses the collection, storage, and breach of privacy. This act would include any data captured by a UAS.

2. **As technology continues to advance beyond "normal" application of current laws, a balanced approach that recognizes the inherent difficulty in predicting the future must be adopted when drafting new laws.**

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[3] Memorandum: Alaska Laws Protecting Privacy (Work Order No. 28-LS0990). September 30, 2013. Division of Legal and Research Services, Legislative Affairs Agency, State of Alaska, Juneau.

[4] John Villasenor. 2013. Observations from Above: Unmanned Aircraft Systems and Privacy. Harvard Journal of Law & Public Policy. Available at http://www.harvard-jlpp.com/wp-content/uploads/2013/04/36_2_457_Villasenor.pdf

The LTFUAS determined that we cannot foresee the future applications of technology (of UAS or other technologies); therefore, creating restrictions in law based on assumptions is not recommended.

Observations From Above: UAS and Privacy

This document was published in the Harvard Journal of Law and Public Privacy by John Villasenor, a senior fellow in Governance Studies and the Center for Technology Innovation, the Brookings Institution.

The Task Force discussed many of the scenarios posed by the author when considering the need for Alaska law.

3. **How should Alaska manage unintentionally captured images or data?**

Discussion as of December 2013 concluded that there are adequate statutes, case law, and data retention guidelines that resolved the concerns of the LTFUAS in the area of unintentionally captured images or data. Discussion during the legislative session of 2014 indicated that data collection will be an area the LTFUAS will need to continue to monitor.

Recommendation: The LTFUAS also requests that the Department of Administration review its data retention schedules with particular emphasis on law enforcement data captured inadvertently and allowing that data to be destroyed.

4. **The tie between safety and privacy is tightest with respect to rules requiring the operator of a UAS to be able to see the aircraft at all times. Public UAS operated in association with the expedited authorizations in Section 334(c)(2)(C) of the FAA Modernization and Reform Act of 2012 (FMRA) have a "line of sight" requirement.**

The LTFUAS assumes that FAA regulations adopted in the next several years will continue to require visual line-of-sight operation. "Sense and avoid" technology will become more mature and some non-line-of-sight missions may be permitted by the FAA. Non-line-of-sight operations and other unknown technological advances may bring new challenges that will require the Legislature to review industry guidelines and state laws in the future.

5. **Unmanned aircraft may bring efficient advances to law enforcement; however, the public seems to be highly sensitive to law enforcement using unmanned aircraft.**

After reviewing many possible uses of UAS, the LTFUAS determined that existing law already affords the public with adequate protections.

- **Routine Technology**: The use of UAS is treated much the same as any other technological tool used to protect the public. The Department of Public Safety has adopted the IACP Guidelines for UAS, and the LTFUAS found those guidelines to be superior for rules of law enforcement use.

Specific guidelines from the IACP were offered as a provision of the legislation.

- **Public Navigable Airspace:** The question of what constitutes "public navigable airspace" for UAS operated by the government is central to privacy policy. The LTFUAS found that almost every law enforcement scenario discussed was already protected by existing law.
- **Role of Imaging Technology:** Rules and case law exist that protect citizens from inappropriate use of capturing data that is "more than the human eye could ever see."
- **Extended Surveillance:** Law enforcement does not intend to use UAS for standard patrol activities at this time. Limiting flight hours was not seen as an acceptable control because long flights may be necessary in the event of search and rescue or natural disaster remediation operations.
- **Obtaining a Warrant:** After much discussion, it was decided that using UAS to gather data would require a warrant in similar situations as using any other data gathering device (such as voice recording, photography, and thermal imaging with manual technology). No additional laws are required to obtain a warrant for UAS data gathering.

Voluntary Approaches

The International Association of Chiefs of Police (IACP) adopted model guidelines for the use of UAS for law enforcement purposes.

The Association for Unmanned Vehicle Systems International (AUVSI) Code of Conduct calls for a commitment to "respect the privacy of individuals."

Academy of Model Aeronautics (AMA) has also adopted operational policies and guidelines for advanced flight systems used in radio-controlled model aircraft.

It is the understanding of the LTFUAS that all law enforcement entities must first obtain a court order to use UAS over private property for criminal investigation against any person. This will be offered as a provision of the recommended legislation.

- **Weaponized Aircraft:** FAA guidelines do not allow anything to be dropped from an unmanned aircraft.
- **Visibility**: Law enforcement is planning to use high-visibility marking on any UAS they will use. Application of navigational lighting and/or high-visibility paint is being considered.
- **Public Education**: It is apparent that public education is necessary for all agencies using UAS but sensitivity is heightened for law enforcement uses.

Law Enforcement

Public protection will benefit greatly from unmanned aircraft for the purposes of search and rescue, crash scene documentation time, natural disaster monitoring, wildfire management, amber and silver alerts, hostage situations, and other life safety extremes. Some efforts will require warrants to proceed and some will be allowed under a Certificate of Authorization (COA).

It is the opinion of the LTFUAS that existing privacy laws are adequate to govern the use of unmanned aircraft.

It is the opinion of the LTFUAS that since Alaska has been chosen as one of the FAA UAS Test Sites, we have the opportunity to participate in the use of UAS in a variety of ways that would put Alaska in the position to establish policy guiding the use of UAS for the rest of the United States to consider.

Hey Amateur Pilot, It's Time To Talk About Your Droning Problem

NEWS VIDEO *February 3, 2015 by DRONELIFE News - No comments*

We made it through the Super Bowl without a drone incident! I'll be honest, I was a little surprised.

But the threat of drone technology being grounded by poorly educated amateur pilots still looms large.

In response, The Globe and Mail has taken it upon themselves to provide new and future drone pilots with this preemptive intervention… and it's fantastic.

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How to Fly a Drone the Dronelife Way

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SHELLEY HUGHES

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ALASKA STATE LEGISLATURE

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State Capitol, Room 13
Juneau, Alaska 99801-1182

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housemajority.org

HOUSE OF REPRESENTATIVES

District 11 – Greater Palmer

February 11, 2015

Dear Commissioner,

The Unmanned Aircraft Systems Legislative Task Force has identified the need for public awareness in the use of small unmanned aircraft systems (UAS) by government agencies. The Task Force respectfully requests that each State agency that intends to use UAS in its work, to provide the task force with a point of contact for your agency. We ask for this point of contact to be provided by March 15, 2015 or prior to a scheduled UAS mission if it will occur prior to March 15, 2015.

The Task Force is currently developing a public education strategy so that all users and observers of UAS understand the rules and expectations thereby, eliminating fear and reducing opportunity for inappropriate use of these aircraft. State agency participation is vital to the education campaign and will provide the Task Force with a better understanding of how our government agencies are planning to use UAS.

Thank you for time.

Sincerely,

Shelley Hughes

Representative Shelley Hughes

Senator Peter Micciche

LUNCH AND LEARN

UAS Industry in Alaska and Alaska Center for Unmanned Aircraft Systems Integration

Unmanned aircraft can save money, time and lives across Alaska, while diversifying the state's economy. Prior years' state investment in this important initiative has launched Arctic scientific research and the use of unmanned systems to support community and industry needs. Alaska now holds the distinction of being one of six centers in the U.S. selected by the Federal Aviation Administration to integrate unmanned aircraft into the national airspace system.

Come learn about the potential for aerospace industry expansion right here in Alaska and the new applications in this technology cluster.

Wednesday
Feb. 11, 2015
Noon-1 p.m.

Room 106,
Alaska State Capitol

Sponsored by Rep. Shelley Hughes and Sen. Peter Micciche

Presenters:

Ro Bailey
Director, Pan-Pacific UAS Test Range Complex; Deputy director, ACUASI, UAF Geophysical Institute

and invited guests

Lunch will be served using private funds.

UNIVERSITY OF ALASKA FAIRBANKS

ALASKA STATE LEGISLATURE

REPRESENTATIVE
SHELLEY HUGHES

Transportation Committee
Co-Chair
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Transportation Finance Subcommittee
Corrections Finance Subcommittee
Fish & Game Finance Subcommittee
Unmanned Aircraft Systems Leg. Task Force
Co-Chair

Session:
State Capitol, Room 13
Juneau, Alaska 99801-1182

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HOUSE OF REPRESENTATIVES

District 11 – Greater Palmer

To: Legislative Task Force on Unmanned Aircraft Systems

From: Representative Shelley Hughes, Co-Chair

Shelley Hughes

Date: February 3, 2015

Re: Committee Schedule for week of February 9, 2015

Wednesday, February 11, 2015

\+ 12pm – 1pm, Room 106
Lunch and Learn session sponsored by University of Alaska Fairbanks ACUASI and the Unmanned Aircraft Systems Legislative Task Force

Wednesday, February 11, 2015

\+ 1:00pm – 3:00pm, Room 17
Update on current events
Review Alaska privacy laws as they may pertain to the use of unmanned aircraft systems

\+ teleconferenced

Ginger Blaisdell

From: Rep. Shelley Hughes <Rep.Shelley.Hughes@akleg.gov>
Sent: Friday, December 19, 2014 4:32 PM
To: lhschus+newsletter@akleg.gov
Subject: Before you finish wrapping your gifts...
Attachments: AK_KBYF_Drone_Safety_Guidelines.pdf

If unable to view the image below and/or for live hyperlinks, please see the attached PDF.

Greetings,

As some of you may have noticed, drones or small Unmanned Aircraft Systems (UAS) have been "flying" off the shelves as one of the most popular gifts this Christmas and holiday season. If you happen to be one of the many who purchased a UAS as a gift, please stick a copy of the safety guidelines 1-pager below (and attached) in with the package before you wrap it. If you're the gift recipient (or the parent of a gift recipient!), please review it. The Unmanned Aircraft Systems Legislative Task Force created this sheet to help ensure that UAS operate safely in our skies in Alaska, and do not interfere with manned aircraft with pilots and passengers on board. We want Alaskans, whether on the ground or in our skies, to be safe. This is an amazing technology; responsible operation of UAS is a priority. One in four homes in America own a small drone. After this Christmas season, I wouldn't be surprised if it will be one in three – so please feel free to share this info with others! Thank you.

December 5, 2014

Alaska's Know-Before-You-Fly Drone Safety Guidelines

FAA allows the operation of model aircraft, also known as small Unmanned Aircraft Systems (sUAS) or drone recreational purposes under the Special Rule for Model Aircraft. Recreational UAS must be operated in accordance community-based safety program and the FAA's guidance in Advisory Circular 91-57.

What is recreational use of a sUAS (Drones)?

Recreational use is the operation of a sUAS for personal interests and enjoyment, and not for compensation or hir example, using a sUAS to take photographs for your own personal use would be considered recreational; using the device to take photographs or videos for compensation or sale to another individual would be considered comm You should check with the FAA for further determination as to what constitutes commercial sUAS operation.

SAFETY GUIDELINES FOR RECREATIONAL USERS OF sUAS (DRONES)

- Users should follow community-based safety guidelines, as developed by organizations such as the Academy Model Aeronautics (AMA)
- Users should fly no higher than 400 feet and remain below surrounding obstacles when possible
- Users must be able to see their sUAS at all times, and use an observer to assist them if needed
- Users should remain well clear and must not interfere with manned aircraft operations, must see and avoic other aircraft and obstacles at all times, must avoid any activity that would cause a manned aircraft pilot tc divert from planned operations, and must give way to all other aircraft at all times.
- Users must not intentionally fly over unprotected persons or moving vehicles, and should remain at least 25 away from individuals and vulnerable property
- Users must contact the airport or control tower before flying within five miles of an airport
- Users should be aware that in addition to public airports, Alaska has many private airstrips as well as bodies waters used for take-off and landing by float planes and should not fly a UAS in the vicinity of these location
- Users should not fly a UAS weighing more than 55 lbs unless it's certified by an aeromodelling community-b organization.
- Users should not fly in adverse weather conditions such as in high winds or reduced visibility
- Users must not fly under the influence of alcohol or drugs
- Users should ensure the operating environment is safe and that the operator is competent and proficient in operation of the sUAS
- Users should not operate on or fly over private property without first obtaining permission from the propert owner and/or tenant
- Users should not fly near or over sensitive infrastructure or property such as power stations, water treatmer facilities, correctional facilities, heavily traveled roadways, government facilities, etc.
- Users should not conduct surveillance or photograph persons in areas where there is an expectation of priva without the individual's permission (See AMA's privacy policy)

Additional safety resources:
AMA National Model Aircraft Safety Code
FAA What Can I Do With My Model Aircraft?

This hand-out is a public education resource provided by Alaska's Unmanned Aircraft Systems Legislative Task Force (UASLTF) to raise awareness by providing a brief summary of the laws applicable to sUAS. For more information, contact 907-376-3725 or Rep.Shelley.Hughes@akleg.gov . The UASLTF would like to thank Academy of Model Aeronautics and the Association of Unmann Vehicle Systems for their joint campaign to promote safe operations of UAS and for providing the safety guidelines listed above. sUAS operators are responsible for reviewing and complying with applicable state and federal laws that may apply to flying sUAS

For the most up-to-date information on the work being done by the UAS Legislative Task Force, please visit http://alaskadrones.org/

Warm Christmas and holiday wishes,

Shelley

Shelley Hughes
Representative
Alaska State Legislature
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FAA to ramp up drone education, regulation

By Sara Fischer, CNN

Updated 10:07 AM ET, Mon December 1, 2014

FAA on drones: Security always a concern 02:29

It's a bird, it's a plane, it's a ... drone?

Story highlights

4

More and more often, large commercial airliners are encountering small, unmanned aircraft flying through the sky, sometimes undetected by the human eye, and often invisible from the cockpit of a large airplane.

FAA Administrator Michael Huerta says increased drone regulations are needed to increase safety

Pilots have increasingly seen drones flying higher than the current limit of 400 feet

Drone education and regulation will help prevent accidents with aircrafts, Huerta says

According to Michael Huerta, head of the Federal Aviation Administration, regulations are in place to prevent drones from interfering with large aircraft -- but education about drone safety and regulation enforcement needs to be improved in order to actually keep airways safe.

"That is certainly a serious concern and it is something that I am concerned about," Huerta told Candy Crowley on CNN's "State of the Union" Sunday. "That's why we are very focused on education. That's why we're also focused on enforcement. We've enforced hundreds of these cases where we have seen someone operating one of these things carelessly and recklessly and posing the danger to aircraft, and that can't happen."

READ: Graham search highlights Virginia drone battle

Since drones have entered the commercial market, the FAA reports pilots have seen up to 25 cases per month of drones flying above the regulated limit of 400 feet, with some flying as high as 2,000 feet in the air. Huerta says the FAA is working to educate people about the dangers of flying drones that high, since enforcement of the small, unmanned aerial vehicles can be difficult.

"(A) big part of what we're doing is educating people," Huerta said. "These are very high performance aircraft, and they are difficult to see and this is one of the big challenges, and so that's why the rules require that people stay away from airports."

"We have been working with the Model Aeronautics Association, with the model community and clubs so we can educate people because these are not your typical pilots that may be flying one of these for the first time and they may be unfamiliar with the rules," he added.

In 2012, the FAA set a September 2015 deadline to lay out a concrete list of rules and regulations for flying commercial drones, many of which are operated from the ground by untrained civilians. The current rules prohibit owners from flying drones higher than 400

feet, near an airport, or out of eyesight. But enforcing those regulations can be difficult, especially in light of the increasing rate of commercial use.

Still, proponents of drone use argue the unmanned aerial vehicles have great potential for both surveillance and commercialism, a balance which Huerta says the FAA is working to achieve.

"Yes, there are proponents of unmanned aircraft and they really see huge potential with this technology and for them, we can't move fast enough," Huerta said. "What they would like to see is free and open use of unmanned aircraft as soon as we can get there."

"On the other side, you have pilots, commercial pilots, general aviation pilots, who are very concerned that these are difficult to see, they don't really have a good understanding of how they interact with other aircraft, and bedrock principle of aviation is a principle called see and avoid. The pilots take action to avoid one another. So it's for that reason that we have a plan for a staged and thoughtful integration of unmanned aircraft where we look at lower risk uses first, and then gradually work to others. "

Of course, the added technology also creates a new avenue for national security concerns, mainly terrorism. In response to that potential threat, Huerta says the FAA will be publishing a "rule-making" that takes into consideration the qualifications of the drone operator, and the certification of the aircraft.

"I can't say what is going to be in it but broadly speaking, what we are looking at are all the questions relating to how we certify the aircraft and what are the qualifications of the operator as well as what uses they can be put to," Huerta said.

Swiss Team Wins 'UAE Drones for Good' $1M Prize

The winners of the first 'UAE Drones for Good Award', the largest award of its kind in the world, were announced on Sunday in the presence of His Highness Mohammed bin Rashid Al Maktoum, UAE ministers and international dignitaries. The competition, launched at the 2014 Government Summit, took place in Dubai Internet City in front of a large crowd of visitors. The Government Summit focuses on how technology will radically reshape government and public services through the introduction of drones, robotics and other innovations; the 2015 Summit, occurring 9-11 February, will feature exciting new initiatives.

Flyability from Switzerland won the US$1 million grant in the International Competition. The Flyability team has developed Gimball, a drone that can enter confined spaces and safely fly close to humans, proving to be highly effective in rescue missions. It is protected by a rotating cage which makes it capable of colliding with obstacles in challenging environments without losing its stability.

Flyability team lead Patrick Thevoz said, "We struggled to find funding to develop our search and rescue drone but this UAE Government Summit initiative, Drones for Good, means we can commercially develop our project within a year, and with Flyability able to go where it is dangerous for rescuers, help save lives.

"The Drones for Good Award is the first of its kind. It is inspirational, because while there are many awards for academic research there aren't many for the social application of new technology. It allows passionate teams like us to move forward and make this a reality. The Drones for Good Award is a unique opportunity to help people realize that these flying machines are capable of positively impacting society," he added.

Over the course of the two-day event, 39 semi-finalists in three categories presented live demonstrations of their projects to a panel of international judges. There was also a division for national competitors who won AED 1 million.

"The UAE Drones for Good Award is a tangible outcome of the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum to make optimal use of innovation and technology for the service of humanity. The UAE Drones for Good award exemplifies our commitment to setting global benchmarks in this endeavor," said His Excellency Mohammed Abdullah Al Gergawi, UAE Minister of Cabinet Affairs.

"I congratulate the winners of this great competition, which showed the amazing ways we can use drones for good. All the entries have the capability to transform the world to make it a better place to live in and we are optimistic that they will continue to inspire new breakthroughs," H.E. Al Gergawi added.

The winners of the UAE Government Entities Award and the National Competition were Etisalat and Wadi Drones respectively.

Photo: The Drones for Good Award is presented by His Highness Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the United Arab Emirates, to the winning team Flyability.

Source: Press Release

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Posted in News on February 9, 2015 by The Editor. Leave a comment

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800 Entries for UAE Drones for Good Award

The UAE Drones for Good Award, launched by His Highness Shaikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, during the second Government Summit last February, has received more than 800 local, Arab and international entries.

The award, which aims to make optimal use of technology to serve humanity and create happiness in the community, received submissions from 57 countries.

Spain topped the list with 62 entries, followed by the United States with 47 and India with 34 entries.

Saudi Arabia topped the list of Arab countries with 18 entries, followed by Egypt with eight entries.
The winners of the award will be announced in February based on the results of live demonstrations by qualifiers of the semi-final stage in front of the panel of judges.

Mohammad Abdullah Al Gergawi, Minister of Cabinet Affairs, praised the global response to the UAE Drones for Good Award and commended the creative level of the projects received, and the volume of entries from global educational institutions.

There were 154 entries from educational institutions with a strong presence from UAE universities, as well as international universities such as MIT, Stanford, and the University of Sanjulata.

Al Gergawi added that the ideas have the potential to improve services in areas such as health, education, civil defence, transport and communications, as well as government services, natural disaster relief, and humanitarian assistance.

The award is also expected to significantly contribute to reduced costs of many services as well as their increased efficiency.

"The UAE government has always been the first to launch initiatives that keep pace with global changes and has harnessed creativity and innovation to serve humanity, identifying them as the real wealth of developed societies," he said.

Relief services topped the list of the entries, accounting for 20 per cent of the entries. Civil defence services came in second with 15 per cent, followed by economic development and the environment at 14 per cent, respectively, and logistics accounting for 13 per cent.

Source: Gulf News

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Posted in Launchers & Recovery Systems on January 22, 2015 by The Editor. Leave a comment

← MEXICO DEPLOYS UAS TO PROTECT ENDANGERED PORPOISE NORWAY WANTS UAS TO AID SEARCH AND RESCUE →

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The Next Steps to Implementation of Unmanned Aircraft Systems into the National Airspace

Contributors:

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http://www.avinc.com/img/media_gallery/PumaAE_BP_Alaska_lg.png

December 2014

Disclaimer

The following is an accumulation of a student lead research project. The conclusions and recommendations are that of our student team and do not represent the views or opinions of any university, government agency, political office, or commercial entity.

December 2014

Executive Summary

The United States is a leader in the unmanned aircraft industry through our military, but we wait in anticipation for the commercial implementation of unmanned aircraft into our national airspace system (NAS). Through this intensive analysis of the industry, regulation, and policy, our group was tasked with finding the most relevant issues within the unmanned aircraft industry and develop our own recommendations for the upcoming Federal Aviation Administration (FAA) proposed rulemaking standards for small unmanned aircraft systems (sUAS).

Through our research we have found that the integration of sUAS into the NAS is expected to represent an $89 billion industry by 2025 (Table 1 – Market Analysis). While the capability of this industry is virtually limitless; our research focused on the benefits sUAS would bring to private business and commercial operations. As a group we also analyzed the FAA mandated test sites in Alaska, New York, Texas, Virginia, and Nevada. These sites are each responsible for testing specific applications for UAS and through our analysis and interviews with test site directors we created several well rounded recommendations for sUAS implementation. Through our analysis of these policy changes our group developed training, certification, and licensing recommendations for sUAS implementation, piloting, operating, and maintenance. We researched the sUAS operations and regulations in other countries and evaluated the International Civil Aviation Organization (ICAO) policies to determine what did work and aligned with our goals in the United States.

Finally we turned our attention to the air traffic control procedures and sense and avoid tactics for sUAS to operate seamlessly with our manned aircraft in the NAS. We broke down the different technologies sUAS manufacturers are using for commercial applications and developed recommendations for requirements and procedures.

Through this presentation we will share our research and recommendations for the upcoming proposed rulemaking standards regarding sUAS implementation.

FAA Issues UAS Guidance for Law Enforcement

The proliferation of small, relatively inexpensive unmanned aircraft (UAS) presents the Federal Aviation Administration with a challenge in identifying people who don't follow the rules of the air or who endanger the nation's airspace. So, the agency is asking the law enforcement community for help.

The FAA released guidance to the law enforcement community explaining the legal framework for the agency's oversight of aviation safety in the U.S., including UAS operations. The guidance describes how UAS and model aircraft can be operated legally, and the options for legal enforcement actions against unauthorized or unsafe UAS operators. The document also discusses the law enforcement community's vital role in deterring, detecting and investigating unsafe operations.

State and local police are often in the best position to immediately investigate unauthorized UAS operations, and as appropriate, to stop them. The document explains how first responders and others can provide invaluable assistance to the FAA by:

- Identifying potential witnesses and conducting initial interviews
- Contacting the suspected operators of the UAS or model aircraft
- Viewing and recording the location of the event
- Collecting evidence
- Identifying if the UAS operation was in a sensitive location, event or activity
- Notifying one of the FAA's Regional Operation Centers about the operation as soon as possible

The FAA's goal is to promote voluntary compliance by educating individual UAS operators about how they can operate safely under current regulations and laws, but the guidance makes clear the agency's authority to pursue legal enforcement action against persons who endanger the safety of the National Airspace System.

The guidance stresses that while the FAA exercises caution not to mix criminal law enforcement with agency administrative safety enforcements, the public is best served by coordinating and fostering mutual understanding and cooperation between governmental entities with law enforcement responsibilities.

The complete guidance document can be seen here.

U.S. Department
of Transportation
Federal Aviation Administration

LAW ENFORCEMENT GUIDANCE FOR SUSPECTED UNAUTHORIZED UAS OPERATIONS

Issue

There is evidence of a considerable increase in the unauthorized use of small, inexpensive Unmanned Aircraft Systems (UAS) by individuals and organizations, including companies. The FAA retains the responsibility for enforcing Federal Aviation Regulations, including those applicable to the use of UAS. The agency recognizes though that State and local Law Enforcement Agencies (LEA) are often in the best position to deter, detect, immediately investigate,[1] and, as appropriate,[2] pursue enforcement actions to stop unauthorized or unsafe UAS operations. The information provided below is intended to support the partnership between the FAA and LEAs in addressing these activities.

Discussion

The general public, a wide variety of organizations, including private sector (e.g., commercial companies), non-governmental (e.g., volunteer organizations), and governmental entities (e.g., local agencies) continue to demonstrate significant interest in UAS. The benefits offered by this type of aircraft are substantial and the FAA is committed to integrating UAS into the National Airspace System (NAS). This introduction, however, must address important safety and security considerations. The increasing number of cases of unauthorized use of UAS is a serious concern for the FAA and, in terms of safety and security challenges, many of its interagency partners.

This document is intended to assist LEAs in understanding the legal framework that serves as the basis for FAA legal enforcement action against UAS operators for unauthorized and/or unsafe UAS operations (Section 1) and to provide guidance regarding the role of LEAs in deterring, detecting, and investigating unauthorized and/or unsafe UAS operations (Section 2).

SECTION 1.

Basic Legal Mandates

The FAA's safety mandate under 49 U.S.C. § 40103 requires it to regulate aircraft operations conducted in the NAS,[3] which include UAS operations, to protect persons and property on the

[1] At least in terms of initial contact with the suspected offender.

[2] Applying any laws falling within the enforcement authority of the LEA in question.

[3] The NAS is "the common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas . . . . Included are system components shared jointly with the military." See FAA Pilot/Controller Glossary (Apr. 3, 2014), available at http://www.faa.gov/air_traffic/publications/media/pcg_4-03-14.pdf.

ground, and to prevent collisions between aircraft and other aircraft or objects. In addition, 49 U.S.C. § 44701(a) requires the agency to promote safe flight of civil aircraft in air commerce by prescribing, among other things, regulations and minimum standards for other practices, methods, and procedures the Administrator finds necessary for safety in air commerce and national security.[4]

A UAS is an Aircraft that Must Comply with Safety Requirements

A UAS is an "aircraft" as defined in the FAA's authorizing statutes and is therefore subject to regulation by the FAA. 49 U.S.C. § 40102(a)(6) defines an "aircraft" as "any contrivance invented, used, or designed to navigate or fly in the air." The FAA's regulations (14 C.F.R. § 1.1) similarly define an "aircraft" as "a device that is used or intended to be used for flight in the air." Because an unmanned aircraft is a contrivance/device that is invented, used, and designed to fly in the air, it meets the definition of "aircraft." The FAA has promulgated regulations that apply to the operation of all aircraft, whether manned or unmanned, and irrespective of the altitude at which the aircraft is operating. For example, 14 C.F.R. § 91.13 prohibits any person from operating an aircraft in a careless or reckless manner so as to endanger the life or property of another.

Model Aircraft Operations

An important distinction to be aware of is whether the UAS is being operated for hobby or recreational purposes or for some other purpose. This distinction is important because there are specific requirements in the FAA Modernization and Reform Act of 2012, Public Law 112-95, (the Act) that pertain to "Model Aircraft" operations, which are conducted solely for hobby or recreational purposes. While flying model aircraft for hobby or recreational purposes does not require FAA approval, all model aircraft operators must operate safely and in accordance with the law. The FAA provides guidance and information to individual UAS operators about how they can operate safely under current regulations and laws. Guidance may be found at: http://www.faa.gov/uas/publications/model_aircraft_operators/

Section 336(c) of the Act defines "Model Aircraft" as an unmanned aircraft that is –

(1) Capable of sustained flight in the atmosphere;

(2) Flown within visual line of sight of the person operating the aircraft; and

(3) Flown for hobby or recreational purposes.

Each element of this definition must be met for a UAS to be considered a Model Aircraft under the Act. Under Section 336(a) of the Act the FAA is restricted from conducting further rulemaking specific to Model Aircraft as defined in section 336(c) so long as the Model Aircraft operations are conducted in accordance with the requirements of section 336(a). Section 336(a) requires that—

[4] FAA action on these security concerns support and are informed by the national defense, homeland security, and law enforcement statutory responsibilities and authorities of our interagency partners.

(1) The aircraft is flown strictly for hobby or recreational use;

(2) The aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization;

(3) The aircraft is limited to not more than 55 pounds unless otherwise certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization;

(4) The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and

(5) When flown within 5 miles of an airport, the operator of the aircraft provides the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport) with prior notice of the operation (model aircraft operators flying from a permanent location within 5 miles of an airport should establish a mutually-agreed upon operating procedure with the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport)).

Model Aircraft that Operate in a Careless or Reckless Manner

Section 336(b) of the Act, however, makes clear that the FAA has the authority under its existing regulations to pursue legal enforcement action against persons operating Model Aircraft when the operations endanger the safety of the NAS, even if they are operating in accordance with section 336(a) and 336(c). So, for example, a Model Aircraft operation conducted in accordance with section 336(a) and (c) may be subject to an enforcement action for violation of 14 C.F.R. § 91.13 if the operation is conducted in a careless or reckless manner so as to endanger the life or property of another.

UAS Operations that are not Model Aircraft Operations

Operations of UAS that are not Model Aircraft operations as defined in section 336(c) of the Act and conducted in accordance with section 336(a) of the Act may only be operated with specific authorization from the FAA. The FAA currently authorizes non-hobby or recreational UAS operations through one of three avenues:

(1) The issuance of a Certificate of Waiver or Authorization, generally to a governmental entity operating a public aircraft;

(2) The issuance of an airworthiness certificate in conjunction with the issuance of a Certificate of Waiver or Authorization; or

(3) The issuance of an exemption under part 11 of title 14, Code of Federal Regulations that relies on section 333 (Special Rules for Certain Unmanned Aircraft Systems) of the Act for relief from the airworthiness certificate requirement, also in conjunction with the issuance of a Certificate of Waiver or Authorization.

It is important to understand that all UAS operations that are not operated as Model Aircraft under section 336 of the Act are subject to current and future FAA regulation. At a minimum, any such flights are currently required under the FAA's regulations to be operated with an

authorized aircraft (certificated or exempted), with a valid registration number ("N-number"), with a certificated pilot, and with specific FAA authorization (Certificate of Waiver or Authorization).

Regardless of the type of UAS operation, the FAA's statutes and the Federal Aviation Regulations prohibit any conduct that endangers individuals and property on the surface, other aircraft, or otherwise endangers the safe operation of other aircraft in the NAS. In addition, States and local governments are enacting their own laws regarding the operation of UAS, which may mean that UAS operations may also violate state and local laws specific to UAS operations, as well as broadly applicable laws such as assault, criminal trespass, or injury to persons or property.

UAS Compliance with Airspace Security Requirements

As an aircraft, UAS operations (including those involving Model Aircraft) must be conducted in accordance with the airspace-centric security requirements prescribed by the FAA's regulations and various implementation tools used by the FAA, specifically including airspace with special flight rules and Notices to Airmen (NOTAM) that define Temporary Flight Restrictions (TFR). It is important that UAS operators and LEAs be familiar with the airspace restrictions respectively relevant to their operations and their enforcement area of responsibility.

Flight restrictions are used to protect, but are not limited to, special security events, sensitive operations (e.g., select law enforcement activity, space flight operations, etc.), and Presidential movement. The most up-to-date list of TFRs is available at http://tfr.faa.gov/tfr2/list.html.

See Attachment A for reference resources.[5]

SECTION 2.

The Role of Law Enforcement

The FAA promotes voluntary compliance by educating individual UAS operators about how they can operate safely under current regulations and laws. The FAA also has a number of enforcement tools available including warning notices, letters of correction, and civil penalties. The FAA may take enforcement action against anyone who conducts an unauthorized UAS operation or operates a UAS in a way that endangers the safety of the national airspace system. This authority is designed to protect users of the airspace as well as people and property on the ground.

However, as noted above, State and local Law Enforcement Agencies (LEA) are often in the best position to deter, detect, immediately investigate,[6] and, as appropriate,[7] pursue

[5] Attachment A also includes a NOTAM concerning avoidance (including no loitering) over power plants, dams, refineries, industrial complexes, and military facilities. Although not a restriction, this TFR urges aircraft operators to avoid these locations.

[6] At least in terms of initial contact with the suspected offender.

[7] Applying any laws falling within the enforcement authority of the LEA in question.

enforcement actions to stop unauthorized UAS operations. Although the FAA retains the responsibility for enforcing FAAs regulations, FAA aviation safety inspectors, who are the agency's principal field elements responsible for following up on these unauthorized and/or unsafe activities, will often be unable to immediately travel to the location of an incident.

While the FAA must exercise caution not to mix criminal law enforcement with the FAA's administrative safety enforcement function, the public interest is best served by coordination and fostering mutual understanding and cooperation between governmental entities with law enforcement responsibilities. Although there are Federal criminal statutes that may be implicated by some UAS operations (see 49 U.S.C. § 44711), most violations of the FAA's regulations may be addressed through administrative enforcement measures. As with any other civil or criminal adjudication, successful enforcement will depend on development of a complete and accurate factual report contemporaneous with the event.

Although certainly not an exhaustive list, law enforcement officials, first responders and others can provide invaluable assistance to the FAA by taking the actions outlined below:

(1) **Witness Identification and Interviews.** Local law enforcement is in the best position to identify potential witnesses and conduct initial interviews, documenting what they observed while the event is still fresh in their minds. In addition, local law enforcement is in an optimum position to secure all information necessary for our safety inspectors to contact these witnesses in any subsequent FAA investigation. Administrative proceedings often involve very technical issues; therefore, we expect our own safety inspectors will need to re-interview most witnesses. We are mindful that in many jurisdictions, state law may prohibit the transmission of witness statements to third parties, including the FAA. In those circumstances it is extremely important that the FAA be able to locate and conduct independent interviews of these individuals.

(2) **Identification of Operators.** Law enforcement is in the best position to contact the suspected operators of the aircraft, and any participants or support personnel accompanying the operators. Our challenges in locating violators are marked in that very few of these systems are registered in any federal database and rarely will they have identifiable markings such as used for conventional manned aircraft. Likewise, information on few of the UAS operators will be archived in a pilot data base. Many operators advertise openly on the internet. However, in our enforcement proceedings, we bear the burden of proof, and showing who actually is operating the unmanned aircraft is critical. Therefore, evidentiary thresholds must be met even when using data or video acquired via the internet. Likewise, the purpose for the operation (such as in support of a commercial venture, to further some business interest, or to secure compensation for their services) may become an important element in determining what regulations, if any, may have been violated by the operation. Identification and interview of suspected operators early on will help immeasurably to advance enforcement efforts.

(3) **Viewing and Recording the Location of the Event.** Pictures taken in close proximity to the event are often helpful in describing light and weather conditions, any damage or injuries, and the number and density of people on the surface,

particularly at public events or in densely populated areas. During any witness interviews, use of fixed landmarks that may be depicted on maps, diagrams or photographs immeasurably help in fixing the position of the aircraft, and such landmarks also should be used as a way to describe lateral distances and altitude above the ground, structures or people (e.g. below the third floor of Building X, below the top of the oak tree located Y, anything that gives reference points for lay witnesses).

(4) **Identifying Sensitive Locations, Events, or Activities.** The FAA maintains a variety of security-driven airspace restrictions around the country to help protect sensitive locations, events, and activities through Temporary Flight Restrictions (TFR), Prohibited Areas, and other mechanisms such as the Washington, DC Flight Restricted Zone (DC FRZ). UAS operations, including Model Aircraft flights, are generally prohibited within these defined volumes of airspace. LEAs should become familiar with the steady-state airspace restrictions active within their area of responsibility, along with as-needed TFRs, which could be instituted to help protect sensitive events (e.g., major gatherings of elected officials) and activities (e.g., Presidential movements). If there is any question as to whether a TFR has been established in a given location, contact the nearest air traffic facility or flight service station for further information or visit http://tfr.faa.gov/tfr2/list.html for a graphic representation of TFRs locatable by state and effective dates.

(5) **Notification.** Immediate notification of an incident, accident or other suspected violation to one of the FAA Regional Operation Centers (ROC) located around the country is valuable to the timely initiation of the FAA's investigation. These centers are manned 24 hours a day, 7 days a week with personnel who are trained in how to contact appropriate duty personnel during non-business hours when there has been an incident, accident or other matter that requires timely response by FAA employees. A list of these centers and telephone numbers is included as Attachment B to this letter.

(6) **Evidence Collection.** Identifying and preserving any public or private security systems that may provide photographic or other visual evidence of UAS operations, including video or still picture security systems can provide essential evidence to the FAA. Many times these systems do not permanently store information but erase it as the system recycles at a given interval. Local law enforcement is in the best position to inquire and make initial requests to identify and preserve this form of evidence or obtain legal process for securing this evidence in the context of an investigation of a possible violation of state criminal law. In addition, some UAS may be marked with identification numbers ("N-numbers") signifying FAA registration. The presence or lack of these identification numbers may be significant in an FAA investigation. For example, an operator may state that he or she is conducting an approved commercial activity, which usually requires registered aircraft. However, the absence of registration markings on the UAS may indicate that the aircraft is not registered, meaning the operation may not be authorized. Note that identification numbers may not be conspicuous from a distance because of the size and non-traditional configuration of some UAS. The registered owners

of UAS bearing identification numbers can be found by searching for the N-number on the FAA's website: www.faa.gov.

Virtually all of the items listed above are already in the tool box for law enforcement officers. Other investigative methods also may prove useful, such as consensual examination of the UAS, equipment trailers and the like. However, other law enforcement processes, such as arrest and detention or non-consensual searches almost always fall outside of the allowable methods to pursue administrative enforcement actions by the FAA unless they are truly a by-product of a state criminal investigation. We do not mean to discourage use of these methods and procedures where there is an independent basis for them under state or local law. We simply wish to emphasize that work products intended for FAA use generally should involve conventional administrative measures such as witness interviews, "stop and talk" sessions with suspected violators, consensual examination of vehicles and equipment, and other methods that do not involve court orders or the potential use of force by law enforcement personnel.

It is extremely difficult to provide a "one size fits all" guide to cooperative investigation of unauthorized UAS operations considering the myriad jurisdictions and the associated statutory and constitutional restraints and requirements. State and local officials are always urged to use their governmental unit's legal resources and their own management chain to develop acceptable protocols for dealing with these instances. In some situations, there may be legal bars to the sharing of some information or the use of databases designed for conventional law enforcement. However, with appropriate data collection during first responses and early reporting to the FAA, Federal, State and local agencies will be in the best position to both collect and share information that may be of interest to each jurisdiction. FAA aviation safety inspectors are adept at coordination with our own legal resources to ensure unauthorized operators are properly accountable for the potential risk they create to both people and property. In addition, we have specially trained inspectors within the FAA UAS Integration office who can provide expertise in this area.

If you have any questions or your agency would like to pursue advance planning on how to address these situations, please feel free to contact your local FAA Law Enforcement Assistance Special Agent or the FAA's Law Enforcement Assistance Program Office at (202) 267-4641 or (202) 267-9411.

Attachment A.

Excerpts

Presidential Movements

FDC 4/7607 ZBW RI..AIRSPACE PROVIDENCE, RHODE ISLAND..TEMPORARY FLIGHT RESTRICTIONS. OCTOBER 16, 2014 LOCAL. THIS NOTAM REPLACES NOTAM 4/7600 DUE TO SCHEDULE CHANGE. PURSUANT TO 49 USC 40103(B THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN THIS NOTAM AS 'NATIONAL DEFENSE AIRSPACE'. PILOTS WHO DO NOT ADHERE TO THE FOLLOWING PROCEDURES MAY BE INTERCEPTED DETAINED AND INTERVIEWED BY LAW ENFORCEMENT/SECURITY PERSONNEL. ANY OF THE FOLLOWING ADDITIONAL ACTIONS MAY ALSO BE TAKEN AGAINST A PILOT WHO DOES NOT COMPLY WITH THE REQUIREMENTS OR ANY SPECIAL INSTRUCTIONS OR PROCEDURES ANNOUNCED IN THIS NOTAM:
A) THE FAA MAY TAKE ADMINISTRATIVE ACTION, INCLUDING IMPOSING CIVI PENALTIES AND THE SUSPENSION OR REVOCATION OF AIRMEN CERTIFICATES; OR
B) THE UNITED STATES GOVERNMENT MAY PURSUE CRIMINAL CHARGES, INCLUDING CHARGES UNDER TITLE 49 OF THE UNITED STATES CODE, SECTION 46307; OR
C) THE UNITED STATES GOVERNMENT MAY USE DEADLY FORCE AGAINST THE AIRBORNE AIRCRAFT, IF IT IS DETERMINED THAT THE AIRCRAFT POSE AN IMMINENT SECURITY THREAT.

...

C. THE FOLLOWING OPERATIONS ARE NOT AUTHORIZED WITHIN THIS TFR: FLIGHT TRAINING, PRACTICE INSTRUMENT APPROACHES, AEROBATIC FLIGHT, GLIDER OPERATIONS, SEAPLANE OPERATIONS, PARACHUTE OPERATIONS, ULTRALIGHT, HANG GLIDING, BALLOON OPERATIONS, AGRICULTURE/CROP DUSTING, ANIMAL POPULATION CONTROL FLIGHT OPERATIONS, BANNER TOWING OPERATIONS, SIGHTSEEING OPERATIONS,MAINTENANCE TEST FLIGHTS, MODEL AIRCRAFT OPERATIONS, MODEL ROCKETRY, UNMANNED AIRCRAFT SYSTEMS (UAS), AND UTILITY AND PIPELINE SURVEY OPERATIONS.

DC FRZ

FDC 0/8326 ZDC PART 1 OF 10 FLIGHT RESTRICTIONS, WASHINGTON, DC, EFFECTIVE 1012010401 UTC UNTIL FURTHER NOTICE. THIS NOTICE WILL REPLACE NOTAM 0/9477 DUE TO A CHANGE IN RESTRICTIONS. THIS NOTAM AND A NOTAM FOR THE LEESBURG MANEUVERING AREA SUPPLEMENT SUBPART V, 14 CFR PART 93 FOR THE WASHINGTON, D.C. SPECIAL FLIGHT RULES AREA (DC SFRA). PURSUANT TO 49 USC 40103(B), THE FAA HAS ESTABLISHED THE DC SFRA AREA AS 'NATIONAL DEFENSE AIRSPACE. ANY PERSON WHO DOES NOT COMPLY WITH THE REQUIREMENTS APPLICABLE TO THE DC SFRA MAY BE INTERCEPTED, DETAINED AND INTERVIEWED BY LAW ENFORCEMENT/SECURITY PERSONNEL. ANY OF THE FOLLOWING ADDITIONAL ACTIONS MAY ALSO BE TAKEN AGAINST A PILOT WHO DOES NOT COMPLY WITH THE REQUIREMENTS OR ANY SPECIAL INSTRUCTIONS OR PROCEDURES ANNOUNCED IN THIS NOTAM: A) THE FAA MAY TAKE ADMINISTRATIVE ACTION, INCLUDING IMPOSING CIVIL PENALTIES AND THE SUSPENSION OR REVOCATION OF AIRMEN CERTIFICATES; B) THE UNITED STATES GOVERNMENT MAY PURSUE CRIMINAL CHARGES, INCLUDING CHARGES UNDER TITLE 49 OF THE UNITED STATES CODE, SECTION 46307; C) THE UNITED STATES GOVERNMENT MAY USE DEADLY FORCE AGAINST THE AIRBORNE AIRCRAFT, IF IT IS DETERMINED THAT THE AIRCRAFT POSE: AN IMMINENT SECURITY THREAT.

...

A. THE FOLLOWING OPERATIONS ARE NOT AUTHORIZED WITHIN THE DC FRZ: FLIGHT TRAINING, AEROBATIC FLIGHT, PRACTICE INSTRUMENT APPROACHES, GLIDER OPERATIONS, PARACHUTE OPERATIONS, ULTRA LIGHT, HANG GLIDING, BALLOON OPERATIONS, TETHERED BALLOONS, AGRICULTURE/CROP DUSTING, ANIMAL POPULATION CONTROL FLIGHT OPERATIONS, BANNER TOWING OPERATIONS, MAINTENANCE TEST FLIGHTS, MODEL AIRCRAFT OPERATIONS, MODEL ROCKETRY, FLOAT PLANE OPERATIONS, UNMANNED AIRCRAFT SYSTEMS (UAS) AND AIRCRAFT/HELICOPTERS OPERATING FROM A SHIP OR PRIVATE/CORPORATE YACHT. B. IT IS HIGHLY RECOMMENDED THAT A PILOT CONTINUOUSLY MONITOR VHF FREQUENCY 121.5 OR UHF FREQUENCY 243.0 FOR EMERGENCY INSTRUCTIONS WHEN OPERATING AN AIRCRAFT IN THE DC FRZ, EITHER IN AN AIRCRAFT THAT IS SUITABLY EQUIPPED, OR BY USE OF PORTABLE EQUIPMENT.

Avoidance of Power Plans Etc. *(Applied to all Aircraft, including UAS)*

FDC 4/0811 SPECIAL NOTICE. THIS IS A RESTATEMENT OF A PREVIOUSLY ISSUED ADVISORY NOTICE. IN THE INTEREST OF NATIONAL SECURITY AND TO THE EXTENT PRACTICABLE, PILOTS ARE STRONGLY ADVISED TO AVOID THE AIRSPACE ABOVE, OR IN PROXIMITY TO SUCH SITES AS POWER PLANTS (NUCLEAR, HYDRO-ELECTRIC, OR COAL), DAMS, REFINERIES, INDUSTRIAL COMPLEXES, MILITARY FACILITIES AND OTHER SIMILAR FACILITIES. PILOTS SHOULD NOT CIRCLE AS TO LOITER IN THE VICINITY OVER THESE TYPES OF FACILITIES.

Select Sporting Events FDC 4/3621 FDC SPECIAL SECURITY NOTICE. SPORTING EVENTS. THIS NOTAM REPLACES FDC NOTAM 9/5151 TO REFLECT A TSA WEBSITE UPDATE AND ADDITIONAL INFORMATION CONCERNING AIRSPACE WAIVERS. FLIGHT RESTRICTIONS IN THIS NOTAM COMPLY WITH STATUTORY MANDATES DETAILED IN SECTION 352 OF PUBLIC LAW 108-7 AS AMENDED BY SECTION 521 OF PUBLIC LAW 108-199. PURSUANT TO 49 USC 40103(B), THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN THIS NOTAM AS 'NATIONAL DEFENSE AIRSPACE'. ANY PERSON WHO KNOWINGLY OR WILLFULLY VIOLATES THE RULES PERTAINING TO OPERATIONS IN THIS AIRSPACE MAY BE SUBJECT TO CERTAIN CRIMINAL PENALTIES UNDER 49 USC 46307. PILOTS WHO DO NOT ADHERE TO THE FOLLOWING PROCEDURES MAY BE INTERCEPTED, DETAINED AND INTERVIEWED BY LAW ENFORCEMENT/SECURITY PERSONNEL. PURSUANT TO 14 CFR SECTION 99.7, SPECIAL SECURITY INSTRUCTIONS, COMMENCING ONE HOUR BEFORE THE SCHEDULED TIME OF THE EVENT UNTIL ONE HOUR AFTER THE END OF THE EVENT. ALL AIRCRAFT OPERATIONS; INCLUDING PARACHUTE JUMPING, UNMANNED AIRCRAFT AND REMOTE CONTROLLED AIRCRAFT, ARE PROHIBITED WITHIN A 3 NMR UP TO AND INCLUDING 3000 F AGL OF ANY STADIUM HAVING A SEATING CAPACITY OF 30,000 OR MORE PEOPLE WHERE EITHER A REGULAR OR POST SEASON MAJOR LEAGUE BASEBALL, NATIONAL FOOTBALL LEAGUE, OR NCAA DIVISION ONE FOOTBALL GAME IS OCCURRING. THIS NOTAM ALSO APPLIES TO NASCAR SPRINT CUP, INDY CAR, AND CHAMP SERIES RACES EXCLUDING QUALIFYING AND PRE-RACE EVENTS. FLIGHTS CONDUCTED FOR OPERATIONAL PURPOSES OF ANY EVENT, STADIUM OR VENUE AND BROADCAST COVERAGE FOR THE BROADCAST RIGHTS HOLDER ARE AUTHORIZED WITH AN APPROVED AIRSPACE WAIVER. AN FAA AIRSPACE WAIVER DOES NOT RELIEVE OPERATORS FROM OBTAINING ALL OTHER NECESSARY AUTHORIZATIONS AND COMPLYING WITH ALL APPLICABLE FEDERAL AVIATION REGULATIONS. THE RESTRICTIONS DESCRIBED ABOVE DO NOT APPLY TO THOSE AIRCRAFT AUTHORIZED BY AND IN CONTACT WITH ATC FOR OPERATIONAL OR SAFETY OF FLIGHT PURPOSES, DEPARTMENT OF DEFENSE, LAW ENFORCEMENT, AND AIR AMBULANCE FLIGHT OPERATIONS. ALL PREVIOUSLY ISSUED WAIVERS TO FDC NOTAM 9/5151 REMAIN VALID UNTIL THE SPECIFIED END DATE BUT NOT TO EXCEED 90 DAYS FOLLOWING THE EFFECTIVE DATE OF THIS NOTAM. INFORMATION ABOUT AIRSPACE WAIVER APPLICATIONS AND TSA SECURITY AUTHORIZATIONS CAN BE FOUND AT HTTP://WWW.TSA.GOV/STAKEHOLDERS/AIRSPACE-WAIVERS-0 OR BY CALLING TSA AT 571-227-2071. SUBMIT REQUESTS FOR FAA AIRSPACE WAIVERS AT HTTPS://WAIVERS.FAA.GOV

Disney Theme Parks

FDC 4/XXXX ZZZ SECURITY SPECIAL NOTICE DISNEY WORLD THEME PARK ORLANDO FL THIS NOTAM REPLACES NOTAM 9/4985 TO REFLECT A TSA WEBSITE UPDATE AND ADDITIONAL INFORMATION CONCERNING AIRSPACE WAIVERS. FLIGHT RESTRICTIONS IN THIS NOTAM COMPLY WITH STATUTORY MANDATES DETAILED IN SECTION 352 OF PUBLIC LAW 108-7 AS AMENDED BY SECTION 521 OF PUBLIC LAW 108-199. PURSUANT TO 49 USC 40103(B), THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN THIS NOTAM AS 'NATIONAL DEFENSE AIRSPACE'. AN PERSON WHO KNOWINGLY OR WILLFULLY VIOLATES THE RULES PERTAINING TO OPERATIONS IN THIS AIRSPACE MAY BE SUBJECT TO CERTAIN CRIMINAL PENALTIES UNDER 49 USC 46307. PILOTS WHO DO NOT ADHERE TO THE FOLLOWING PROCEDURES MAY BE INTERCEPTED, DETAINED AND INTERVIEWED BY LAW ENFORCEMENT/SECURITY PERSONNEL. PURSUANT TO 14 CFR SECTION 99.7, SPECIAL SECURITY INSTRUCTIONS, ALL AIRCRAFT FLIGHT OPERATIONS TO INCLUDE UNMANNED AND REMOTE CONTROLLED AIRCRAFT ARE PROHIBITED WITHII A 3 NMR OF 282445N/0813420W OR THE ORL238014.8 UP TO AND INCLUDING 3000 FT AGL. THE RESTRICTIONS DO NOT APPLY TO THOSE AIRCRAFT AUTHORIZED BY AND IN CONTACT WITH ATC FOR OPERATIONAL OR SAFET OF FLIGHT PURPOSES, AND DEPARTMENT OF DEFENSE, LAW ENFORCEMENT, AND AIR AMBULANCE FLIGHT OPERATIONS. FLIGHTS CONDUCTED FOR OPERATIONAL PURPOSES OF ANY DISNEY WORLD EVEN AND VENUE ARE AUTHORIZED WITH AN APPROVED WAIVER. AN FAA AIRSPACE WAIVER DOES NOT RELIEVE OPERATORS FROM OBTAINING ALL OTHER NECESSARY AUTHORIZATIONS AND COMPLYING WITH ALL APPLICABLE FEDERAL AVIATION REGULATIONS. ALL PREVIOUSLY ISSUED WAIVERS TO FDC NOTAM 4/4985 REMAIN VALID UNTIL THE SPECIFIED END DATE BUT NOT TO EXCEED 90 DAYS FOLLOWING THE EFFECTIVE DATE OF THIS NOTAM. INFORMATION ABOUT AIRSPACE WAIVER APPLICATIONS AND TSA SECURITY AUTHORIZATIONS CAN BE FOUND AT HTTP://WWW.TSA.GOV/STAKEHOLDERS/AIRSPACE-WAIVERS-0 OR BY CALLING TSA AT 571-227-2071. SUBMIT REQUESTS FOR FAA AIRSPACE WAIVERS AT HTTPS://WAIVERS.FAA.GOV

Attachment B.

Facility	States	Office	EMail
Western ROC	AK, AZ, CA, CO, HI, ID, MT, NV, OR, UT, WA and WY	425-227-1999	9-ANM-ROC@faa.gov
Central ROC	AR, IA, IL, IN, KS, LA, MI, MN, MO, ND, NE, NM, OH, OK, SD, TX and WI	817-222-5006	9-asw-operation-center@faa.gov
Southern ROC	AL, FL, GA, KY, MS, NC, PR, SC, TN and VI	404-305-5180	9-ASO-ROC@faa.gov
Eastern ROC	DC, DE, MD, NJ, NY, PA, VA and WV	718-553-3100	7-AEA-ROC@faa.gov
New England ROC	CT, MA, ME, NH, RI and VT	404-305-5156	7-ANE-OPSCTR@faa.gov
Washington WOC		202-267-3333	9-awa-ash-woc@faa.gov

Senators McCain, Flake and Ayotte Introduce UAS Improvement Act of 2015

U.S. Senators John McCain (R-AZ), Jeff Flake (R-AZ), and Kelly Ayotte (R-NH) have introduced *The Unmanned Aircraft System Improvement Act of 2015*, legislation that would provide critical reform to the U.S. Customs and Border Protection's (CBP) mismanaged Unmanned Aircraft System (UAS) programme.

The bill addresses concerns raised in a Department of Homeland Security (DHS) Inspector General Report released last month that highlighted the management failures of CBP's UAS programme to "achieve intended results or recognise all costs of operation." Specifically, the report found that the UAS programme is not meeting current flight hour goals; is not utilizing the most effective available resources; and is failing to accurately determine programme costs.

"Unmanned Aircraft Systems, when properly utilized, are critical in our fight to effectively secure the border," said Senator John McCain. "The findings released in the Inspector General Report highlight exactly where reform is needed, and this bill is an important step to ensuring our border security efforts are effective in preventing future waves of illegal border crossings."

Until DHS can better manage and utilize its current fleet of UAS, *The Unmanned Aircraft System Improvement Act of 2015* would prohibit the procurement of new UAS. In addition, the bill would require DHS to conduct continuous, 100 percent surveillance of the Southern border and coordinate with the Department of Defense to ensure the programme is utilizing "best management practices" to improve national security. Finally, the bill would require DHS to submit a detailed report to Congress regarding the programme's effectiveness.

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114TH CONGRESS
1ST SESSION

S. _____

To improve the operation of the Department of Homeland Security's Unmanned Aircraft System Program.

IN THE SENATE OF THE UNITED STATES

Mr. MCCAIN (for himself, Mr. FLAKE, and Ms. AYOTTE) introduced the following bill; which was read twice and referred to the Committee on

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A BILL

To improve the operation of the Department of Homeland Security's Unmanned Aircraft System Program.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. DEFINITIONS.

In this Act:

(1) ILLEGAL BORDER ACTIVITIES.—The term "illegal border activities" means the illegal trafficking or smuggling of an individual or controlled substances or activities to further a Federal crime relating to United States immigration, customs, con-

trolled substances, agriculture, monetary instruments, or other border controls.

(2) SOUTHERN BORDER.—The term "Southern border" means the international border between the United States and Mexico.

(3) UAS.—The term "UAS" means unmanned aircraft systems.

SEC. 2. PERSISTENT SURVEILLANCE ALONG THE SOUTHERN BORDER.

(a) IN GENERAL.—The Department of Homeland Security shall fully utilize surveillance and detection capabilities developed or used by the various Federal departments and agencies for the purpose of enhancing the functioning and operational capability to conduct continuous and integrated manned or unmanned, monitoring, sensing, or surveillance of 100 percent of Southern border mileage or the immediate vicinity of the Southern border.

(b) PROCUREMENT OF ADDITIONAL UNMANNED AIRCRAFT SYSTEMS.—

(1) IN GENERAL.—The Secretary of Homeland Security may not procure any additional UAS until after the Secretary provides Congress with written certification that the Department of Homeland Security successfully operated its current fleet of UAS

at least 23,000 hours during the preceding calendar year.

(2) EXEMPTION.—The limitation set forth in paragraph (1) shall not apply to the procurement of unmanned aircraft that do not weigh more than 150 pounds.

(c) USE OF BEST AVAILABLE RADAR AND SURVEILLANCE TECHNOLOGY.—The Department of Homeland Security shall use the best available radar and surveillance technology—

(1) to increase awareness of illegal border activities along the Southern border; and

(2) to identify gaps in surveillance capabilities.

SEC. 3. REPORT TO CONGRESS.

Not later than 90 days after the date of the enactment of this Act, and biannually thereafter, the Secretary of Homeland Security shall submit a report to the Committee on Homeland Security and Governmental Affairs of the Senate and the Committee on Homeland Security of the House of Representatives that contains, for the reporting period—

(1) the total number of UAS hours required to provide persistent surveillance along the Southern border;

(2) the total number of UAS flight hours planned in support of any Federal or State department or agency;

(3) the number of planned UAS flight hours in support of the goal referred to in paragraph (1);

(4) the number of hours in which UAS were flown in support of the goal referred to in paragraph (1);

(5) the number of planned UAS flight hours in support of the goal referred to in paragraph (1) that were cancelled before takeoff, including the reason for such cancellations;

(6) performance measures regarding—

(A) the number of hours flown by the current fleet of UAS operated by the Department of Homeland Security;

(B) the number of subjects detected though the use of UAS;

(C) the number of apprehensions assisted by the use of UAS; and

(D) the number and quantity of illicit drug seizures assisted by the use of UAS; and

(7) all accumulated cost associated with the Unmanned Aircraft System Program within the Department of Homeland Security, including—

(A) salaries of pilots; and

(B) costs associated with radar and surveillance technology.

SEC. 4. INTERAGENCY COLLABORATION.

The Secretary of Homeland Security shall consult with the Secretary of Defense to identify the best practices used by the Department of Defense that could also be used by the Department of Homeland Security to improve the security of the Southern border by enhancing wide aerial surveillance and fulfilling the requirements set forth in section 2.

SEC. 5. SUNSET.

This Act shall be repealed on the date that is 5 years after the date of the enactment of this Act.

Ginger Blaisdell

From: Binder, John R (DOT) <john.binder@alaska.gov>
Sent: Wednesday, January 14, 2015 8:55 PM
To: Ginger Blaisdell
Subject: FW: Ask NASAO ~ Integration of UAS into the NAS

Categories: Drone

Ginger - Thought you might find the proposed California legislation linked below relating to UAS operation by public agencies interesting. Not in any way advocating for/against, but indicates the direction some states are moving on this issue. My interpretation is that state agency use in performing core missions would be unaffected, which probably begs the question of why then is legislation required?

Fodder for the next meeting.

John R. Binder III
Acting Commissioner
907-465-3901

Alaska Department of Transportation & Public Facilities
Keep Alaska Moving through Service and Infrastructure

From: Stevens, Kim [mailto:kstevens@nasao.org]
Sent: Wednesday, January 14, 2015 9:04 AM
To: Kim Stevens
Cc: carol.glatfelter@dot.ca.gov
Subject: Ask NASAO ~ Integration of UAS into the NAS

California is seeking your help. They are being asked to analyze a state bill on unmanned aerial systems and are seeking input from other states on any similar action you might be taking in regard to the integration of UAS into the NAS.

California Assembly Bill 37 Unmanned Aerial Systems, would generally prohibit public agencies from using unmanned aircraft systems, or contracting for the use of unmanned aircraft
systems: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB37

There is a section on the analysis form that says: "What other states are doing" pertaining to this bill or one similar in other states.

Please respond with any information to Carol, carol.glatfelter@dot.ca.gov and copy me. Thank you!

Kim Stevens
Director, Communications/Operations
National Association of State Aviation Officials
8400 Westpark Drive, 2nd Floor
McLean, VA 22102
703-610-0223; Fax 703-995-0837

California LEGISLATIVE INFORMATION

AB-37 Unmanned aircraft systems. (2015-2016)

CALIFORNIA LEGISLATURE— 2015–2016 REGULAR SESSION

ASSEMBLY BILL **No. 37**

Introduced by Assembly Member Campos

December 01, 2014

An act to add Section 6254.31 to the Government Code, and to add Title 14 (commencing with Section 14350) to Part 4 of the Penal Code, relating to unmanned aircraft systems.

LEGISLATIVE COUNSEL'S DIGEST

AB 37, as introduced, Campos. Unmanned aircraft systems.

Existing federal law, the Federal Aviation Administration Modernization and Reform Act of 2012, provides for the integration of civil unmanned aircraft systems, commonly known as drones, into the national airspace system by September 30, 2015. Existing federal law requires the Administrator of the Federal Aviation Administration to develop and implement operational and certification requirements for the operation of public unmanned aircraft systems in the national airspace system by December 31, 2015.

This bill would generally prohibit public agencies from using unmanned aircraft systems, or contracting for the use of unmanned aircraft systems, as defined, with certain exceptions applicable to law enforcement agencies and in certain other cases, including when the use or operation of the unmanned aircraft system achieves the core mission of the agency and the purpose is unrelated to the gathering of criminal intelligence, as defined.

The bill would require reasonable public notice to be provided by public agencies intending to deploy unmanned aircraft systems, as specified. The bill would require images, footage, or data obtained through the use of an unmanned aircraft system under these provisions to be permanently destroyed within one year, except as specified. The bill would generally prohibit images, footage, or data obtained through the use of an unmanned aircraft system under these provisions from being disseminated outside the collecting public agency, except as specified. Unless authorized by federal law, the bill would prohibit a person or entity, including a public agency subject to these provisions, or a person or entity under contract to a public agency, for the purpose of that contract, from equipping or arming an unmanned aircraft system with a weapon or other device that may be carried by or launched from an unmanned aircraft system and that is intended to cause bodily injury or death, or damage to, or the destruction of, real or personal property. The bill would also provide that specified surveillance restrictions on electronic devices apply to the use or operation of an unmanned aircraft system by a public agency.

The bill would apply its provisions to all public and private entities when contracting with a public agency for the use of an unmanned aircraft system.

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Existing law, the California Public Records Act, requires state and local agencies to make public records available for inspection, subject to certain exceptions.

This bill would make certain images, footage, or data obtained through the use of an unmanned aircraft system under its provisions, or any related record, including, but not limited to, usage logs or logs that identify any person or entity that subsequently obtains or requests records of that system, subject to disclosure. The bill would except from disclosure above images, footage, data, and records obtained through the use of an unmanned aircraft system, if disclosure would endanger the safety of a person involved in an investigation, or would endanger the successful completion of the investigation.

Existing constitutional provisions require that a statute that limits the right of access to the meetings of public bodies or the writings of public officials and agencies be adopted with findings demonstrating the interest protected by the limitation and the need for protecting that interest.

This bill would make legislative findings to that effect.

Vote: majority Appropriation: no Fiscal Committee: yes Local Program: no

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. Section 6254.31 is added to the Government Code, to read:

6254.31. (a) Notwithstanding any provision of this chapter, images, footage, or data obtained through the use of an unmanned aircraft system pursuant to Title 14 (commencing with Section 14350) of Part 4 of the Penal Code, or any related record, including, but not limited to, usage logs or logs that identify any person or entity that subsequently obtains or requests records of that system, are public records subject to disclosure.

(b) Notwithstanding subdivision (a), nothing in this chapter or any other law requires the disclosure of images, footage, or data obtained through the use of an unmanned aircraft system, or any related record, including, but not limited to, usage logs or logs that identify any person or entity that subsequently obtains or requests records of that system, to the extent that disclosure of the images, footage, data, or records would endanger the safety of a person involved in an investigation, or would endanger the successful completion of the investigation.

SEC. 2. Title 14 (commencing with Section 14350) is added to Part 4 of the Penal Code, to read:

TITLE 14. UNMANNED AIRCRAFT SYSTEMS

14350. (a) A public agency shall not use an unmanned aircraft system, or contract for the use of an unmanned aircraft system, except as provided in this title. This title shall apply to all public and private entities when contracting with a public agency for the use of an unmanned aircraft system.

(b) A law enforcement agency may use an unmanned aircraft system if it has obtained a warrant based on probable cause pursuant to this code.

(c) A law enforcement agency, without obtaining a warrant, may use an unmanned aircraft system in all of the following circumstances:

(1) In emergency situations if there is an imminent threat to life or of great bodily harm, including, but not limited to, fires, hostage crises, "hot pursuit" situations if reasonably necessary to prevent harm to law enforcement officers or others, and search and rescue operations on land or water.

(2) To assess the necessity of first responders in situations relating to traffic accidents.

(3) (A) To inspect state parks and wilderness areas for illegal vegetation or fires.

(B) For purposes of this paragraph, "wilderness areas" means public lands without permanent improvements or human habitation.

(4) To determine the appropriate response to an imminent or existing environmental emergency or disaster, including, but not limited to, oils spills or chemical spills.

(d) A public agency other than a law enforcement agency may use an unmanned aircraft system, or contract for the use of an unmanned aircraft system, to achieve the core mission of the agency provided that the purpose is unrelated to the gathering of criminal intelligence.

(e) A public agency that is not primarily a law enforcement agency, but that employs peace officers or performs functions related to criminal investigations, may use an unmanned aircraft system without obtaining a warrant to achieve the core mission of the agency provided that the purpose is unrelated to the gathering of criminal intelligence, and that the images, footage, or data are not used for any purpose other than that for which it was collected.

14351. A public agency that uses an unmanned aircraft system, or contracts for the use of an unmanned aircraft system, pursuant to this title shall first provide reasonable notice to the public. Reasonable notice shall, at a minimum, consist of a one-time announcement regarding the agency's intent to deploy unmanned aircraft system technology and a description of the technology's capabilities.

14352. (a) (1) (A) Except as permitted by this title, images, footage, or data obtained by a public agency, or any entity contracting with a public agency, pursuant to this title shall not be disseminated to a law enforcement agency unless the law enforcement agency has obtained a warrant for the images, footage, or data based on probable cause pursuant to this code, or the law enforcement agency would not have been required to obtain a warrant to collect the images, footage, or data itself, as specified in Section 14350.

(B) A public agency that is not primarily a law enforcement agency, but that employs peace officers or performs functions related to criminal investigations, may disseminate images, footage, or data collected pursuant to Section 14350 if the dissemination is to others within that agency.

(2) Except as permitted by this title, images, footage, or data obtained by a public agency, or any entity contracting with a public agency, through the use of an unmanned aircraft system shall not be disseminated outside the collecting public agency, unless one of the following circumstances applies:

(A) Images, footage, or data obtained by a public agency through the use of an unmanned aircraft system may be disseminated to another public agency that is not a law enforcement agency if the images, footage, or data are related to the core mission of both public agencies involved in the sending or receiving of the images, footage, or data.

(B) Images, footage, or data obtained by a public agency through the use of an unmanned aircraft system may be disseminated outside the collecting public agency if the images, footage, or data are evidence in any claim filed or any pending litigation.

(C) Images, footage, or data obtained by a public agency through the use of an unmanned aircraft system may be disseminated to a private entity if both of the following conditions are satisfied:

(i) The collecting public agency is not a law enforcement agency.

(ii) The images, footage, or data are related to the core function of the collecting public agency.

(3) A public agency may make available to the public images, footage, or data obtained by the public agency through the use of an unmanned aircraft system if both of the following conditions are satisfied:

(A) The images, footage, or data do not depict or describe any individual or group of individuals, or the activities of any individual or group of individuals whose identity or identities can be ascertained.

(B) The disclosure of the images, footage, or data is required to fulfill the public agency's statutory or mandatory obligations.

(b) Except as permitted by this title, images, footage, or data obtained by a public agency through the use of an unmanned aircraft system shall not be used by the public agency for any purpose other than that for which it was collected.

(c) (1) Images, footage, or data obtained through the use of an unmanned aircraft system shall be permanently destroyed within one year, except that a public agency may retain the images, footage, or data in all of the following circumstances:

(A) For training purposes. Images, footage, or data retained for training purposes shall be used only for the education and instruction of a public agency's employees in matters related to the mission of the public agency and for no other purpose.

(B) For academic research or teaching purposes. Images, footage, or data retained for academic research or teaching purposes shall be used only for the advancement of research and teaching conducted by an academic or research institution and matters related to the mission of the institution and for no other purpose.

(C) For purposes of monitoring material assets owned by the public agency.

(D) For environmental, public works, or land use management or planning by the public agency.

(2) Notwithstanding paragraph (1), a public agency may retain beyond one year images, footage, or data obtained through the use of an unmanned aircraft system in both of the following circumstances:

(A) If a warrant authorized the collection of the images, footage, or data.

(B) If the images, footage, or data are evidence in any claim filed or any pending litigation or enforcement proceeding.

14353. Unless authorized by federal law, a person or entity, including a public agency subject to Section 14350 or a person or entity under contract to a public agency, for the purpose of that contract, shall not equip or arm an unmanned aircraft system with a weapon or other device that may be carried by or launched from an unmanned aircraft system and that is intended to cause bodily injury or death, or damage to, or the destruction of, real or personal property.

14354. All unmanned aircraft systems shall be operated so as to minimize the collection of images, footage, or data of persons, places, or things not specified with particularity in the warrant authorizing the use of an unmanned aircraft system, or, if no warrant was obtained, for purposes unrelated to the justification for the operation.

14355. (a) This title is not intended to conflict with or supersede federal law, including rules and regulations of the Federal Aviation Administration.

(b) A local legislative body may adopt more restrictive policies on the acquisition or use of unmanned aircraft systems.

14356. For the purposes of this title, the following definitions shall apply:

(a) "Criminal intelligence" means information compiled, analyzed, or disseminated in an effort to anticipate, prevent, monitor, or investigate criminal activity.

(b) "Law enforcement agency" means the Attorney General of the State of California, each district attorney, and each agency of the State of California authorized by statute to investigate or prosecute law violators.

(c) "Public agency" means and includes each state agency and each local agency.

(d) "Unmanned aircraft system" means an unmanned aircraft and associated elements, including communication links and the components that control the unmanned aircraft, that are required for the pilot in command to operate safely and efficiently in the national airspace system.

14357. Except as provided in this title, the surveillance restrictions on electronic devices described in Chapter 1.5 (commencing with Section 630) of Title 15 of Part 1 shall apply to the use or operation of an unmanned aircraft system by a public agency.

SEC. 3. The Legislature finds and declares that Section 1 of this act, which adds Section 6254.31 of the Government Code, imposes a limitation on the public's right of access to the meetings of public bodies or the writings of public officials and agencies within the meaning of Section 3 of Article I of the California Constitution. Pursuant to that constitutional provision, the Legislature makes the following findings to demonstrate the interest protected by this limitation and the need for protecting that interest:

In order to ensure the safety of persons involved in investigations and to preserve the integrity of those investigations, it is necessary that this act take effect.

Ginger Blaisdell

From: McKenzie, Connie (Murkowski) <Connie_McKenzie@murkowski.senate.gov>
Sent: Thursday, February 05, 2015 11:42 AM
To: Ginger Blaisdell
Subject: FW: Murkowsk, Young Introduce Bicameral Bills Pushing for Safe Drone Usage
Attachments: 15.02.05.UAS.Bill.pdf

Categories: Drone

FYI

Connie

From: Felling, Matthew (Murkowski) **On Behalf Of** Press Office (Murkowski)
Sent: Thursday, February 05, 2015 3:17 PM
Subject: Murkowsk, Young Introduce Bicameral Bills Pushing for Safe Drone Usage

FROM THE OFFICES OF...
SENATOR MURKOWSKI & CONGRESSMAN YOUNG
ALASKA

FOR IMMEDIATE RELEASE
February 5, 2015

Contact: Matthew Felling 202.224.9301
or Matthew Shuckerow 202.225-0722

Murkowsk, Young Introduce Bicameral Bills Pushing for Safe Drone Usage

Lawmakers: Policies Needed to Establish "Rules of the Road,"

Bill Can Be "Game Changer" for Arctic Research Funding Opportunities

WASHINGTON, D.C. – Senator Lisa Murkowski and Congressman Don Young announced companion legislation in both chambers of Congress aimed at urging the Federal Aviation Administration to create policies for safe usage of unmanned aerial systems (UAS) across America's skies. Senator Lisa Murkowski introduced the bipartisan Safe Skies for Unmanned Aircraft Act of 2015 with co-sponsors Heidi Heitkamp (D-ND) and Ron Wyden (D-OR) in the Senate, and Congressman Young introduced legislation by the same name in the House of Representatives.

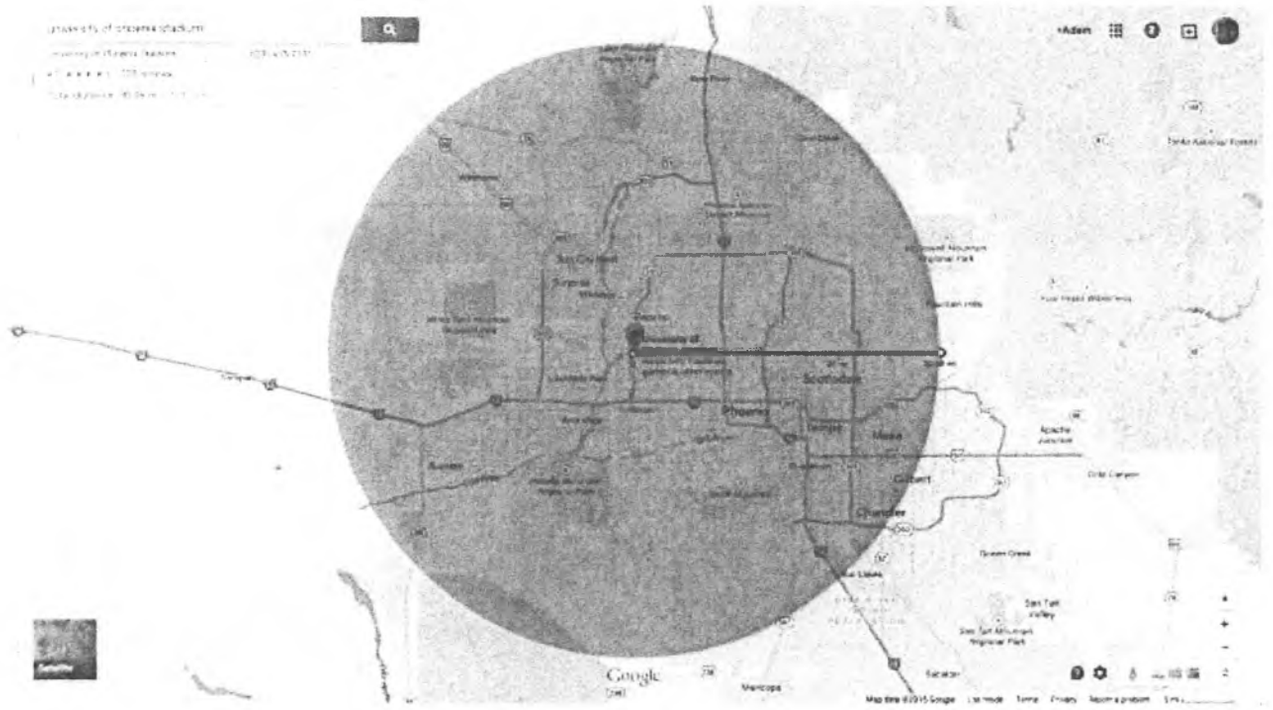
Beyond promoting safety in the air, the bill:

- Opens the door for public-private partnerships to support UAS research, allowing universities to accept research funding from the private sector, and saving American taxpayers money.
- Requires the FAA to remove bureaucratic hurdles to research operations for safe beyond 'line of sight' flying, an important research tool for medium- and long-distance applications.

"As we see more and more unmanned aircraft in use, it's critical that we lay out rules of the road – and this bill starts by telling the FAA to get to work," Murkowski said. "One of the most pressing items we discussed last week at the Arctic Encounter Symposium was how unmanned aerial systems can be game changers for Alaska, to work around our distances and lack of infrastructure. Arctic research, delivering goods in the Bush, fire-fighting and policing in rural areas are all new possibilities for us, and with the private sector investing in research today, we can all benefit tomorrow."

"In the last FAA reauthorization, Congress directed the creation of six regional UAS tests sites; however no funds were set aside to ensure their success," said Congressman Young. "Our legislation will clear significant roadblocks that stand in the way of successful research activities, and work to strengthen and empower UAS test sites for the benefit of the FAA and all stakeholders."

The lack of any rules or policies governing UAS was evident in last weekend's Super Bowl. Because the FAA had no laws to enforce, it was forced to create a "No Drone Zone" spanning 30 miles in all directions around the stadium – totaling over 2,800 square miles. (Larger than the state of Delaware.) Rules like those promoted by today's bill would help limit such overbroad restrictions.



(The "No Drone Zone" for the Super Bowl was larger than the Municipality of Anchorage and the State of Delaware.)

The Safe Skies for Unmanned Aircraft Act of 2015 aims to redefine how the FAA considers unmanned aerial systems – giving them greater autonomy and opportunities like those seen in commercial aviation. FAA's currently bans universities from working with private sponsors to develop and research unmanned aircraft technology applications. The delegation, working in conjunction with the University of Alaska Fairbanks, believe the private sector must be allowed and encouraged to invest and participate in research activities.

###

Note: Please do not reply to this email. This mailbox is unattended. For further information, please contact Senator Murkowski's press office at 202-224-9301 or 202-224-8069. Visit our website at http://murkowski.senate.gov

114TH CONGRESS
1ST SESSION

S. _____

To require the Administrator of the Federal Aviation Administration to use the definitions in section 40125 of title 49, United States Code, in determining whether an unmanned aircraft conducting aeronautical research flights qualifies for public aircraft status under that section, and for other purposes.

IN THE SENATE OF THE UNITED STATES

Ms. MURKOWSKI (for herself, Mr. WYDEN, and Ms. HEITKAMP) introduced the following bill; which was read twice and referred to the Committee on _____

A BILL

To require the Administrator of the Federal Aviation Administration to use the definitions in section 40125 of title 49, United States Code, in determining whether an unmanned aircraft conducting aeronautical research flights qualifies for public aircraft status under that section, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Safe Skies for Unmanned Aircraft Act of 2015".

SEC. 2. PUBLIC AIRCRAFT OPERATING STATUS OF UNMANNED AIRCRAFT USED IN AERONAUTICAL RESEARCH FLIGHTS; SAFETY PROCEDURES FOR SUCH FLIGHTS.

(a) PUBLIC AIRCRAFT OPERATING STATUS.—In determining whether an unmanned aircraft used in the conduct of aeronautical research qualifies as a public aircraft under section 40125 of title 49, United States Code, the Administrator of the Federal Aviation Administration shall—

(1) for purposes of determining whether the aircraft is used for a commercial purpose, use only the definition given that term in subsection (a) of such section; and

(2) for purposes of determining whether the aircraft, including airborne platforms and systems, is used for aeronautical research and platform-based research, include atmospheric and natural resources research, meteorological observation, and airborne astronomy as aeronautical research.

(b) PROCEDURES FOR BEYOND-LINE-OF-SIGHT OPERATIONS.—

(1) IN GENERAL.—Not later than 90 days after the date of the enactment of this Act, the Administrator shall develop and implement procedures for safe, beyond-line-of-sight operations in the national

airspace system by unmanned aircraft conducting aeronautical research.

(2) CONSIDERATIONS FOR APPROVAL.—In developing the procedures required by paragraph (1) relating to beyond-line-of-sight operations by unmanned aircraft described in that paragraph, the Administrator shall ensure that a decision to approve such an operation takes into consideration the safety of the entire operation, including whether any provisions required to be included in the certificate of authorization for the operation result in additional safety risk to any individual associated with the operation.

(c) UNMANNED AIRCRAFT DEFINED.—In this section, the term "unmanned aircraft" has the meaning given that term in section 331 of the FAA Modernization and Reform Act of 2012 (Public Law 112–95; 49 U.S.C. 40101 note).

Ginger Blaisdell

From: Rep. Shelley Hughes
Sent: Wednesday, February 04, 2015 8:10 PM
To: Ginger Blaisdell
Subject: FW: a picture that tells a story (on hobby UASs)
Attachments: IMG_0953.JPG

Categories: Drone

Plz include pic in packet next week.

Shelley Hughes
Representative
Alaska State Legislature
Serving Greater Palmer
Room 13 State Capitol Building
Juneau, Alaska 99801
(907) 465-3743
1-800-565-3743

If you would like to subscribe to my newsletter, please click here.

From: Steve Poirot [mailto:steve.poirot@fairweather.com]
Sent: Wednesday, February 04, 2015 4:23 PM
To: Rep. Shelley Hughes
Subject: Fwd: a picture that tells a story (on hobby UASs)

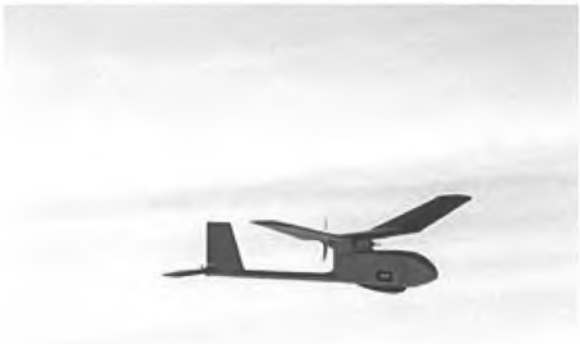
Hi Shelley, I had your address wrong when I tried to send this before.. hope you're doing well!

---------- Forwarded message ----------
From: **Steve Poirot** <steve.poirot@fairweather.com>
Date: Wed, Feb 4, 2015 at 4:09 PM
Subject: a picture that tells a story (on hobby UASs)
To: Shelley.Hughes@akleg.gov, jeremy.worrall@alaska.gov

Hi,

This picture was taken about 1/2 mile from Campbell Lake, which is a seaplane port, and less than 3 miles from the departure end of Anchorage Runway 7L, and it is on Anchorage's Chickaloon Departure route.


Bayshore
COMMUNITY EVENTS
LOST: REMOTE HELICOPTOR IF
FOUND PLEASE CALL 230 [illegible]
NO
SOLICITING
PLEASE
BAYSHORE
CLUBHOUSE



Unmanned Aircraft Systems: An Economic Development Strategy for Alaska

January 27, 2015

Prepared for the State of Alaska, Department of Commerce, Community, and Economic Development, Division of Economic Development

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AAC	Alaska Aerospace Corporation
ACTD	Advanced Concept Technology Demonstration
ACUASI	Alaska Center for Unmanned Aircraft Systems Integration
ADSB	Automatic Dependent Surveillance-Broadcast
AFB	Air Force Base
AIDEA	Alaska Industrial Development and Export Authority
AK ANG	Alaska Air National Guard
AMOC	Alternate Method of Compliance
ATTREX	Airborne Tropical Tropo-pause Experiment
AUVSI	Association for Unmanned Vehicle Systems International
AVAPS	Advanced Vertical Atmospheric Profiling System
BLM	Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
BP	British Petroleum
C2	Command and Control
CAD/CAM	Computer-aided Design/Computer-aided Manufacturing
CARVE	Carbon in Arctic Reservoirs Vulnerability Experiment
CBP	Customs and Border Protection
CFR	Code of Federal Regulations
CNC	Computer Numerical Control
COA	Certificate of Waiver/Authorization
CONOPS	Concept of Operations
CPB	Customs and Border Protection
CSAR	Combat Search and Rescue
CTA	Continental Control Area
DCCED	Department of Commerce, Community and Economic Development, State of Alaska
DETR	Department of Employment, Training and Rehabilitation, State of Nevada
DHS	Department of Homeland Security
DoD	Department of Defense

DOI	Department of Interior
DMVA	Department of Military and Veterans Affairs, State of Alaska
DOT&PF	Department of Transportation and Public Facilities, State of Alaska
EDCO	Economic Development for Central Oregon
EO	Electro-optical
EXCOM	UAS Executive Committee
FAA	Federal Aviation Administration
FEDC	Fairbanks Economic Development Corporation
FEMA	Federal Emergency Management Agency
FIR	Flight Information Region
FMRA	FAA Modernization and Reform Act of 2012
GDP	Gross Domestic Product
GOED	Governor's Office of Economic Development, State of Nevada
GWOT	Global War on Terrorism
HAMSR	High-Altitude MMIC Sounding Radiometer (MMIC also an acronym)
HF	High Frequency
HIRAD	Hurricane Imaging Radiometer
HIWRAP	High-Altitude Imaging Wind and Rain Airborne Profiler
HS3	Hurricane and Severe Storm Sentential
ICAO	International Civil Aviation Organization
IR	Infra-red
ISR	Intelligence Surveillance and Reconnaissance
JPARC	Joint Pacific Alaska Range Complex
LTFUAS	Legislative Task Force on Unmanned Aircraft Systems (Alaska)
MAAP	Mid-Atlantic Aviation Partnership
MIZOPEX	Marginal Ice Zone Observations and Processes Experiment
MODIS	Moderate Resolution Imaging Spectroradiometer
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NGA	National Geospatial-Intelligence Agency
NIAS	Nevada Institute for Autonomous Systems

NIC	Nanook Innovation Corporation
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NSSI	North Slope Science Initiative
NTV	Nanook Tech Ventures
OAM	Office of Air and Marine
OCS	Outer Continental Shelf
OEM	Original Equipment Manufacturer
OIPC	Office of Intellectual Property and Commercialization (UAF)
OR-UAS	Oregon Unmanned Aircraft Systems Business Enterprise
OSU	Oregon State University
PPUTRC	Pan-Pacific UAS Test Range Complex
PUR	Pendleton UAS Range
RCC	Rescue Coordination Center
R&D	Research & Development
ROW	Rights-of-Way
RT&D	Research and Technical Development
RDT&E	Research, Development, Testing and Evaluation
SAC	Special Airworthiness Certificate
SAREX	Search and Rescue Exercise
S-HIS	Scanning High-resolution Interferometer Sounder
SME	Subject Matter Expert
SSS	Sea Surface Salinity
SST	Sea Surface Temperature
TAMCC	Texas A&M Corpus Christi
TEES	Texas A&M Engineering Experiment Station
UA	University of Alaska
UAA	University of Alaska Anchorage
UAF	University Alaska Fairbanks
UAF-GI	University of Alaska Fairbanks Geophysical Institute
UAS	Unmanned Aircraft Systems

UAS	University of Alaska Southeast (for purposes of this document no acronym will be used)
UAV	Unmanned Aircraft Vehicle
USAF	US Air Force
USDA	US Department of Agriculture
USFS	US Forest Service
USGS	US Geological Survey
UNLV	University of Nevada Las Vegas
UTARI	University of Texas at Arlington Research Institute
VaCAS	Virginia Center for Autonomous Systems
VC	Venture Capital
WISPAR	Winter Storms and Pacific Atmospheric Rivers

PURPOSE

The State of Alaska Department of Commerce, Community, and Economic Development, Division of Economic Development, and the University of Alaska Center for Economic Development have developed this Unmanned Aircraft Systems (UAS) strategy document to guide the future expansion of the UAS-industry in Alaska.

The primary functions of the Division of Economic Development are research, business assistance, promotion, and development finance. These functions have influenced the focus of this study as the state hopes to leverage its existing competencies to develop UAS-related business opportunities.

This strategy document aims to advance the expansion of what is already an excellent economic opportunity for the state of Alaska. It focuses on growing related UAS industry sectors, advancing technologies in aerospace and aviation, and identifying opportunities for the Alaska workforce of the future.

Key long-term objectives related to the advancement of the UAS industry include the following:

1. Improve Alaska's unmanned system and aerospace industries business climate
2. Grow the UAS industry sector by encouraging private investment and job creation
3. Attract UAS sector anchor firms to Alaska
4. Promote UAS and aerospace research and development
5. Advance UAS and STEM education
6. Market and brand Alaska's UAS industry
7. Increase public sector education and engagement
8. Engage the FAA to produce a favorable regulatory framework for UAS operations.

The opportunities for Alaska's UAS sector are statewide. Alaska's existing geographic and technical assets, if developed in a strategic and intentional way, greatly increase the likelihood that the UAS industry will lead to economic opportunities and job creation for communities across the state.

As with any strategy document, this initial plan hopes to capture current thinking and data to frame the development of a strategy. This document is intended to be a living and changing plan and should be regularly revised and updated to reflect technological, political, and policy changes in both the public and private sectors.

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EXECUTIVE SUMMARY

Unmanned aircraft systems (UAS) are positioned to revolutionize the field of commercial aviation. This technology has already transformed the defense market and will soon have a similar impact in a variety of civilian industries. These devices can perform a number of tasks ranging from wildlife observation to search and rescue and pipeline inspection effectively, efficiently, and safely. With global UAS expenditures of $5.2 billion in 2013[1], industry analysts expect the market to more than double in the next decade, with a total value of $89 billion over the whole period. As an early leader in the testing and development of UAS regulations and applications, Alaska has the potential to benefit economically from this emerging sector. The state can increase benefits reaped by implementing investment strategies that encourage growth, innovation, and job creation.

Alaska offers unique advantages for the development of this new industry. First and foremost, the state has vast airspace available for testing UAS. While the Federal Aviation Administration (FAA) currently prohibits operating UAS in most civilian airspace, Alaska is a partner (with Hawaii and Oregon) in one of six FAA-designated test ranges across the country (see map below). Achieving this status is the culmination of a decade of path breaking research on UAS applications at the University of Alaska Fairbanks. Another regulatory advantage is the existence of the Arctic Airspace, a specially designated area over most of the Bering, Chukchi, and Beaufort Seas that will permit extensive UAS testing and some commercial operations. On the geographic front, Alaska provides a wide variety of landscapes and weather conditions for the testing and evaluation of aircraft over an immense area. Lastly, with the longstanding presence of resource development industries, military bases, civilian federal agencies, and other large actors, the state is home to a sizable potential market for UAS services.

Alaska test ranges, where FAA permits UAS testing

[1] "Teal Group Predicts Worldwide UAV Market Will Total $89 Billion in Its 2013 UAV Market Profile and Forecast" http://tealgroup.com/index.php/about-teal-group-corporation/press-releases/94-2013-uav-press-release

Despite these strengths, other states and nations see economic opportunities in the UAS industry as well. The intense competition requires that Alaska develop a competitive strategy that coordinates the efforts of numerous stakeholders within government, the University of Alaska system, private industry, and others. By 2017, the FAA will implement a regulatory framework that integrates UAS into the national airspace system (NAS), opening the skies to commercial UAS use and negating some of Alaska's current advantages. Most other states feature lower business costs and larger available workforces, as well as established incentive programs, to attract private investment. Capturing the economic benefit of a UAS industry in Alaska is thus a time-sensitive undertaking requiring strategic action.

RECOMMENDATIONS

A comprehensive strategy to grow and sustain a viable UAS industry for Alaska hinges on four major elements: business climate, innovation and entrepreneurship, workforce, and strategic partnerships.

Create a Strong UAS Business Climate

The business climate for UAS includes such elements as critical infrastructure, tax policies, and regulatory framework. Any strategies deployed to minimize taxes, finance infrastructure, and minimize the cost of doing business in Alaska will improve the overall business climate. Specific recommendations are as follows:

- **Strategically incentivize UAS investment to attract anchor firms.** Nationwide, most states and regions offer financial incentives (often in the form of tax credits or abatements) to attract businesses looking to expand or relocate. Alaska offers few incentives comparable to other states, but should consider them to offset the costs of doing business in the state. A state R&D tax credit, for instance, could provide businesses with corporate income tax relief.
- **Infrastructure investments.** Alaska must invest in critical infrastructure to support the continued development of the industry. This investment may include facilities, special use roads, airfields, or training centers. Infrastructure investments may be financed via public-private partnerships or such organizations as the Alaska Industrial Development Export Authority (AIDEA).
- **A coordinated, branded marketing effort.** Several states in competition with Alaska for UAS investment feature marketing efforts to attract investment in targeted industries, such as "Diversify Nevada." Such an effort would include a team to recruit companies and serve as business liaisons. Clearly presented financial incentives are an expected component.
- **Clear communication of the state's assets.** The state offers more airspace for UAS testing than any other, a long history with defense and aviation related industry, deeply rooted UAS expertise, and nationally-renowned aviation training programs. With a large and diverse land mass, Alaska is an excellent laboratory for testing UAS. These and other strengths need to be communicated clearly and effectively.
- **Business retention and expansion (BRE).** The State of Alaska DCCED has successfully launched a BRE initiative to identify the needs of the business community in the state and specific steps that can be taken to assist them. An aviation and UAS-specific BRE survey and engagement could yield information to encourage expansion of the industry.

- **State procurement of UAS services.** Where possible, state entities should consider employing UAS services in place of manned aircraft. This approach would be especially applicable for the Department of Natural Resources (DNR) or the Department of Environmental Conservation (DEC). In this way the state can promote UAS industry development while also realizing the greater efficiency and effectiveness of UAS.

Foster Innovation and Entrepreneurship

Alaska was an early leader in testing and evaluating UAS and has R&D capabilities within the University of Alaska system. The state and the university (along with other private sector stakeholders) must encourage spillovers of information that result in commercializing innovations. This can be accomplished through:

- **Targeted R&D efforts.** The University of Alaska system is well-suited to conduct R&D to further develop specific UAS applications, such as wildlife monitoring, search and rescue, or remote infrastructure inspection. These projects could be financed with a mix of public and private funds, with interested corporations sponsoring some of the R&D efforts. Public funding should support centers of innovation. Such centers could ensure the commercialization of research into viable products that will advance the industry. Several states have established technology funds for this purpose.
- **Development of a university research or technology park.** This real estate development integrates corporate R&D facilities into an area typically adjacent or in close proximity to a university campus. A key success factor is establishing a strong collaborative relationship between the university and industry partners. The corporations gain access to university facilities and brainpower. This access allows for the ability to recruit top graduates, and to sponsor targeted research. A business incubator or accelerator (a structured program to nurture early stage businesses) could be integrated into a research park with an emphasis on aviation and UAS-related firms.
- **Availability of early stage capital.** With the advent of the 49th State Angel Fund in Anchorage (and its spinoffs) and venture funds at UAA and UAF, the state has the capital availability to support high growth ventures. In addition to the Angel Fund, the state should consider other financing programs designed to provide early-stage capital to the state's most promising entrepreneurs. These different funding sources must be aligned to ensure that access to capital is achieved across Alaska.

Cultivate a Talented Workforce

The availability of skilled and semi-skilled workers has always been a challenge for Alaska's industrial development. A thriving UAS industry, however, requires a specialized workforce capable of piloting the vehicles as well as tending to the operational systems. A variety of ancillary services ranging from accounting to construction will also be necessary. Training and education needs can be met in the following ways:

- **Specialized coursework in UAS-related fields**. Both UAA and UAF offer aviation training

programs leading to degrees and certificates, including one course specific to UAS. Through the addition of UAS-related classes and the development of a certificate program targeted towards UAS, Alaska will be better poised as a training leader in unmanned aviation. The state will also benefit from the growth of a specialized workforce. Coursework and certificates for technicians in such fields as remote imaging and electronic systems will complement this training.

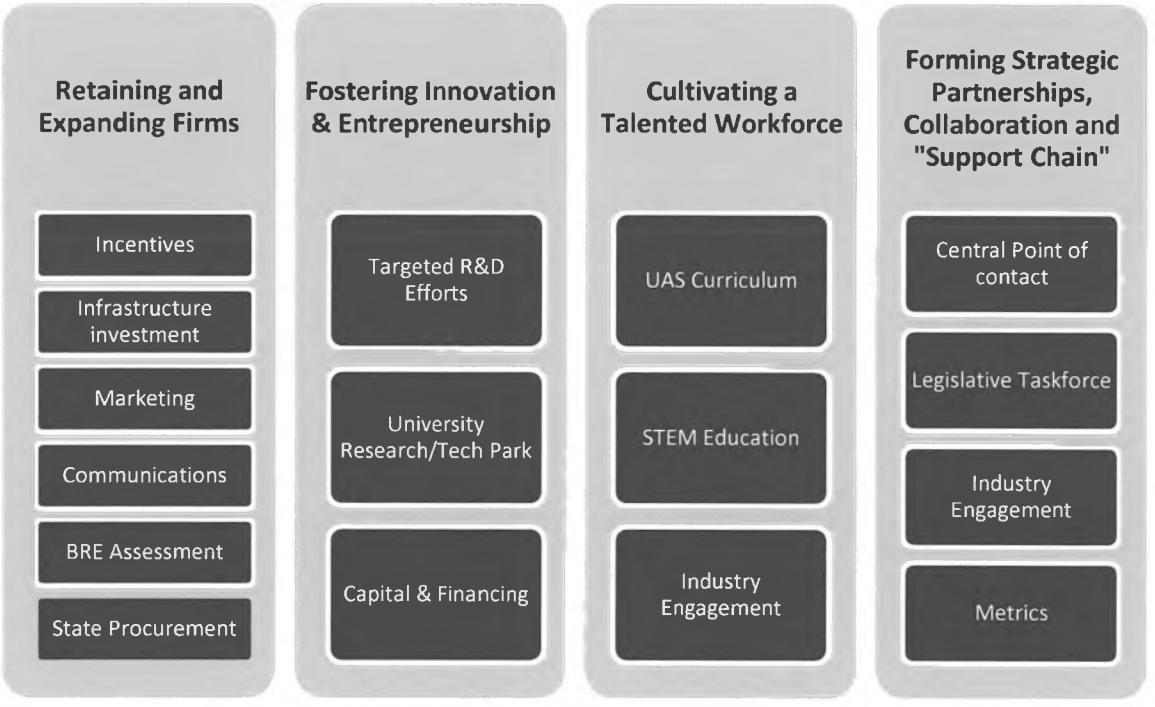
- **Invest in STEM education at all levels.** Activities could range from supporting youth robotics programs to expanding the Alaska Native Science and Engineering Program to ensure Alaska has a highly qualified workforce. Post-graduate education in advanced engineering disciplines will further help develop a specialized workforce. Funding is necessary for marketing and promotion materials dedicated to building a career in aviation-related industries.
- **Engage industry in determining needs and partnering to fund programming.** Establish an employer-driven, standardized core curriculum for post-secondary students. Provide tax incentives for specialized training programs funded by employers.

Improve Strategic Partnerships and Collaboration

Contributors to the development of the UAS strategy plan spoke to the importance of improved alignment between government, higher education institutes, and private industry to maximize the potential for successful industry development. The following strategies are recommended to improve collaboration:

- **Formalize the UAS Interest Group or create an office as a central point of contact to coordinate efforts related to UAS**. This office might initially coordinate the efforts of the major stakeholder groups to ensure that strategies are inclusive yet disciplined. It might also serve as a point of contact for private industry.
- **Continue and expand the legislative task force.** This body works to ensure policies and workforce training needs are adequately funded and aligned with industry needs. It should also make legislative recommendations on the development of incentive programs.
- **Engage industry leadership.** Promoting a dialogue with industry leaders can lead to productive and meaningful public sector activities. An industry association could help advocate for policies that encourage targeted and necessary investment.
- **Develop Metrics.** Outcome-based metrics can measure the impacts of incentives developed to support the UAS industry.

These strategies would position Alaska to compete as the UAS industry and related sectors evolve in the global marketplace. Alaska is in the enviable position of having several strong assets as it relates to leading in the UAS industry. Alaska must make a conscious decision to act in a strategic, orchestrated, and sustained way in order to stand out from competing regions across the globe.



The four major components of a UAS-centered economic development strategy for Alaska

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1. UAS Industry Background

Experiments with pilotless aircraft began at the end of World War I. These earlier aircraft were known as "aerial torpedoes" and "flying bombs" and used on an experimental or small-scale basis. Not unlike the manned aviation industry, the maturity of unmanned aircraft has sprung from military and special operations to civilian applications. These began with search and rescue before moving to non-military security, firefighting, pipeline surveillance, and agricultural applications. As the civilian industry has matured in recent years, the terminology has also evolved from "drones" to "unmanned aerial vehicles" (UAVs) to the now widely accepted term "unmanned aircraft systems" (UAS).

1.1 National UAS Background

Used sparingly in military operations prior to the Global War on Terrorism, UAS now make national headlines as they play supporting roles in both military and commercial efforts normally reserved for manned aircraft or satellites. For the past two decades, the Department of Defense (DoD) has driven the aerospace and defense industries to advance UAS related technologies with greater capabilities in the vehicles themselves as well as imaging technology. By 2009, the US Air Force (USAF) began to train more UAS pilots than manned fighter and bomber pilots.[2] Today, one-third of the USAF aircraft fleet is unmanned, and the US Army flew approximately 1 million UAS hours in 2010 alone. While the US reduces its presence in Iraq and Afghanistan, the number of UAS needed to support US military activity has remained constant, as DoD operations expand into Africa, the Philippines, and South America, and are incorporated into US and NATO maritime realms.

A note on terminology: drone, UAV, or UAS?
While unmanned aircraft are frequently referred to as "drones," unmanned aerial vehicle (UAV) is the established industry term. A UAV is defined by the *Dictionary of Military and Associated Terms* as a "powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload, or both." "Unmanned aircraft system" (UAS) describes not just the unmanned aircraft itself but all the other necessary components and infrastructure, such as the control system or ground control station, navigational equipment, communication control link or data link and ground-based pilot. For the remainder of this document, UAS will be the most frequently used term.

UAS come in a variety of sizes and configurations, ranging from those as small as an insect to as large as a commercial airliner. According to available research, small (under 55lbs) UAS constituted the vast majority of platforms in operation between 2005 and 2011 while

[2] Air Force Times http://www.airforcetimes.com/article/20090616/NEWS/906160319/More-training-UAVs-than-bombers-fighters

strategic (larger) UAS included some of the most versatile, typically operating up to 65,000 feet in altitude, with a maximum endurance (time in the sky) of more than 20 hours. The US Air Force categorizes UAS in five tiers, which will be referred to throughout this document:

- Tier N/A : Small/Micro, low altitude
- Tier 1: Low altitude, long endurance
- Tier 2: Medium altitude, long endurance
- Tier 2+: High altitude, long endurance conventional
- Tier 3: High altitude, long endurance low-observable

The success of US DoD applications for UAS has driven demand from other national governments to incorporate the technology into their own militaries. This trend is fueling a rapid growth in the international defense-related UAS marketplace.

In parallel, there is a growing understanding of non-military UAS capabilities and applications throughout civilian marketplaces to address "dull, dirty, and dangerous" or otherwise complicated tasks. UAS operations in the National Airspace System (NAS) has been primarily limited by the Federal Aviation Administration (FAA) to missions focused on public interest such as disaster relief, wildfire control, law enforcement, search and rescue, or related functions. Teal Group Corporation (a consultancy) reports indicate ***the primary challenges holding back commercial development are the lack of access to airspace for UAS research and development, as well as restrictive export control regulations for US manufacturers to other countries with more flexible airspace restrictions.***

Figure 1: Uses for UAS Technology

Non-Military UAS Applications	
Airworthiness Certification	**Provision of non-military Services**
Border surveillance	**Damage surveying**
Suspect tracking	**Aerial photography**
Traffic monitoring	**Wildlife monitoring**
Disaster response/relief	**Pipe/power line surveillance**
Damage assessment	**Agricultural applications**
Atmospheric/weather research	**Communications/broadcast**

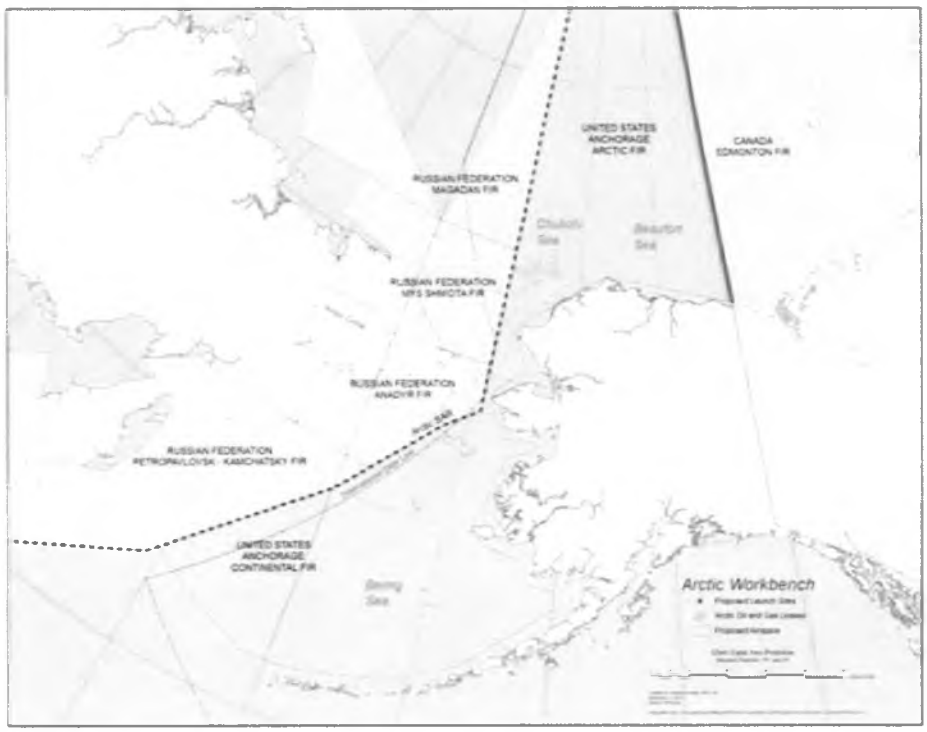
Critical infrastructure monitoring	**Movie production**
Aerial news coverage	**Flood mapping**
Mail/freight transport	**Real estate mapping**
Mining	**Sports event coverage**

Given increasing demand for use of UAS in domestic airspace, the FAA has taken initial steps to integrate UAS into the NAS, the largest, most complex air traffic system in the world. In the FAA Modernization and Reform Act of 2012 (FMRA), Congress directed the FAA to establish six "test ranges" to assist in developing the policies, procedures, and technologies required to integrate UAS into the NAS. In selecting the test ranges, the legislation mandated that the FAA, in consultation with the National Aeronautics and Space Administration (NASA) and the DoD, consider geographic diversity, climatic diversity, location of ground infrastructure and research needs in choosing the ranges.

Most significantly, the airspace encompassing Alaska's Arctic was given special consideration in the FMRA. Alaska was designated to be first in allowing commercial UAS. **In recognition of Alaska's role in UAS development, the act also established the Arctic Airspace, a unique region located off the coast of Alaska north of the Aleutians over the Bering, Chukchi, and Beaufort Seas up to at least 2000 feet, for 24-hour access by all types and users of UAS, with launch and recovery from selected coastal locations without the need for special permissions or waivers (see map below).**[3]

[3] The FAA is currently in the process of designating the Arctic Airspace, and as such the map reflects proposed areas.

Figure 2: Arctic Airspace



In 2013, the first commercial offshore UAS flights in the US were conducted about 50 miles northwest of Wainwright in the Chukchi Sea. Conoco Phillips, Insitu, and Olgoonik Fairweather conducted two commercial Scan Eagle flights from the R/V Westward Wind to investigate the viability of using UAS to conduct marine mammal surveys and ice reconnaissance. In the summer of 2014, BP and AeroVironment, Inc. conducted the first terrestrial UAS operations near Deadhorse, the center for Alaska's North Slope oil production. The UAS industry partnered with Alaska operators to conduct these historic flights and have scheduled many more promising operations to highlight the effectiveness of the technology.

The six FAA test ranges were announced in December 2013 and began operations in January 2014, initiating airspace access for researchers, government agencies, and industry towards assisting in the assimilation of requirements for integration of UAS into the NAS. The test range selection established range operators in Alaska, Nevada, New York, North Dakota, Texas, and Virginia. While the selection of test ranges does not provide wide-scale access to national airspace for commercial and civil purposes, the operational data collected will provide the FAA an opportunity to develop regulations for future commercial and civil uses in the NAS.[4]

[4] FAA UAS Fact Sheet - http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=15575

1.2 National UAS Economic Impact

UAS will likely become the most dynamic growth sector of the world aerospace industry this decade. UAS in civilian use will likely become a multi-billion dollar industry while opening new opportunities in scientific research and student education. The Teal Group Corporation, in its 2013 Small UAS (SUAS) Market Profile and Forecast, estimated that the global UAS market could be worth up to $89 billion over the next decade, and the US is expected to account for almost two-thirds of the world's research and development (R&D) investment in the field.[5] The same study predicts a UAS demand worldwide for R&D, testing, and procurement, rising from $6.6 billion in 2013 to $11.4 billion in 2022. Teal expects the US share of R&D to account for 62% of worldwide spending. In short, the development and manufacture of UAS for use by public entities and commercial consumers is expected to grow in the coming years despite the many regulatory and technical issues remaining to be addressed.

A number of US and international firms currently manufacture UAS for military and civil government operations. Depending on the mission, unmanned aircraft are typically equipped with payloads that provide multiple capabilities, including reconnaissance (surveillance and intelligence gathering) and in some cases attack capabilities. All UAS require a ground control component and a communications link to the unmanned aircraft. According to Forecast International, unmanned air vehicles will account for 46% of UAS spending, payloads for 38%, and ground control equipment for 16% during the next decade. US manufacturers with the largest share of the global UAS market are listed below.[6]

Figure 3: Global UAS Market Share (manufacturing)

Company	Global Market Share
General Atomics	20.4%
Northrop Grumman	18.9%
Boeing	1.5%
AAI	1.2%

The Association for Unmanned Vehicle Systems International (AUVSI) estimates that by 2029 more than 23,000 UAS jobs could be created in the US as the result of UAS integration into the NAS. New jobs will not only result with this industry growth, but also expand into academia, federal government agencies, and the civilian/commercial UAS support community. These new positions could translate into more than $1.6 billion in wages over the next 15 years. These jobs will emerge from the manufacturing sector; pilots and operators, data analysts, maintenance personnel, range and air traffic control management, and consultants will also

[5] World Unmanned Aerial Vehicle Systems. 2011 Market Profile and Forecast, The Teal Group Corporation, 2011.
[6] Graham Warwick and Larry Dickerson, "Cooling Down? Export and civil unmanned aircraft demand will grow, but mainstay military markets may slow." Aviation Week & Space Technology, December 31, 2012 p. 84

result. Universities are already developing curriculums targeted for these future positions and as preparation for related workforce training. Student demand has led to operator certification and maintenance programs. In a few instances, four-year professional degrees as well as advanced degrees are offered.

The increased demand for UAS will spur secondary employment growth in ancillary markets. For instance, sensor manufacturers, avionics providers, software developers, and composite manufacturers will add manufacturing and engineering personnel. Companies anticipate adding support staff, such as accountants, sales associates, managers, human resources specialists, insurers, and administrators to ensure business efficiency. Regions with a large UAS manufacturing or R&D presence will experience employment growth across employment sectors as spillover effects materialize.

An additional opportunity area—and perhaps the most relevant to Alaska—is an emerging market for UAS services. Large resource development companies and civilian government agencies have already exhibited need for a variety of imaging, mapping, and other services (Chapter 3 will describe several examples). The ability to operate UAS fleets and analyze data collected from unmanned aircraft will likely become a profitable business opportunity.

1.3 Alaska UAS Background

Within Alaska, UAS currently have an expansive breadth of applications. Several factors drive the use of UAS, including Alaska's vastness, abundance of natural resources, limited road access (and therefore remoteness), and extreme weather and terrain. These realities, coupled with Alaska's strong aviation-centric orientation (with six times more pilots per capita than the rest of the nation) have made the leap to UAS technologies a natural fit. UAS already support a wide array of activities, such as conducting scientific research and environmental monitoring by NASA and the National Oceanic and Atmospheric Administration (NOAA), oil spill mapping (response/environmental cleanup), weather forecasting, wildlife monitoring and counts, atmospheric sampling during wildfires, power line inspections, air quality monitoring and examination of sea ice build ups. Further applications tried in Alaska include whale observing, cadastral mapping, maritime navigation support, industrial plant and pipeline monitoring, oil and gas flare stack maintenance, and environmental cleanup response.[7] Furthermore, the opening of the Northwest Passage to shipping, the additional burden of providing potential assistance to those vessels, and related port developments lend themselves to UAS technologies. As evidenced by these examples, aviators, researchers, and industry collaborate

[7] Alaska Center for Unmanned Aircraft Systems Integration (ACUASI) presentations and interviews

closely to use unmanned aircraft for missions previously requiring manned aircraft at higher cost, greater risk, and with fewer capabilities.

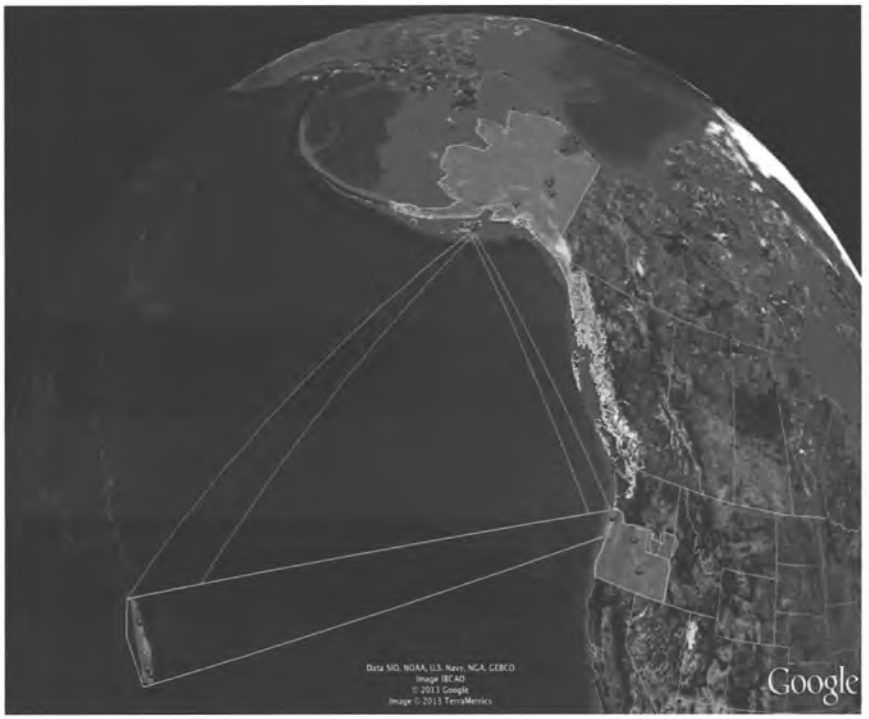
Throughout these initiatives, the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI) at the University of Alaska Fairbanks Geophysical Institute has been instrumental in developing a world-class program and successfully securing one of the six FAA test ranges to further this capacity. ACUASI was formally established in December 2012 by the University of Alaska Board of Regents to advance the study of UAS capabilities. Program roots reach back to 2001; over the years it has expanded its scope, obtained more advanced equipment, and increased the variety and complexity of research executed. The ACUASI mission is to serve as a research center for small, unmanned aircraft systems providing integration of unique payloads and supporting pathfinder missions within the government and scientific communities, with special emphasis on the Arctic region. ACUASI has worked on UAS projects all across the world, including projects in Iceland, Chile, and South Africa. For instance, ACUASI led a trip to South Africa in which they deployed UAS technology in an effort to find rhinoceros and elephant poachers. In recognition of the important role of UAS in Alaska, the Legislature appropriated $5 million from the state Capital Budget in 2012 to the UAF for the specific purpose of "Research and Development of Unmanned Aircraft Systems" and to support the development of sustainable high-tech industry in Alaska.

Who can legally operate UAS?
Until the FAA fully integrates UAS into the National Airspace System, unmanned aircraft may only operate under certain highly controlled circumstances. Under current FAA rules, there are three types of UAS that can be operated: civil UAS, public UAS, and model aircraft. Flying Civil UAS requires a Special Airworthiness Certificate to be issued for experimental purposes, such as R&D. UAS may not be used to transport people or property for hire. Public UAS requires a Certificate of Airworthiness (COA) that may be issued to a public entity to carry out a public purpose, such as law enforcement or search and rescue. Model aircraft are those operated by hobbyists at 400 feet or less within sight of the operator.

In 2012, ACUASI began collaborating with Oregon State University, the University of Hawaii, and several industry and government entities to propose a Pan-Pacific UAS Test Range Complex (PPUTRC). The PPUTRC, led by ACUASI, proposed test range research targeted towards the development of standards for UAS categories, state monitoring and navigation, and safety standards for UAS operations. **In December 2013 the FAA announced that PPUTRC was successful in its bid, awarding approval for 9 of its 13 proposed test ranges located in Alaska, Hawaii, and Oregon.** Of the 13 proposed ranges, six ranges are in Alaska (Denali, Kodiak, North Slope, Oliktok Corridor, Poker Flat, and Wainwright Corridor), three ranges are in Hawaii, and three ranges are in Oregon. Since designation, the FAA has opened the opportunity for PPUTRC to propose additional locations, and several have already been approved. In late 2014, ACUASI

entered into an agreement to expand testing operations to Iceland. The FAA test range designation runs through February 2017 in accordance with the FMRA. However, the FAA has stated that it expects to grant an extension, and after expiration will view the test sites as continuing operations to support long-term testing of new design UAS and supporting systems. Another issue of strategic importance is that the FAA test range designation comes with no fiscal support.

Figure 4: Alaska, Hawaii, and Oregon, the three states that form the Pan-Pacific UAS Test Range Complex (PPUTRC).



While this strategy plan focus is UAS related activities, **the University of Alaska Fairbanks via its School of Fisheries and Ocean Sciences, is also developing expertise with Marine Autonomous Underwater Vehicles (AUV).** The AUV program is symbiotic and complementary to other work with which the University of Alaska system is engaged relating to UAS and may ultimately lead to some crossover research, innovation and commercialization opportunities. At a later update this strategy document may want to incorporate AUV strategies for the emerging AUV sector.

1.4 Strategic Considerations

As the nation races to transition UAS from military to civil and scientific applications, an opportunity exists for Alaska to participate in the development of this industry and benefit from the associated economic development resulting in additional jobs. As already presented, Alaska

has some clear advantages or assets to leverage when considering UAS industry expansion including:

- Access to comparatively vast airspace for UAS research and development;
- Location (Arctic Airspace, a unique region located off the coast of Alaska north of the Aleutians over the Bering, Chukchi, and Beaufort seas);
- Aviation-centric orientation;
- An engaged university (the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI) at the University of Alaska Fairbanks within the Geophysical Institute has focused on UAS since 2001);
- FAA test range (the Pan-Pacific UAS Test Range Complex was awarded multiple test ranges located in Alaska, Hawaii, and Oregon).

While Alaska's position is enviable, unless the state strategically grows its opportunities from a nascent occurrence to an established industry, the potential value will not be realized. Over the next few years Alaska must transition from being a lead test range to an expanding center for UAS-related industries. Currently, all focus is on conducting missions and collecting the data the FAA needs to implement rules for the civil and commercial use of UAS. Simultaneously, more formal efforts to support the application of current UAS capabilities and development of new technologies and the advancement of uses for UAS are necessary. Other states with fewer strategic assets, even in some instances lacking a "test range" designation, are ramping up to further expand their presence.

Alaska has an opportunity to tap distinctive expertise and develop a new industry for the state, one that leverages its global position and unique competencies. Alaska has the potential to market and position itself as the best place nationally and globally to work out the issues of integrating the emerging UAS systems into the NAS, as well as commercializing technologies into private sector uses. Alaska must face the challenge of how best to link and align these assets to grow a prospering new industry.

2. Alaska's UAS-Anchor Assets

Alaska possesses key anchor assets which, if coordinated properly, can help the state to develop a thriving and integrated UAS industry. These assets come from a broad spectrum of organizations, including the University of Alaska, the US military, and several public sector stakeholder groups that have formed in response to the development of UAS within Alaska. The key moving forward will be to align the efforts of these diverse organizations as they work toward the common goal of building a strong UAS industry within Alaska.

2.1 University of Alaska

A key asset in developing its Unmanned Aircraft Systems industry is the University of Alaska system. The University of Alaska Fairbanks (UAF) and the University of Alaska Anchorage (UAA) both possess a number of core competencies that position them well in supporting the development of a UAS industry within the state. The two universities have significant experience in aviation, aviation maintenance, aerospace, and unmanned systems. In addition to offering coursework each possesses state-of-the-art facilities and training equipment. Through the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI), the UA system has emerged as an early leader in testing and evaluating UAS.

Moreover, the University of Alaska system is committed to economic development and industry partnerships. The Shaping Alaska's Future Initiative details the commitment to continuous improvement and innovation. Relevant themes of the initiative include: Productive Partnerships with Public Entities and Private Industry; R&D to Enhance Alaska's Communities and Growth; and Accountability to the People of Alaska. Through these initiatives the UA system is working to modernize, streamline and improve by investing in areas of real need and eliminating areas of barrier. The following table outlines the major assets of both UAF and UAA in terms of their collective coursework, facilities, and other relevant attributes. This chapter also reviews Alaska's other anchor assets such as its UAS Interest Group, military presence, aviation/aerospace competencies, and Arctic location.

Figure 5: University System Anchor Assets

Entity	Asset	Details
University of Alaska Fairbanks	Alaska Center for Unmanned Aircraft Systems Integration (ACUASI)	A nationwide leader in the testing of UAS applications; one of the first centers of its kind and the lead entity in the Pan Pacific Test Range Complex
	Poker Flats Research Range	Largest land-based research rocket range in the world. Alaska's first UAS test site.

	Office of Intellectual Property and Commercialization (OIPC)	Leases university-owned patents to businesses. Also manages Nanook Tech Ventures spinoff, a venture capital fund.
	Aviation Program	Possesses large hangar and degree or certificate programs in aviation, airframe, and power plant maintenance.
University of Alaska Anchorage	Office of Technology Commercialization	Leases university-owned patents to businesses. Also manages Seawolf Venture Fund.
	Aviation Program	One of nation's top ranked aviation programs, with programs in air traffic control, professional piloting, aviation technology, and aviation administration. Under Center of Excellence designation, performs aviation safety research with other top aviation schools.
	Business Enterprise Institute	Hosts Center for Economic Development, Alaska Small Business Development Center and other entities. Serves as a bridge between academia and private industry.

2.1.1 University of Alaska Fairbanks

Leading the charge for the development of an unmanned aircraft systems industry in Alaska is the University of Alaska Fairbanks (UAF). The university is the official host of the Pan Pacific UAS Test Range Complex, and has a long history of working with UAS technology. In fact, UAF was one of the first universities in the country to begin working with unmanned systems. UAF took on a leadership role in establishing ACUASI, the only center of its kind in Alaska, and one of only a small number nationwide. ACUASI began its operations in 2001, when it began investigating UAS technology and potential applications. Since then, the center has conducted associated research and flight missions with the aid of UAS technology in a variety of areas including sea ice, fish and wildlife observations, firefighting, environmental cleanup, and climate research. ACUASI has conducted significant UAS-related research in Alaska, across the nation as well as internationally.

Another UAF asset is its Poker Flat Research Range, which serves as one of the state's six test ranges through the FAA test range selection. The Poker Flat Research Range is one of the

most advanced ranges of its kind anywhere. The range is the single largest land-based rocket range in the world and is the only high-latitude rocket range in the United States. The range first began its testing of UAS in 2004, and has scaled up its research activities since that time. The range is now home to more than two dozen UAS models, including everything from the 2.5 pound Aeryon Scout (the range's smallest UAS) to the 40 pound Insitu A-20, the range's largest. In addition to its core competencies directly related to UAS technology and research, the range is also unique in being the only university-owned rocket range in the world.

Poker Flat Research Range

UAF conducts approximately $120 million per year in research. The Office of Intellectual Property and Commercialization (OIPC) leads efforts to commercialize UAF research in direct support of business development and job creation. While OIPC develops and protects intellectual property for UAF, the separate nonprofit, Nanook Innovation Corporation (NIC), is charged with licensing new technologies to existing companies or creating startup companies through its subsidiary, Nanook Tech Ventures (NTV). In 2014 alone, 75 inventions were reported to OIPC, patent filings were up over 130% from FY13, 2 patents were granted, and 40 technologies were licensed through 6 licensing agreements from NIC to private companies. Royalties from NIC licenses are returned to the University to promote innovation and development. Also in FY14, NTV created the startup company ArcticFire Development Corporation that will commercialize unmanned aircraft software.

UAF is also a core partner of the proposed FAA UAS Center of Excellence team being led by Mississippi State University. This team, called the Alliance for System Safety of UAS through

Research Excellence (ASSURE), consists of eighteen of the world's leading research universities and roughly one hundred leading industry and government partners. ASSURE possesses the expertise, infrastructure, and outstanding track record of success that the FAA Center of Excellence for Unmanned Aircraft Systems requires. In addition to UAF, members include Oregon State University, the University of Kansas, and Auburn University. ASSURE members are core to three FAA UAS test sites, lead four FAA research centers, have seven airfields and a 340 UAS fleet—24 more UAS than the USAF. If ASSURE succeeds, each core University team member will receive a contract with the FAA to support UAS research in their individual areas of expertise. For Alaska this will include a focus on low altitude operations, efforts related to extreme climates, human factors, and pilot training and certification.

UAF's many resources and core competencies, including its expertise in rocketry, unmanned aircraft systems, technology transfer, and aviation maintenance, make it a strong resource in developing an integrated UAS industry in Alaska.

2.1.2 University of Alaska Anchorage

The University of Alaska Anchorage (UAA) possesses many core competencies allowing it to play a significant role in the UAS industry. UAA is especially well known for its aviation programs, which are often regarded as among the best in the nation. UAA also supports a growing research portfolio, is expanding its technology transfer competencies, and has decades of experience supporting industry through addressing technical assistance needs. Offering education, providing industry technical assistance, engaging in public policy needs and research related to unmanned aircraft systems are natural extensions of UAA's already existing programming.

UAA's aviation students can obtain degrees in air traffic control, professional piloting, aviation maintenance technology, and aviation administration or choose to minor in aviation technology. The FAA ranked UAA's air traffic control program 3rd out of 31 certified Collegiate Training Initiative (CTI) schools. CTI schools are those designated by the FAA for meeting the specific requirements necessary to produce certified air traffic controllers for the agency. A state-of-the-art air traffic control simulator is a central asset of the program, with a full 360-degree interface, and is one of only a handful worldwide.

UAA's specialties in the aviation and aviation maintenance fields feature several core competencies that have clear applications in the UAS field. Seeing this potential opportunity, UAA has taken on a leadership role in developing curriculum around unmanned aircraft systems. Starting in the fall 2014 semester, UAA became the first school in the state of Alaska to offer a UAS class. The class, "Introduction to Unmanned Aircraft Systems," provides students with an overview of UAS technology. The course informs students of present and future missions, as well as a detailed study of sensors and mission development. Further, the UAF ACUASI team helped develop the course.

Another program at UAA, the Business Enterprise Institute (BEI), links economic development programs across the UA system and supports businesses with technical assistance and the expansion of entrepreneurial capacities across Alaska. Providing economic development-related research and technical assistance, high-level professional education, small business development services and youth entrepreneurship programming, BEI serves as a bridge to expertise and talents throughout the UA system. BEI's programs, which include the Alaska Small Business Development Center and the Minority Business Development Agency, are becoming better versed in the needs and opportunities of UAS related business development and will assist both existing and startup firms with their business development needs. The UA Center for Economic Development also reports through BEI and provides technical assistance in the form of information, research, data and "know-how" in evaluating, shaping and implementing specific projects and programs that promote economic development.

UAA expertise in aviation and economic development, coupled with its leadership in establishing course offerings on UAS, position the university well to aid the coalition of organizations in helping to grow a UAS industry in Alaska.

2.2 Military[8]

The military represents a major sector of Alaska's overall economy, as military personnel routinely relocate to Alaska to receive specialized training. This strong influence on Alaska's economy is highlighted by the Department of Labor, which has pointed out that the military's influence on Alaska can be viewed as one of the state's leading exports, as troops positioned in Alaska bring new revenues to the state and thus provide large numbers of indirect jobs.

Beginning in 1993, the military presence in Alaska began declining from a peak of 30,800 personnel. The terrorist attacks of 2001 and the wars in Iraq and Afghanistan then led to a large influx of military to Alaska. While total troops fell to 17,631 in 2000, by 2009 the active duty count in Alaska climbed to 24,449. The vast majority of current UAS innovation and use is via the Army and Air Force, both of which have substantial installations in Alaska.

According to the *Alaska Economic Trends* magazine, the military's economic reach includes a large civilian workforce as well. In 2012 Alaska had more than 7,000 defense-related civilian jobs with a payroll of $452 million and average earnings of $62,278. Civilians provide base support ranging from highly technical skillsets to construction to retail workers in the commissaries. The Anchorage and Fairbanks areas are home to 90 percent of all Alaska-based uniformed military and their dependents.

[8] Alaska Economic Trends, December 2013 – The Military and Alaska's Economy

The military has increasingly outsourced or sought private contracting opportunities. In 2010 approximately $2.2 billion in military contracts were awarded in Alaska. In 2009, Arctic Slope Regional Corporation topped the Alaska contractors list at $151 million. These contracts include utilities, housing, security, specialized technical support, food services, and janitorial services.

In 2009, defense spending in Alaska totaled $44.9 billion, or about 10.77% of Alaska's total GDP. Procurement contracts account for approximately $2.2 billion or 45% of total defense spending, with salaries and wages accounting for $2.7 billion. On a national comparison, defense spending equated to $6,999 on a per capita basis as compared to $1,719 nationally.[9]

One strategy for Alaska is to work with the federal government through our Congressional Delegation not only to maintain, but also grow our military presence in Alaska by expanding its current focus to include UAS competencies and innovation. Similarly, targeting future defense spending toward UAS activities and capturing those dollars for Alaska will further strengthen UAS industry development. Alaska's strategic location and the opening of the Arctic call for expanded military and homeland security measures. While much work has already been placed here, it will be imperative to deploy strategies that focus on military expansion, particularly UAS-related business development strategies that involve federal investment.

Figure 6: Alaska's Military Anchor Assets

Entity	Asset	Details
US Army	Fort Richardson (now JBER)	62,000 acres, a helipad, and firing ranges. Located near Anchorage.
	Fort Greeley	Part of US missile defense system and home to Cold Regions Test Center for testing vehicles and weapons systems in cold climates. Located near Delta Junction in the state's Interior.
	Fort Wainwright	Long history as aviation testing center (Ladd Field) with large airfield. Located near Fairbanks.
US Air Force	Eielson AFB	Home to F-16 fighters and a candidate to receive F-35 fighters. Currently hosts Gray

[9] Source: Impact of Defense Spending: State by State Analysis, Bloomberg Government Study November 17, 2011.

		Eagle. Located near Fairbanks.
	Elmendorf AFB (now JBER)	Home to F-22 fighter and part of the Pacific Command. Located near Anchorage
US Coast Guard	Bases and support operations throughout coastal regions	Assets include bases in Ketchikan and Kodiak, air stations in Sitka and Kodiak, and cutters stationed in 13 communities.

2.3 Other Anchor Assets

In addition to its university and military assets, the State of Alaska also possesses many other key anchor assets that will support the development of a strong UAS industry. These assets include geographic and industry-related core competencies, as well as several public entities that have formed to guide leadership on UAS and other aviation-related issues.

One of Alaska's key anchor assets within the public sector is the Alaska UAS Interest Group. The group was formed in 2006 to bring together UAS industry members from both the public and private sectors. The interest group includes a broad cross section of entities, including the Department of Interior, the US military, FAA, Department of Energy, and several UAS manufacturers. The interest group has an immediate goal of building a stronger network of Alaska UAS entities and projects, and a longer goal of positioning Alaska as the UAS location and test range in the US for both commercial and military sectors.

Another asset for Alaska's UAS industry is the formation of the FAA Arctic Team. The team was formed to address the many changes occurring within the Arctic. Increasing global temperatures have caused the melting of Arctic sea ice. This rapid melting may provide an opportunity for the development of Arctic shipping lanes, and a need for research into the changing climactic conditions of Alaska's Arctic.

Within the FAA Modernization and Reform Act of 2012, specific language was included to address the expanding use of UAS technology within the Arctic. This UAS expansion in the Arctic will provide such benefits as increased scientific research, environmental analysis, fisheries and marine mammal observations, oil and gas leasehold management and maritime route planning. According the Act, the Secretary of Transportation must develop a plan to designate permanent areas in the Arctic where small UAS may operate 24 hours per day for research and commercial purposes. Having a specially-designated zone for UAS use within Alaska could prove crucial in attracting and developing a thriving UAS industry within the state.

Key stakeholder members of the FAA Arctic Team are as follows:

- National Oceanic and Atmospheric Administration (NOAA)
- United States Coast Guard
- National Aeronautics and Space Administration
- Department of Energy
- Department of Interior
- UAS Executive Committee Senior Steering Group
- Department of State
- Arctic Council and its member states
- Cross Polar Working Group
- Marine Mammal Commission
- International Civil Aviation Organization (ICAO)
- State of Alaska

Figure 7: Alaska's Public Entity Anchor Assets

Entity	Asset	Details
Alaska UAS Interest Group	Participants include FAA, Department of Interior, DoD, Department of Energy, ACUASI, and private industry	Group exists to provide leadership and coordinate UAS related activities.
FAA Arctic Team	Various public entities including Department of State, Department of Energy, Coast Guard, NASA, State of Alaska, Arctic Council, and others.	A stakeholder group advising on policies related to Arctic aviation
Alaska Aerospace Corporation	Kodiak Launch Complex	The only high-latitude rocket launch complex in US.

2.4 Strategic Considerations

Alaska is well positioned to lead the nation in the integration of UAS into the NAS. Such assets as the University of Alaska, the UAS Interest Group, the US Military, and its other public sector assets make Alaska a potential leader in research and testing, and in the establishment of a UAS education and business development system. As it relates to UAS education, there is great opportunity to design, test, and exhibit to FAA a proto-type UAS pilot certification program, which would include the following:

- Degree or Certification Completion Standards
- Practical Test Questions
- Manual System (similar to Part 141)

- Integration of UAS into existing degree programs (i.e. engineering or business)

Similarly, ACUASI and the UAA Business Enterprise Institute could align and become a stronger focal point for UAS industry development in support of leveraging the University of Alaska's other assets. Each of these programs is well versed in serving as the face of the university to public and private entities as well as to economic development organizations across Alaska. Each of these programs is also well situated to identify and secure additional sources of funding to support research, teaching expansion and business and economic development growth.

It is also recommended that the Alaska UAS interest group develop plans for a more formal organization. The Cascade Chapter of the Association of Unmanned Vehicle Systems International (AUVSI), which represents the states of Oregon and Washington, offers one model. The Cascade Chapter was established in 2009 with 25 members and is now the second largest chapter with just over 292 members in 2014. The Cascade Chapter has spurred the formation of working groups to address specific areas of industry development including: programming, membership, finance, government and media relations, and education initiatives. Ultimately this form of organization encouraged the sharing of resources to allow for the hiring of an executive director to promote and lead the industry working group. This level of organization has been significant in facilitating collaboration across industry, academia and government agencies. Supporting the transition of the UAS interest group towards becoming a standalone organization that has a sole purpose of linking and aligning industry members is recommended.

Figure 8: a UAS flight station

3 ALASKA UAS MARKET OPPORTUNITIES

One of Alaska's chief advantages for the development of a thriving UAS industry is the significant federal investment within the state. Many federal agencies have significant expenditures within Alaska because of the state's strong military presence, and the many natural resources under the federal government's control. As a whole, the state consistently ranks at or near the top nationally in federal expenditure per capita. (e.g. $17,762 in 2010) Defense spending accounted for over $7,000 in 2010, placing the state second nationally. These federal funding sources drive a substantial portion of the state's economy; they will likely be instrumental in the success or failure of a UAS industry within Alaska.

The oil and gas sector is another large potential customer for UAS services. As mentioned in Chapter 1, both ConocoPhilips and BP, Alaska's two largest oil companies, have used UAS to monitor wildlife and sea ice conditions. Other oil-and-gas related applications include pipeline inspection and emergency response.

The technology has high potential application within the state, with broad research and data collection needs possible from many agencies at both the federal and state level. This demand could spur the growth of the UAS industry. The potential for substantial demand within the government sector presents Alaska with an opportunity to grow its UAS capabilities and to build its core competencies, allowing the state to be ready to capture the private sector demand as it becomes available following the implementation of UAS into the NAS.

We anticipate that much of the statewide demand for UAS technology will come from research activities, including research into UAS capabilities and testing, and activities carried out by UAS, such as volcano monitoring and wildlife management. If the demand for the technology is great enough, it may become large enough to support some level of UAS components manufacturing and maintenance, as well as the operation of UAS services for government or the private sector

This chapter provides an overview of the existing and potential demand for UAS services in Alaska and includes a table that outlines the major likely customers for UAS technology.

3.1 FEDERAL MARKET DEMAND

One of the largest sources of market demand will continue to come from the federal side. Many federal agencies have unique demands currently serviced through UAS technology and could be expanded with Alaska in mind. **In order for Alaska to serve the federal marketplace, it will be important to identify those areas in which the state is best suited to compete. This will require an honest and ongoing assessment of the state's core competencies and weaknesses.** By focusing energy on those markets in which it has the best opportunity to succeed, the state will allow itself maximum return on investment for any

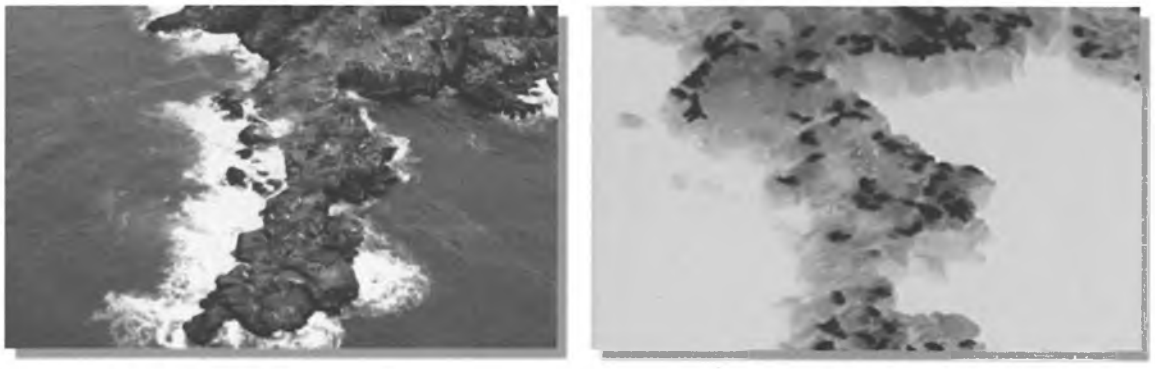
financial investments made. Within the federal sector, two areas show the most promise: agencies with a research emphasis and the military. Each will be discussed in turn.

3.1.1 Civilian Agency Demand

Government agencies outside of the DoD have pioneered several UAS applications in Alaska (although NASA falls under DoD, it is discussed separately from other military agencies). Some specific examples highlight the utility of UAS technology in the state and suggest a variety of applications that can be built into viable business opportunities:

- In 2009, NOAA began using Scan Eagle UAS developed by Insitu, a subsidiary of Boeing, to monitor sea lions in the Aleutian Islands as well as volcanic ash in multiple locations.[10] The Scan Eagle and Aeryon Scout UAS, both equipped with infrared image sensors and cameras were used to locate hot spots within wildfire perimeters.
- The Scan Eagle was also used to combat fires including the Crazy Mountain Complex fire of 2009[11] and the Funny River fire of 2014.[12]
- In 2010, NASA and Northrop Grumman partnered to launch the Global Hawk Advanced Concept Technology Demonstrator under NASA operation. NASA's Global Hawk Pacific environmental science campaign took the Global Hawk on its longest flight from California over Alaska and the Arctic Ocean.[13] In 2011, the Global Hawk was again used in Alaska to complete the Winter Storms and Pacific Atmospheric Rivers (WISPAR) research to explore atmospheric conditions and collect observations to improve weather forecasting.[14]
- In 2012, NASA also supported the Marginal Ice Zone Observations and Processes EXperiment (MIZOPEX) research, which was flown by UAF's Nanook version of the ScanEagle. The MIZOPEX mission collected data on ocean surface temperature and salinity by employing the unique capabilities of multiple UAS, including the NASA SIERRA, Scan Eagle and a micro UAS.[15]

[10] National Marine Mammal Laboratory - http://www.afsc.noaa.gov/nmml/polar/research/uastests.php
[11] Unmanned Aircraft Maps Alaskan Forest Wildfires - https://www.youtube.com/watch?v=sYfOyriR-ws
[12] UAF Geophysical Institute - http://www.gi.alaska.edu/node/1826
[13] NASA's Global Hawk Aloft on 28-Hour Arctic Flight - http://www.nasa.gov/centers/dryden/status_reports/Global_Hawk_03_11_10.html#.VASkhPldUvw
[14] NASA Global Hawk Complete Atmospheric Rivers Study - http://www.nasa.gov/centers/dryden/status_reports/global_hawk_03_10_11.html#.VASlwPldUvw
[15] NASA Airborne Science Program - https://airbornescience.nasa.gov/content/Marginal_Ice_Zone_Observations_and_Processes_EXperiment_MIZOPEX



UAS pared with heat sensing technology is used to count Stellar Sea Lions in the Aleutians for NOAA (photo courtesy of ACUASI).

The most promising agencies with regard to UAS technology use in Alaska are those with a dedicated research purpose, such as NOAA, NASA, and US Geological Survey, and those managing lands in the state, such as the National Park Service and US Forest Service.

3.1.2 U.S. Department of Defense (DOD) Demand

The DoD is charged with coordinating and supervising all agencies and functions of the government concerned directly with national security and the United States Armed Forces. Given the significant budget of the DoD, and historical activity within the industry, it is likely that the DoD will continue to be one of the largest buyers and operators of UAS technology in the coming years. The DoD will continue to require support from UAS platforms and services, particularly the platforms currently in use. It will also need significant airspace to test the technology across a variety of landscapes and conditions. Growing challenges around the world will drive the need for greater enhanced, long-range ISR (Intelligence, Surveillance, and Reconnaissance) capability while any troops on the ground will require light, flexible platforms and payloads.

The DoD currently uses a wide variety of platform and payloads to meet the needs of the Army, Air Force, Marines, and Navy. The Army currently employs AAI's RQ-7 Shadow in Alaska for ISR, target acquisition and battle damage assessment. **In 2015, the army will expand its operations by adding the Grey Eagle platform to Ft Wainwright. The Army and USAF are both likely to base additional UAS units in Alaska, particularly as the Arctic generates geopolitical and commercial interest.**

3.1.3 State Government Demand

While the bulk of demand for UAS technology has historically come from the federal level, an emerging market will be those agencies and organizations at the state level with similar or complementary purposes as their federal counterparts. These agencies (i.e. Environmental Conservation, Fish and Game, Natural Resources, etc.) may potentially benefit from incorporation of UAS technology. **Given the state's mission and efforts already underway**

to support the development of an Alaska-grown UAS industry, meeting the State of Alaska's own demands with the incorporation of UAS technology is a natural expectation. This strategy may prove an effective means to build core industry competencies, enable for testing of additional uses and ultimately position Alaska to better compete for increased market share out-of-state.

Opportunities may exist to support Alaska's Air National Guard, the Alaska State Troopers and municipal police programs. Given Alaska's geographic challenges, permitting Alaska State Troopers the use of UAS may be beneficial in addressing agency needs as well as testing and further proving uses for the emerging technology. Agencies such as, the Alaska Department of Fish and Game, which often use manned aircraft to accomplish wildlife management activities, may find value in augmenting their services with UAS and thereby improve safety as well as information access.

3.1.4 Oil & Natural Gas Development Demand

The security of pipeline infrastructure and emergency response support for oil spills directly affect US national security. Given the special importance placed on the security and proper operations of oil infrastructure, UAS technology may have potential application within the oil and gas industry. The oil and gas industry has been responsible for much of Alaska's economic growth for 40 years.[16] Oil revenues fund most state services including the education system, transportation infrastructure, public health, and safety services. Since statehood, Alaska has received $164 billion in revenues from oil. An industry of this size brings the need for continued exploration, risk mitigation, and security monitoring. For these reasons, Shell, Conoco Phillips, and others all await unrestricted use of UAS in the Arctic.

Currently, the oil companies employ aerial technology throughout the course of their operations, including some early use of UAS. The industry is expected to become a major customer for the technology once a regulatory framework is in place. State entities with a regulatory role in the oil and gas industry, such as the Departments of Environmental Conservation (CED) and Natural Resources (DNR), should work with the FAA to ensure their interests are represented.

[16] State of Alaska Resource Development Council, website, http://www.akrdc.org/issues/oilgas/overview.html

Figure 9: BP Utilized Aeryon Scout for Pipeline Inspections Jun 2013 [17]

Presently, oil companies have incorporated a variety of manned fixed wing and rotary platforms to collect data and monitor infrastructure. These firms have been early adopters and experimenters with varied UAS platforms. Current adoption seems restricted only by FAA regulations on their use.

3.1.5 International Market Demand

At present, the United States is the world's key market for UAS technology. However, the limited availability of airspace for UAS restricts market growth. Other countries are pursuing efforts to develop the technology for their own purposes, but are also eagerly awaiting the US, specifically the FAA's integration of UAS with manned aircraft. The current efforts toward development of a UAS industry in Alaska will continue to attract potential international market opportunities, particularly in high-interest nations such as Canada and Japan. The Canadian military continues to research UAS uses and programs, and opportunities exist for synergistic missions across the scientific research and environmental monitoring communities. Further, opportunities exist to launch flight simulation and other UAS training programs to reposition the US and Alaska as leaders in this arena. The successful implementation of a UAS industry within Alaska will need to focus on domestic customers, while at the same time expanding research, training and other opportunities via international markets.

3.2 Strategic Consideration

As reviewed throughout this chapter, significant market opportunity exists across Alaska from federal, state and private sector stakeholders. These industry players are already deriving mutual benefit from their proximity, shared needs, and connections.

A more structured UAS interest group will provide significant benefits to the advancement of the UAS industry sector in Alaska and spur the ability of Alaska to compete in the global UAS economy. The role of the UAS interest group will facilitate a stronger

[17] Alaska Uses Drones to Inspect Oil and Gas Pipelines at a Fraction of the Cost, The Raw Story, June 7, 2013, http://www.rawstory.com/rs/2013/06/07/alaska-uses-drones-to-inspect-oil-and-gas-pipelines-at-a-fraction-of-the-cost/

environment for success. The focus should be on expanding and growing the UAS industry strategically beyond its present state. The UAS interest group will need to act as the hub and in this role facilitate engaged and strategic conversations involving all stakeholders to improve production and sharing of information, logistics, workforce development, and the identification of infrastructure needs. Alaska must compete with the rest of the nation and the world by staying abreast of innovations and leading advancements in business and workforce development.

As previously noted, the Cascade Chapter of the Association of Unmanned Vehicle Systems International (AUVSI) representing the states of Oregon and Washington, may be an industry group to emulate. A significant outcome of the Cascade Chapter has been the collaboration of private sector leaders, elected officials, education leaders, and even interested non-governmental entities. Key has been the formation of working groups or initiative areas to address specific needs common to industry development including deepening skills and talent, aligning innovation investments, accelerating entrepreneurship, and raising global awareness of the industry. Membership with the industry group, however, is not enough to achieve industry expansion. A successful Alaska based industry group must use the platform to encourage tighter relationships between industry stakeholders and then leverage the relationships to drive forward shared actions, policies and programs for ultimate expansion of the industry.

The State of Alaska can aid in the development of a stronger industry group through supporting tax and incentive policies, targeting education, training and research investments, streamlining regulations, and encouraging greater access to seed and venture capital. Conversely, a strong industry group can advocate for UAS-friendly policies (such as those recommended in this report) within the Legislature. The appointment of a special liaison to the interest group will likely be beneficial until the group can afford its own executive director. While the state—through DED or another entity—can help spur the creation of a strong industry group, it must ultimately be led by the private sector.

Potential or Actual Customers for UAS Services

Market Segment	Customer	Current/Potential Usage	Other Information
Federal Government			
	Department of Defense	• Long range ISR(Intelligence, Surveillance, and Reconnaissance) • Target acquisition and battle damage assessment	• US Army currently uses UAS for ISR in Alaska. • One of the largest current buyers of UAS technology.
	NASA	• Climate/weather research • Volcano research and remote thermal sensing • UAS traffic management research	• NASA is exploring ways to integrate UAS into the NAS. Their Traffic Management Project is interested in testing in Alaska.
	NOAA/National Marine Fisheries Service	• Fisheries research/monitoring • Climate/weather research • Arctic sea ice monitoring • Oil spill surveys • Marine mammal surveys/monitoring	• NOAA/NMFS have a strong Alaska footprint • NOAA currently uses UAS technology in their scientific research
	Department of Homeland Security	• UAS for Alaska/Canada border patrol • Drug trade monitoring	• DHS currently uses UAS technology for border patrol with Mexico and Canada

	Bureau of Land Management	• Mineral and energy development • Land-use planning and monitoring • Fire management • Evaluation of stream & watershed enhancement projects • Water quality & habitat analysis • Climate change analysis • Management of fish and wildlife resources	• BLM currently uses manned aviation with visual scanning/counting techniques. Not currently using UAS technology. • BLM currently manages 1/5 of Alaska's surface lands and wetland areas
	Bureau of Ocean Energy Management	• Oil & Gas site identification for land leasing • Resource evaluation and assessment • Geological data acquisition • Environmental stewardship • Regulations and guidance	• BOEM uses collected data to create a database for environmental and mammal health trend analysis. • BOEM does not currently employ UAS technology. • BOEM currently uses manned aircraft w/ visual counting techniques.
	National Park Service	• Fire and aviation management • Lands management • Personnel transport • Law enforcement • Information technology • Resource/wildlife management • Visitor protection (search and rescue)	• Alaska has 60% of all land managed by NPS in the US. • NPS currently uses manned aircraft for visual monitoring and detection.
	US Geological Survey	• Climate change and land usage • Energy and minerals research • Environmental management • Natural hazard research	• USGS incorporates UAS technology into many data collection methods. • Most data collection is still generated through manned aircraft methods.
	US Department of Agriculture	• Precision agriculture • Vegetation mapping • Terrain extraction/monitoring	• USDA is currently experimenting with Tier I, small UAS for precision agriculture, vegetation mapping, and terrain extraction/monitoring.

	US Forest Service	• Land mapping • Forest management • Fire prevention/management	• USFS serves as the premier leader in wildland fire management operations, computer simulated fire management programs and sophisticated resource tracking systems. • USFS currently uses UAS equipped with low-cost digital cameras to acquire thousands of images. • USFS uses UAS technology to generate mosaics for the creation of vegetation maps of arid rangelands.
	Federal Emergency Management Agency	• Disaster response • Disaster assessment • Search and rescue	• FEMA currently uses manned aircraft, but does not has not yet incorporated UAS technology.
State/University			
	Alaska Air National Guard	• Combat search and rescue • Arctic shipping lane management	• AANG has expressed interest in hiring UAS services on an as-needed basis. • AANG currently uses manned aircraft for search and rescue. • AANG could potentially be used to identify soft areas of sea ice to improve ice breaker success in Arctic shipping lanes.
	Alaska State Troopers	• Emergency response • Search and rescue • Law enforcement	• AST do not currently implement UAS technology.
	Department of Fish and Game	• Wildlife monitoring/management • Fisheries data collection • Marine mammal detection	• DFG currently uses sonar for collection of fish counts. • Department is not currently implementing UAS technology.

	Department of Natural Resources	• Lands mapping • Environmental studies and assessments	• DNR is not currently implementing UAS technology.
	University of Alaska	• UAS and other applied research • Student/workforce training (for UAS operations)	• UAA offers a class specific to UAS technology. • University has potential to become a national leader in UAS training and research.
Private Sector/Other			
	Oil & Gas Industry	• Pipeline monitoring • Emergency spill response	• Industry has employed some UAS technology for pipeline monitoring. • Industry currently uses manned technology for data collection and infrastructure monitoring.
	Alaska Native Corporations	• Trespass detection • Land surveying	• Native Corporations hold roughly 13% of the state's land area which must be secured and surveyed periodically.

4 COMPETING LOCATIONS

The Federal Aviation Administration (FAA) is responsible for the integration of UAS into the National Airspace System (NAS). This integration requires the development of standards and protocols (regulation, policy, procedures, guidance material, training requirements, etc.) for all aspects of operation of UAS. In furtherance of this charge, and amid mounting pressure to expedite the integration, the FAA Modernization and Reform Act of 2012 directed the FAA, in coordination with NASA and the DoD, to designate six test ranges to research the safety and other operational aspects of the technology. This testing will ultimately inform and assist the regulatory process.

As in Alaska, leaders in each of the states hosting a test range hope to develop strong, local UAS-related economic opportunities. In addition, several states without a test range also hope to capture economic benefits from a homegrown UAS sector. This chapter discusses each of the states that have been identified as potential competitors, including the assets they offer to the emerging industry.

4.1 FAA TEST RANGE LOCATIONS

To accomplish safe integration of UAS into the NAS, the FAA needs to develop a specific regulatory framework as expediently as practical. These regulatory protocols will ultimately cover all aspects of UAS from aircraft design specification to pilot certification and comprehensive operational standards. The selected test ranges will address the agency's overarching UAS research goals: (1) system safety and data gathering, (2) aircraft certification, (3) command and control link issues, (4) control station layout and certification, (5) ground and airborne sense-and-avoid, and (6) environmental impacts.

Key among the range selection criteria was geographic and climatic diversity. While individual ranges may be more suited to specific research areas than others, they are each free to expand research and testing activities into multiple UAS applications. Following a 10-month process, the FAA awarded six test ranges from a field of more than 25 applications representing 24 states. A total of 19 teams were not chosen; some of these unsuccessful teams have abandoned UAS plans and others have joined forces with designated test ranges. The six ranges selected by the FAA to carry out its research goals include the following:

- University of Alaska
- State of Nevada
- New York's Griffiss International Airport
- North Dakota Department of Commerce
- Texas A&M University
- Virginia Polytechnic Institute

What follows is a more comprehensive profile of each of the six FAA test ranges. Each is identified by the lead for the range with the goal of providing a format for understanding each of the range's specific capabilities with respect to the FAA's goal of integrating UAS into the NAS. Each of the ranges selected by the FAA has a specific advantage or charge for the furtherance of UAS integration into the national airspace. Following the profiles a brief overview of non-FAA test range activity is also provided.

University of Alaska[18]

Lead Organization & Assets

The Pan-Pacific UAS Test Range Complex (PPUTRC) is the designation for this test range. The PPUTRC represents the largest of the FAA test ranges with 59 contributing partners as well as expansive geographic coverage. The PPUTRC spans seven climate zones, allowing UAS manufacturers and users to test their equipment in the Arctic, the tropics, and arid environments. The Alaska Center for Unmanned Aircraft Systems Integration (ACUASI) oversees all operations for the test range and in this role represents the entire PPUTRC, which includes test ranges in Alaska, Oregon and Hawaii.

The team proposed six test ranges in Alaska that included the Kodiak Range, Denali Range, Poker Flat, Oliktok Corridor, Wainwright Corridor, and the North Slope Range. Oregon proposed four ranges including Tillamook coastal, Warm Springs, Pendleton Range, and Juniper MOA. Lastly, Hawaii proposed three test sites at Humuula-R-3103, Makua-R-3109, and Maku-R-3110. After selection, the FAA initially approved a smaller set of ranges, but has since approved additional range locations.

Stakeholder Organizations

The University of Alaska (UA) leads the PPUTRC effort and has the most experience of any school in the country with regard to UAS technology. ACUASI was established in 2012 under the Geophysical Institute at UAF. The ACUASI team conducted UAS research for more than ten years prior to 2012 and has successfully managed more than 50 FAA Certificates of Authorization. Additionally, UA has strong pilot, air traffic control and mechanic training programs that directly align with UAS and range needs.

The PPUTRC represents a collaboration of academia, state agencies, Native organizations, private sector firms, economic development organizations, and related stakeholder organizations. Oregon State University is the primary research lead for Oregon and

[18] http://acuasi.alaska.edu/about
http://www.wired.com/2012/06/64-drone-bases-on-us-soil/
http://higherlogicdownload.s3.amazonaws.com/AUVSI/656942e4-4448-41c3-877d-0c5f3ea40e63/UploadedImages/2013AprilSymposium/Pan-Pacific-UAS-Test-Site_OSU.pdf
http://www.faa.gov/uas/legislative_programs/test_sites/

University of Hawaii-Hilo is the primary research lead for Hawaii. These entities manage the ranges in their respective states, but both report to ACUASI as PPUTRC's lead organization.

The armed forces in Alaska represent a key stakeholder group. The RQ-7 Shadow is in use at Fort Richardson, Fort Greely/Allen Army Airfield, and Fort Wainwright/Ladd Army Airfield. The Army uses the unmanned Shadow for global reconnaissance, surveillance, and damage assessment. Fort Wainwright is also home to the RQ-11 Raven. These smaller, fixed wing systems can be hand launched, but have limited range and endurance due to their small size. The Army is preparing to host the Grey Eagle system at Ft Wainwright starting in 2015. These expansion plans should have an impact on PPUTRC.

Economic impact

The AUVSI has projected the following economic growth from the UAS industry for Alaska:

Year	Direct Employment	Total Employment Impact	Total Direct Spending ($M)	Total Economic Impact ($M)	Total Taxes ($K)	Percent Change Over Previous Year
2015	16	32	$41.21	$77.14	$0	
2016	33	64	$82.41	$154.28	$0	100.00%
2017	49	95	$123.62	$231.42	$0	50.00%
2018	52	100	$129.80	$242.99	$0	5.00%
2019	54	105	$136.29	$255.14	$0	5.00%
2020	57	110	$143.11	$267.89	$0	5.00%
2025	73	141	$182.64	$341.91	$0	5.00%

Incentive Structure

Alaska is still maturing in its creation of incentives for business expansion and attraction. The Alaska Industrial Development and Export Authority (AIDEA) provides financing to a wide range of commercial facilities and assets in the state. AIDEA's financing options include loan participations, revenue bonds, equity investment, and asset purchase. The 49th State Angel Fund, run by the Municipality of Anchorage, also makes venture capital available to firms operating in that city.

Oregon provides research tax credits for firms engaged in advanced computing and

materials, environmental assessment, and electronic device technology. The state also offers property tax breaks for new or expanding facilities and the potential for an income tax holiday spanning multiple years.

Hawaii offers a range of programs aimed at the attraction and development of high-tech firms. Blue Startups is Hawaii's venture accelerator and the state's technology incubator. Key components of Blue Startups include seed funding, mentorship, access to business expertise, product testing, peer review, pitch development, and introductions to investors. Twice a year, teams are selected to go through an intensive 12-week program, to kick-start their business. Businesses looking to make foreign sales can benefit from its foreign trade zone designation, reducing trade duties. Hawaii also hosts Mbloom, an incubator and early stage technology investment fund created as a public-private partnership.[19]

Each state exhibits a growing demand for incentives and programs to support business starts as well as to attract new innovative firms. States often align technical assistance providers and funds to sustain a start-up through the "valley of death," or the critical years between initial investment and sustainable cash flow.

Nevada

Nevada is sparsely populated, not unlike Alaska, which makes it attractive for UAS testing. The state hosts a large military presence, including Nellis Air Force Base, Fallon Naval Air Station, the Nellis Test and Training Range, and the Nevada National Security Site (NNSS). Also of interest, the federal government owns approximately 80% of the land in Nevada. Further, Creech Air Force Base is home to the premier UAS military support units. Creech personnel have logged more than 10 million hours of flight time in UAS platforms, training, experimental, and operational modes. Likely because of this, Nevada boasts the largest numbers of trained UAS pilots and sensor operators in the world.

Nevada has developed capabilities and infrastructure that will make it a strong competitor within the UAS industry. Many of the large UAS manufacturers, including Lockheed Martin, General Atomics, and Northrop Grumman, maintain operations within Nevada. Sierra Nevada Corporation, Arcata Associates, and Science Application International Corporation are other defense contractors located in Nevada. The University Nevada, Las Vegas, through the Desert Research Institute, is developing a Center of Excellence, an incubator designed to aid in the commercialization of UAS technology. **Furthermore, the University of Nevada, Reno offers an engineering minor in unmanned technology, and is working on the construction of the Nevada Advanced Autonomous Systems Innovation Center, a Reno-based UAS research hub.**[20]

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[19] A Range of Choices", Dee Ann Divis, Inside Unmanned Systems, Spring 2014, http://insideunmanned.epubxp.com/i/307674/0
[20] A Range of Choices", Dee Ann Divis, Inside Unmanned Systems, Spring 2014, http://insideunmanned.epubxp.com/i/307674/0
http://www.unr.edu/autonomous-systems

New York – Griffiss International Airport

Griffiss International Airport is the official designee of the FAA test range. Griffiss is teamed with the Northeast UAS Airspace Integration Research Alliance (NUAIR), a New York nonprofit regional consortium of more than 50 private industry, academic, and military entities collaborating to support the testing of UAS in New York and Massachusetts. Griffiss International Airport in Rome, New York (a former Air Force base) and Joint Base Cape Cod in Massachusetts serve as the two approved test ranges. The range received its certificate of authorization (COA) by the FAA on August 7th 2014 and had its first unmanned aircraft test operation in early November 2014 for Lockheed Martin.

Griffiss International is charged with the development of sense and avoidance capabilities to prevent collisions with other aircraft. The specific UAS projects include detection of insects, weeds, diseases, crop characteristics, crop biomass, and background soil characteristics. Research at the range will evaluate methods for scouting agricultural fields using different types of sensors. The range also expects to manage agricultural research flights from Joint Base Cape Cod in Massachusetts. Combined, New York and Massachusetts offer more than 7,000 square miles of diverse airspace available for UAS testing.

North Dakota Department of Commerce

The FAA certified the Northern Plains UAS Test Site as the first range ready for operation in April, 2014. This range relies on various test sites in the Grand Forks area, including Grand Sky, Grand Forks AFB, Carrington, and Sullys Hill Game Preserve. Grand Sky in Grand Forks County provides a 217-acre site for potential development, testing, training, sensor technology development, data analysis, and management. The site is adjacent to Grand Forks AFB and thus provides access to runways for testing. To date, the state has invested over $19 million to advance UAS research and development and is collaborating with organizations statewide to expand this industry.

The University of North Dakota established the John D. Odegard School of Aerospace Sciences in the 1960s and, more recently, the Center for Unmanned Aircraft Systems. The Center leads the research, education, and training for UAS. The UND offers a BS degree in Aeronautics with a major in Unmanned Aircraft System Operation. The university was the first in the nation to offer a focus area in unmanned aircraft systems. University researchers are also developing a ground-based radar system capable of detecting low-flying aircraft such as sailplanes and hot air balloons. North Dakota State University, located in Fargo, is a partner as well, with a world-class engineering department specializing in electronic and electrical engineering, including nano and micro-scale electronics[21].

[21] A Range of Choices", Dee Ann Divis, Inside Unmanned Systems, Spring 2014, http://insideunmanned.epubxp.com/i/307674/0

Texas A&M University

The Texas FAA test range will focus its efforts on applications involving coastal and ocean areas (tracking of marine mammals, environmental monitoring, and drill platform assessment). Texas also offers a one-of-a-kind testing area for UAS emergency response applications. "Disaster City" is a recreated urban training environment composed of simulated rubble in which emergency response scenarios are executed for first responder personnel and technology insertion training[22]. The test range has developed a partnership with the University of Texas at Arlington Research Institute (UTARI), which is currently focusing on several facets of UAS research for commercial applications. UTARI is researching UAS command and control link operations, general system safety and data gathering, and sense and avoid technology, both in air and on the ground, as well as aerial refueling possibilities.

Virginia Polytechnic University (Virginia Tech)

VPU's primary goal as an FAA test range is to conduct individual and collaborative work with the FAA, as well as economic modeling and marketing for the commercial applications of UAS. Additionally, the group will focus on the research of failure mode testing as well as operational and technical risks specific to UAS. The Mid-Atlantic Aviation Partnership (MAAP) has several sites used for test flights including the Kentland experimental air station in Blacksburg, VA. The range had its first flight on August 13th, 2014, and is now fully operational.

MAAP is one of the largest UAS groups supporting the UAS integration into the NAS with ten universities, seven government departments, and dozens of industry and economic development firms as members of the core group. Since the universities and government agencies are spread over the East Coast (primarily Virginia, Maryland and New Jersey), MAAP expands the Virginia Tech test range borders well beyond simply the state of Virginia.

Virginia Tech does much of its research through the Virginia Center for Autonomous Systems (VaCAS), which has over a decade of experience working with UAS. The VaCAS UAS fleet is ever growing with systems constantly being built by students and faculty. One set of systems is the SPARROs, which help build on failure rate versus cost research. These systems are inexpensive to manufacture, but have sophisticated safeguards to accommodate failures. VaCAS has performed this variety of research since 2009. Other areas of research are vehicle guidance and control, sensing and navigation advancement, mobility and actuation development, dynamic vehicle modelling and analysis, and overall vehicle design.

[22] "A Range of Choices", Dee Ann Divis, Inside Unmanned Systems, Spring 2014, http://insideunmanned.epubxp.com/i/307674/0

	Nevada	North Dakota	New York (including Massachusetts)	Virginia (including Maryland and New Jersey)	Alaska (including Hawaii and Oregon)	Texas
Cost of Living	• CPI*** Oct. 2014: 241.650; • Inflation Oct. 2014 to Oct. 2013: 2.0%	• CPI Oct. 2014: 225.793; • Inflation Oct. 2014 to Oct. 2013: 1.6%	• CPI first half 2014: 260.5; • Inflation (12 month change): 1.3%	• CPI Sep. 2014: 155.52; • Inflation Sep. 2014 to 2013: 1.3%	• CPI first half 2014: 214.777; • Inflation (12 month change): 1.9%	• CPI Oct. 2014: 214.791 • Inflation Oct. 2014 to 2013: 3.4%
Per Capita Personal Income****, 2013, $	• $39,235	• $53,182	• $54,462 (NY)	• $48,838 (VA)	• $50,150 (AK)	• $43,862

	Nevada	North Dakota	New York (including Massachusetts)	Virginia (including Maryland and New Jersey)	Alaska (including Hawaii and Oregon)	Texas
Incentives	• No personal income, corporate income, unitary, warehouse, or franchise taxes. • Sales and use tax abatement, business tax abatement, personal property tax abatement; • Train Employees Now program; • Nevada's Catalyst Fund (expansion or relocation of businesses). • Knowledge Fund (promote research and technology commercialization).	• State appropriated $5 million for UAS development. • Abatements on income tax for up to 5 years, breaks on sales tax, investment tax credits, interest rate buy-downs and gap financing, property tax abatement • State programs for workforce training and interns positions financing (Job Training Assistance). • Research North Dakota for firms in support of R&D (up to $300,000 in matching funds). • Agricultural Products Utilization Commission: 15 grants annually.	**NY:** • 80 different technology incubators. • Income tax exemptions, sales tax exemption. • Grants to promote targeted industries like UAS. • The Essential New York Initiative. • Start-Up New York tax-free zones. **MA:** • Emerging Technology Fund (loans or loan participations for emerging firms up to $1.5 million and loan guarantees of up to $1.5 million). • Bridge financing offered to private sector businesses.	• Virginia Economic Development Incentive Grant (for starting-up or moving to the state firms). • Governor's Agriculture and Forestry Industries Development Fund. • Virginia Investment Partnership Grant; • Virginia Enterprise Zone Program; • Technology Zone Program; • Virginia Jobs Investment Program; • Tax credit programs: corporate income tax credit, sale and use tax credits, and property tax credits; • Center for Innovative Technology.	**AK:** • Small Business Loans of up to $300,000. • AIDEA's financing options • 49th State Angel Fund financing **OR:** • research tax credits; • property tax breaks; **HI:** • Blue Startups tech. incubator; • Mbloom incubator;	• State incentives: tax breaks, tax refunds, and expansion and relocation financing. • The Texas Emerging Technology Fund ($485 million). • Texas Enterprise Fund (helps businesses to locate in Texas). • Workforce Development: Self Sufficiency Fund and Skills Development Fund.
Available Aerospace	More than 30,000 square miles of airspace[23]	More than 13,000 square miles of airspace[24]	More than 7,000 square miles of diverse airspace (NY	More than 2700 square miles	More than 663,300 square miles of	11 test regions cover about 6,000 square miles across

[23] http://www.insidegnss.com/node/4143
[24] http://www.uasresearch.com/aboutus/projects.aspx

	Nevada	North Dakota	New York (including Massachusetts)	Virginia (including Maryland and New Jersey)	Alaska (including Hawaii and Oregon)	Texas
			and MA together)	of airspace[25]	airspace[26]	the state[27]
R&D personnel at higher education institutions	3,144	3,963	60,706 (NY), 39,089 (MA)	22,016 (VA), 38,204 (MD), 14,724 (NJ)	1,558 (AK), 5,086 (HI), 14,806 (OR)	57,529
R&D Expenditures (in thousands), FY 2012 (information on states leading the project)	Total: $153,325 Federal –70.31%; State and Local – 3.09%; Institution Fund – 22.53%; Business –1.60%; Non-Profit –2.34%; Other –0.13%	Total: $215,642 Federal –46.82%; State and Local – 24.78%; Institution Fund – 19.28%; Business –5.20%; Non-Profit –1.43%; Other –2.49%	Total: $5,361,113 Federal –59.92%; State and Local – 5.26%; Institution Fund – 20.91%; Business –5.37%; Non-Profit –7.14%; Other –1.40%	Total $1,379,440 Federal –55.61%; State and Local – 9.37%; Institution Fund – 25.54%; Business –3.94%; Non-Profit –5.06%; Other –0.46%	Total: $181,983 Federal – 61.23%; State and Local – 5.23%; Institution Fund – 27.49%; Business – 3.51%; Non-Profit – 1.64%; Other – 0.91%	Total: $4,651,322 Federal –46.71%; State and Local – 15.63%; Institution Fund – 21.18%; Business –6.52%; Non-Profit –8.95%; Other –1.01%
Number of Universities with R&D Activities (state and private)	3	2	66 (NY), 26(MA)	15 (VA), 13 (MD), 16 (NJ)	3 (AK), 3 (HI), 11 (OR)	47
Universities Involved in UAS Development	• University of Nevada;	• University of North Dakota (John D.	20 universities total,	• Virginia Polytechnic University (the	• University of Alaska	• Texas A&M University-College

[25] http://www.navair.navy.mil/nawcad/index.cfm?fuseaction=home.download&id=744
[26] http://commerce.state.ak.us/dnn/portals/6/pub/unmannedaircraftsystems.pdf
[27] http://www.theeagle.com/news/local/faa-names-texas-a-m-corpus-christi-as-drone-test/article_ac269367-7611-5d8c-a97e-c21d656c47f1.html

	Nevada	North Dakota	New York (including Massachusetts)	Virginia (including Maryland and New Jersey)	Alaska (including Hawaii and Oregon)	Texas
Programs	• Reno (College of Engineering); • College of Southern Nevada; • Las Vegas Desert Research Institute	Odegard School of Aerospace Sciences, the Center for Unmanned Aircraft Systems); • North Dakota State University	including: • Rochester Institute of Technology; • Massachusetts Institute of Technology; • Boston University; • Cornell University; • Embry-Riddle Aeronautical University and others.	Virginia Center for Autonomous Systems); • Rutgers University; • State University of New Jersey; • National • Institute of Aerospace; • Liberty University; • New Jersey Institute of Technology; • Rowan University; The Richard Stockton College of NJ; • Virginia State University	Fairbanks (the Pan-Pacific UAS Test Range Complex; Alaska Center for Unmanned Aircraft Systems Integration); • Oregon State University; • University of Hawaii-Hilo	Station; • Southwest Research Institute; • University of Texas at Arlington Research Institute (UTARI)
Labor Pool	Total Civilian Labor Force Oct. 2014 (thousands): 1,368.4 Unemployment Rate Oct. 2014: 7.1%	Total Labor Force Oct. 2014 (thousands): 415.5 Unemployment Rate Oct. 2014: 2.8%	Total Labor Force Oct. 2014 (thousands): 9,539.7 Unemployment Rate Oct. 2014: 6.0%	Total Labor Force Oct. 2014 (thousands): 4,263 Unemployment Rate Oct. 2014: 5.3%	Total Labor Force Oct. 2014 (thousands): 364 Unemployment Rate Oct. 2014: 6.8%	Total Labor Force Oct. 2014 (thousands): 13,039.2 Unemployment Rate Oct. 2014: 5.1%

	Nevada	North Dakota	New York (including Massachusetts)	Virginia (including Maryland and New Jersey)	Alaska (including Hawaii and Oregon)	Texas
Share of labor employed in Industries supportive to UAS development, 2013	Manufacturing – 4.2% Information – 1.7% Science* - 11.2% Transportation** - 5.2%	Manufacturing – 7.1% Information – 1.4% Science* - 6.6% Transportation** - 5.4%	Manufacturing – 6.6% Information – 2.9% Science* - 11.7% Transportation** - 4.9%	Manufacturing – 7.2% Information – 2.1% Science* - 14.8% Transportation** - 4.1%	Manufacturing – 3.7% Information – 1.8% Science* - 9.4% Transportation** - 7.9%	Manufacturing – 9.3% Information – 1.8% Science* - 11.1% Transportation** - 5.2%

5 MARKET DEVELOPMENT CONSIDERATIONS

Alaska's traditional industries, which include oil and gas extraction, mining, fishing and seafood processing, tourism and military operations, are part of complex ecosystems that developed gradually over time. Forestry and wood products form a declining industry while commentators point to logistics and international trade, advanced business services, specialized machinery and social services as emerging areas of opportunity. The current concentration on UAS activity has the potential to develop a strong economic base in Alaska, in part by leveraging a number of established industries of importance including military operations, and those oriented towards resource monitoring and extraction. A potential UAS industry also benefits from Arctic or "cold climate" competencies as well as rocket launch expertise. The following provides an overview explaining how an industry focus might be established.

5.1 ANCHOR TENANT

The introduction of an anchor tenant to a region will in many cases spur or advance an industry's development.[28] An anchor tenant will attract other firms. These co-located businesses will then benefit from greater innovation and economic performance due to the sheer proximity, resulting workforce, and even from the drawing of symbiotic players like venture capital investors to an area.

Definition of Anchor Tenant: An anchor tenant is a large firm, often engaged in R&D, which can promote the development of an industry concentration, encouraging smaller firms to locate in close proximity. For the purposes of UAS development, the role of an anchor tenant may be filled by the oil and gas industry or military. While these do not meet the conventional definition, they may support UAS by serving as large customers. Alternatively, the UAS industry in Alaska may benefit more from the attraction of a firm that is drawn by the FAA test site designation and has a sincere interest in engaging in and even serving as the champion for the development of a UAS industry.

An anchor tenant is considered one of the central elements necessary for stronger industry formation and ultimate growth. Attracting an anchor tenant for industry development purposes is not a new idea. This strategy has been borrowed from commercial real estate development practices, particularly for retail or mall developments. The classic anchor tenant is a large department store associated with a shopping mall. These department stores typically have name recognition and are known for creating demand, and thus generate traffic for the overall retail development. In many cases, a retail developer won't pursue a sites development

[28] Michael Porter, *Cluster and the New Economics of Competitions*, Harvard Business Review, Nov. – Dec. 1998

until an "anchor tenant" can be locked in for the site. As an initial step in encouraging growth of UAS industry in Alaska, an anchor tenant is an important component that may actually involve multiple tenants or the engagement of multiple key stakeholders. The attraction of a large or multiple smaller private sector firms is essential. Further, large public entities such as the University of Alaska and other institutes of higher learning, public laboratories and/or public entities with interest such as the FAA, all serve critical tenant roles, but are not typically an anchor tenant due to the need to integrate private sector capital and market practices into the mix. Similarly, national public stakeholders that will positively influence the dynamics of the emerging industry are also worth attracting if they are not already present (i.e. Department of Defense or NASA). In addition, the military bases and oil and gas companies may play the role of anchor tenant by serving as large potential customers of UAS services. The state itself can act as an anchor tenant by becoming a purchaser of UAS services.

In reviewing aerospace development activity across decades of the aircraft industry's existence, it is common to find companies from other sectors that acted as "incubators" by dedicating part of their activity to aircraft production. Afterwards, based on their performance, some of these incubators converted themselves entirely to aircraft production, while others returned to their previous activity, and closed or split their aircraft production unit, which continued to develop in an independent way.

These aviation industry anchor tenants positively influenced the innovation activity of a region (i.e. increasing number of patents and number of entrepreneurial firms) as well as attracted other innovators and smaller firms working in the same or related industries. Other examples were noted in which the anchor tenants attracted specialized suppliers when relevant to the industry sector, or when firms believed proximity would benefit their entry into the nascent industry. Once co-located within a region, these firms then attracted skilled labor with specialized training. As a result, it is important to understand the factors that will influence the decision of an anchor tenant, including:

- A pool of potential entrepreneurs or startup talent;
- A workforce or qualified manpower capable of understanding the complexity and satisfying the Requirements of the emerging industry;
- Access to capital – including both private and public sources of funds; and
- Inputs to research and development as well as manufacturing.
    - Further, based on the study of aerospace anchor tenants a UAS anchor tenant will also seek:
- Strategic military and or federal player engagement if it is believed the government will have a strong involvement in the financing and supervision of the ultimate development of the industry.

To encourage the development of healthy industry linkages, It will be useful to build a

collaborative regional strategy that emphasizes:

- Alignment of regional leaders in common direction and provides opportunity for collaboration;
- Promotion of skill and talent development as well as career advancement paths;
- Support for study tours, networking and learning exchanges;
- Direction of R&D funds and mobilizes capital to encourage UAS business starts; and
- Acceleration of a robust UAS related entrepreneurial ecosystem.

5.2 Incentive Structures

One of the most important aspects in attracting UAS industry investment or an anchor tenant to Alaska will be providing key incentive packages to private industry. Incentives are cash or cash equivalent forms of assistance provided to firms on a discretionary basis to attract or retain business operations. Popular incentives include property tax abatements, discretionary credits under the state's corporate income tax, low-interest financing, and even free land and buildings. Alaska is faced with a number of challenges that make business development and attraction difficult, particularly the high supply chain and labor costs when compared with other states. However, the state can offer many unique incentives that can help spur industry development within the state and create a more even and comparative business investment environment. (Please see appendix 3 for table summary of incentives.)

Given the many challenges that Alaska faces from a business attraction standpoint, the state already finds itself at a disadvantage compared to other test range locations. Alaska is not currently a major hub for defense contractors or aerospace manufacturing, like some competing test ranges are (Nevada, for example). These realities do not make it impossible to develop a thriving, successful, and integrated UAS industry within the state. They do, however, reduce the margin for error as the state moves forward with its efforts to grow the industry. **Making a concerted, coordinated attempt to customize incentives for private industry investment within the state is therefore paramount.** With the right incentive structure in place, Alaska can help mitigate its current challenges, while at the same time promote those positive attributes and resources that the state currently holds.

As detailed throughout this section, a number of states have begun (or are planning to begin) offering tax incentives to private industry. For instance, California introduced a bill that provides a tax credit to firms choosing to manufacture UAS within their state. This could be a major opportunity area for Alaska with its industry attraction efforts. The state's current corporate income tax rate, 9.4%, ranks as the 5th highest in the nation. This, coupled with the high supply chain and labor costs associated with Alaska, make it difficult to entice businesses to relocate or invest in the state. However, Alaska could begin offering targeted tax credits aimed at creating a positive business environment ripe for investment from the UAS industry.

These tax credits can come from the State, as well as from the respective Borough or Municipality. Possible tax credits at the State level that could be used to entice UAS industry investment include:

- **Research and development tax credits**. According to *Forbes*, 38 states offer an R&D tax credit as of 2013, thereby reducing state income tax liability for qualifying R&D expenses.[29] Under most accepted definitions, working to develop UAS technology for the market would qualify as R&D. Formulas for calculating the value of the credit vary widely from state to state, but generally include two components: a credit rate and a base level. The credit rate is the percentage of R&D expenses by which the tax liability is reduced. A base level is the minimum amount of expenditure before the credit applies. For instance, a state may offer a 10% R&D credit for qualified activity over $1M. Some states attempt to make the credit more lucrative for small businesses by reducing or eliminating the base level, or making other adjustments. To promote sustained R&D activity, some states require multiple years of R&D activity before the credit can be claimed; others offer a higher credit to companies with multiple years of qualified activity. The effectiveness of state R&D tax credits is the subject of some debate; a 2007 study by the San Francisco Federal Reserve found that the credits often increase the amount of R&D activity occurring within a state. The report added, however, that these gains are usually "zero-sum," meaning that they largely shift R&D activity between states rather than incentivizing new expenditure.[30]
- **Hiring tax credits**. This type of credit reduces a company's state income tax liability for hiring certain classes of employees. In Alaska, a credit could apply to specific skillsets such as aerospace engineers to advance the development of a UAS industry. As an example, the State of Mississippi offers a tax credit of $1,000 per employee each year for five years to companies that hire in scientific and technical fields and meet other requirements. Oklahoma also has incentives in place to spur their UAS industry. The state offers employers a tax credit of up to $12,500 per qualified employee per year for five years for each aerospace engineer it hires. The State also offers a separate $5,000 annual tax credit to each aerospace engineer who relocates to Oklahoma for their job, for up to five years. This provides incentives for both employers and employees to relocate to Oklahoma. This program is set to expire, however, on December 31, 2014.
- **Manufacturing tax credits**. These can take several different forms, including credits or exemptions for property, sales, or corporate income taxes. The State of Wisconsin, for instance, exempts manufacturing-specific machinery and equipment from property taxes. (The exemption does not extend to land or buildings associated with

[29] "Eight Myths That Keep Small Businesses From Claiming The R&D Tax Credit" http://www.forbes.com/sites/deanzerbe/2013/03/28/eight-myths-that-keep-small-businesses-from-claiming-the-rd-tax-credit/
[30] "Overview of Research and Development Tax Incentive Strategies," http://www.lbb.state.tx.us/Other_Pubs/Overview%20of%20Research%20and%20Development%20Tax%20Incentives.pdf

manufacturing, however.) Other states exempt manufacturing equipment purchases from sales tax, or provide credits against income taxes for such investments. It remains to be seen whether or not a UAS industry in Alaska would have a manufacturing component, but such credits could help to offset the cost of business if manufacturers show interest in locating production to the state. Given Alaska's current tax structure, however, the only manufacturing tax credits that would be available at the State level would be for corporate income taxes. Other taxes, such as property and sales taxes, would have to come at the Municipal or Borough level. An alternative option at the state level would be to replace any lost revenues to local governments who promote UAS development. This would provide additional incentives for local governments to help work with the state to develop a friendly climate for UAS development.

In addition to those tax credits and incentives offered at the State level, additional credits and incentives can be made at the Borough or Municipality level, including the following:

- **Property tax abatements** for businesses operating in "Military Facility Zones." A more specific type of incentive which the Alaska Legislature passed is an exemption or partial exemption from property taxes for up to 10 years if the property is in a military facility zone that creates or supports industry, development, or educational or training opportunities beneficial to a facility. HB 223, was introduced in January 2014, and signed into law September 2014. This bill permits local governments in the state to exempt businesses that serve military bases. Since the state does not levy a property tax, the exemptions are provided by municipalities or boroughs. As such, in this case municipalities and boroughs have the strongest ability to make UAS related investments more cost effective.
- **Manufacturing tax credits (local level).** As mentioned above, many states incorporate manufacturing tax credits through property and sales tax incentives. Given that within Alaska these taxes occur at the local level, these tax credits would need to come from boroughs and municipalities.
- **Sales tax abatements.** An additional form of tax incentive that can be offered at the borough or municipality level is a sales tax incentive. These would allow local governments to exempt particular purchases, or businesses within particular industries, from sales taxes. Local governments can craft these abatements in specific ways to help incentivize development of a UAS industry within their community.

On the whole, Alaska is positioned as one of the states with the best overall tax climate, despite having a relatively high corporate tax structure. The state levies no personal income or state sales tax, which offers great incentives for small businesses looking to establish within the state. However, the state's high corporate income tax will make it difficult to attract investment from the largest industry participants. By offering tax credits aimed at large corporate

investment within the state, Alaska can help to reduce some of the high costs of doing business in the state.

In addition to potential tax credits, the state can consider offering other useful incentives to help spur investment. As an example, Alaska could follow North Dakota's lead by offering matching research and development grants for businesses in the UAS industry sector. These grants could be focused on projects involving a joint effort between private industry and the University of Alaska. This would allow the state's university to receive targeted funding for projects of economic importance while at the same time aiding the industry's development. Alaska could also choose to focus on expansion of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants or rather contract funding from various agencies of the US government. The purpose of these awards is to provide early-stage research and development funding to advance technology. The state could consider matching successful SBIR and STTR awardees.

One important incentive available within the state stems from the recent passage of HB 316 during the 27th Alaska Legislature. The bill allows for the designation of Military Facility Zones, which would allow the Alaska Industrial Development and Export Authority (AIDEA), as well as the Alaska Housing Finance Corporation (AHFC) to fund projects occurring within these zones. The MFZ designation would allow AIDEA to fund not only just the structures within the zones, but also for infrastructure development within the MFZ (such as sewers, sidewalks, and potential UAS infrastructure).

Other similar incentive opportunities include gap loans, equity financing, venture capital assistance, and interest rate buy downs. In some cases states are also developing targeted technical assistance support by providing information on how to start up a business, or make one more profitable within a specific industry. In these instances states are typically collaborating with existing technical assistance providers such as the Small Business Development Center to further bolster and support existing programs. The aim of state support in these instances is to reduce the overall risk and make the participating businesses more attractive for leverage of other resources.

Other incentives for consideration might include customized services targeted towards meeting the needs of individual businesses such as conducting relevant research, performing basic due diligence on high target locations for development, providing assistance programs to aid firms in navigating through state or local regulations, workforce development programs, and developing site-related infrastructure such as road access. Customized services are those incentives that will ultimately save firms in their development expenditures as well as convey a message to industry that Alaska is not only open for business, but keen in its understanding of what firms require to be successful in the UAS industry sector.

In order for Alaska to be competitive with attracting industry to the state, incentives will play a key role. Incentives will help to attract industry if they reduce costs associated with

development within the state as compared to other locations. Incentives alone will not be enough, however. Nor should Alaska ignore its other attributes that make it a prime candidate for corporate investment.

Economic development practitioners are often criticized for developing incentive packages without first critically taking into consideration if the incentives are in the best interest of the state and/or local government and actually relevant to the business being attracted. Incentives can become too costly for the jobs created and may actually result in hurting businesses that are already in the marketplace. As Alaska moves forward in developing incentives to attract UAS industry it may be beneficial to focus first on those incentives that bolster existing Alaska firms already in the industry and then on those incentives that target new business activities that will again further support and bolster existing firms or bring about desired performance by the firms being attracted. **In all cases, a more comprehensive cost-benefit analysis should be conducted along with the establishment of performance metrics associated with incentives to ascertain they are achieving desired results.**

5.3 Tech Park

One approach to commercializing the University of Alaska's expertise on UAS is through the formation of a university research or technical park. These developments, also referred to as research parks or tech parks, are a common means of spurring regional innovation by connecting business with the research assets of a university. The Association of University Research Parks (AURP) defines the term as "physical environments that can generate, attract and retain technology companies and talent in alignment with sponsoring research institutions (universities and public and private research laboratories)."[31] Famous examples include the Research Triangle Park in North Carolina (leveraging three large universities) and the Stanford Research Park in the heart of Silicon Valley. At the most basic level, these tech parks are real estate developments with leasable property for commercial tenants in targeted industries, allowing them to partner or affiliate with one or more universities. These research partnerships are a vital component to a successful tech park, as the availability of inexpensive real estate alone will not likely attract targeted industries. According to AURP, tech parks exhibit the following attributes:

- A property master plan designed for research and commercialization;
- Partnerships with at least one university or other research institution(s);
- Encouragement of the establishment and growth of new companies;
- Technology translation from the lab to the marketplace; and
- A focus on technology-led economic development.[32]

[31] https://aurp.memberclicks.net/assets/documents/aurp_batelllestudy2012-final.pdf
[32] https://aurp.memberclicks.net/assets/documents/aurp_batelllestudy2012-final.pdf, page 6.

The University of Alaska, in partnership with other public entities and private investors, may find that a tech park is a viable development vehicle. Companies wishing to establish R&D facilities related to UAS, ranging from large defense contractors or startup firms, would be potential tenants (parks often contain incubator components to support the startup of new firms). Chief benefits to the tenant include the ability to sponsor targeted research, access university labs and other facilities, utilize faculty as consultants, hire students and/or graduates, and license intellectual property. In essence, the university could act as an amplifier to the tenant firms' R&D operations, creating value for their intellectual property portfolios. As UAF has emerged as one of the nation's leaders in testing UAS in a variety of climates and geographies, it has also made itself a viable partner to industry for this purpose, and could leverage other assets in the Fairbanks area, including the four Interior military bases (Fort Wainwright, Eielson Air Force Base, Clear Air Force Station and Fort Greely) and access to runways and an international airport. Likewise, Anchorage would offer access to Joint Base Elmendorf Richardson, a university campus, as well as a large international airport. In either city, companies hoping to build a business around UAS would find adequate space to test the technology in consultation with leading experts.

Proximity to military bases would make a potential tech park attractive to defense contractors engaged in R&D. Of potential consideration, the US Army is expected to place one of its 17 Gray Eagle companies in Alaska. This company will have responsibility for 12 unmanned Gray Eagle aircraft, and includes a support staff of approximately 120 soldiers. The need to service and support these aircraft may present new business opportunities that dovetail with a tech park.

From the public sector standpoint, the benefits to a successful tech park are substantial. First the development would serve as the focal point for a new industry by building a knowledge center where expertise passes from university labs directly to interested firms. The park would provide a space for ideas to disseminate rapidly, helping to cement the state's status as a thought leader for UAS integration into the national airspace. Ultimately, the spillovers of knowledge—crucial to new industry formation—would spur the creation of new businesses statewide and bolster employment opportunities. Additional benefits include the generation of revenue through facility leases, and the enhancement of university stature. It should be noted, however, that success (defined as the attraction and retention of tenant firms, as well as formation of startups) depends on several critical factors. According to AURP, these include:

- Alignment between university competency and that of the targeted firms;
- Ability to assist early stage firms in commercialization;
- Access to investment capital for tenants;
- Access to university facilities, faculty, and students;
- Support of university leadership; and

- Support within the economic development community.[33]

Foremost among these factors is the strength of the university partnership. Numerous university tech parks nationwide have failed to attract commercial tenants because they treated the development purely as commercial property to be marketed and leased in a manner similar to other types of real estate. This approach fails to differentiate the tech park from other leasable property. Instead, businesses must see tangible value in the access to university facilities and expertise, and these are the features that should be used to attract commercial tenants. For this reason, the park should be physically an extension of the campus, intermingled closely with other university facilities to maximize the sharing of resources and knowledge. Locating a tech park far from its affiliated university can often doom it to irrelevance, as core university assets, including faculty, students, and research facilities, become less accessible.

The physical layout and location of the tech park are thus important elements of success. The type of leasable space available to firms is also a relevant consideration. While the Research Triangle Park was able to attract technology companies in the 1950s by offering inexpensive land on which to build their own facilities, this model has lost much of its effectiveness as many corporations have scaled back their R&D facilities. Instead, businesses are looking for less capital-intensive mixed-use space in shared buildings. Occupying this type of real estate requires less upfront cost and strengthens the offering, as well as provides an open, collaborative environment where knowledge can be shared and new ideas take form. Nationwide, innovative firms are choosing to co-locate with complementary firms, research labs, and universities so they can share ideas and practice "open innovation". Entrepreneurs and entrepreneurial firms increasingly seek to interact with like-minded firms and have efficient access to industry-specific guidance in addition to sophisticated equipment. New communication technologies make it possible for entrepreneurs to be successful nearly anywhere in the world, yet the "magic" occurs when entrepreneurs are able to leap forward due to shared thinking and utilization of space, workforce and innovations coming from an industry.

To help advance this type of innovation, university tech parks often include a business incubator or an accelerator to nurture startups. Both are facilities that provide physical space for new businesses, along with mentorship, assets such as laboratories and technology, and in some cases seed capital. Incubators generally host businesses for indefinite time periods (often years) until they are ready to "graduate" and leave the incubator. Accelerators, on the other hand, are designed to provide intensive guidance as part of a structured mentorship program for a fixed term, usually no more than 6 months. In either case, the operation may take equity in the startup businesses, or simply charge rent for use of the facilities. Incubators and

[33] https://aurp.memberclicks.net/assets/documents/aurp_batelllestudy2012-final.pdf, page 10.

accelerators can be centered on a specific type of industry segment, such as biotechnology or in this case, UAS. An operation of this sort might serve as an additional vehicle for commercializing university research, and established firms in the tech park could mentor, invest in, or ultimately acquire businesses started in an incubator.

As an additional note, Alaska's remote location will present challenges for the development of a university tech park, as with many other types of business developments. UAS technologies in particular can be operated from remote locations, so project leaders will need to focus on the strength and value proposition of a university partnership to attract companies, and emphasize features unavailable elsewhere, such as the airspace and unique expertise. These alone may not be enough, however, as several other states are exploring similar concepts. The state may also need to explore financial incentives to attract targeted firms to the tech park (or elsewhere in Alaska) as explored earlier in this chapter.

5.4 Strategic Considerations

- University tech parks are a common strategy to advance innovation for the purposes of regional economic development, and a possible option to advance UAS commercialization in Alaska.
- Tech parks encourage linkages between university expertise and businesses with complementary needs, and provide opportunities to move innovations into the marketplace.
- UAS industry development could benefit from the formation of a tech park and/or systems for establishing a core knowledge center. See appendix 2 – Central Oregon example.
- Alaska based private sector firms commented via interviews on their need for special use airspace to allow for experimental UAS flights to prove airworthiness – a tech park could address this need.
- Success hinges on several critical factors, including financial, political, and market feasibility, as well as alignment between university competencies and those of the targeted industry.
- Tech park development closely resembles that of any other real estate project, with phases including pre-development, feasibility, site development, financing, and construction. See appendix 3 – Real Estate Development Process defined for greater explanation.
- An incubator or accelerator to help launch startups to scale could be incorporated into a tech park as an additional means to commercialize UAS technology and create an innovative environment.

6 ALASKA UAS STRATEGIC ASSESSMENT

The successful development of a UAS industry in Alaska will benefit the Alaska economy in terms of high wage/high talent job creation and new private sector investment. In addition to building a core competency for the state (UAS research and development), a successful industry development strategy will also strengthen existing and emerging sectors within the state, such as metal fabrication, aviation, and resource development. Foundational to a development strategy is understanding the current position or conducting a strategic assessment outlining the current competitive position of Alaska as a player within the global UAS industry, including current strengths and weaknesses (internal factors), as well as opportunities and threats (external). These are summarized by the **Current Position** table below:

6.1 CURRENT POSITION

	Beneficial	Harmful
Internal	**Strengths** • Abundance of airspace for safe operations • Diversified need for this technology in the state – (public and private sector) • Strong aeronautical awareness (large number of pilots and aeronautic jobs) • Varied weather (good for R&D) • ACUASI leading UAS for over 10 years with great success • Strong legislative support for UAS development • UAS test range designation from FAA • FAA-certified aviation schools and strongly established maintenance and operation programs within these schools • Alaska UAS Interest Group	**Weaknesses** • High cost of logistics, energy, and labor • Limited road infrastructure (necessary for small UAVs) • Public skepticism (must educate public on positive uses of UAS) • Lack of formal structure to receive inquiries from prospective UAS range users • Lack of methodology to guide prospective UAS range users through range selection and scheduling

Although this strategy document has addressed the strengths and opportunities of a UAS industry in Alaska at length, threats and weaknesses must also be addressed and mitigated. These include a litany of common barriers to economic development in Alaska, such as high energy costs, a small workforce, long supply chains, and limited infrastructure (although this latter issue has probably helped spur the state's aviation competencies).

Alaska must identify the most significant obstacles to private sector investment in UAS-related enterprise, and explore policy solutions. Similarly, state entities such as the Alaska Industrial Development and Export Authority (AIDEA) and the Alaska Aerospace Corporation (AAC) can participate in financing critical infrastructure if such investments can be justified in terms of economic development and then tied to an overall strategic plan for the launch of a new UAS industry.

	Opportunities	Threats
External	• Education/informing the public as UAS are integrated in Alaska • Education/public schools system and University degree programs • Implementation in environmental monitoring, national security, and the oil industry • Opportunity to grow support industries (small aircraft maintenance, manufacturing, and metal and composite fabrication) • Ability to position Alaska on the cutting edge for UAS testing and implementation • Job creation and new investment	• Safety of airspace in Alaska. Need to establish rules governing integration in common airspace • Declining value of test site designation as UAS are accepted into NAS • Budget cuts at the state and university level • Possibility of value creation not benefitting state—UAS could be built and operated out-of-state, not benefitting local economy

6.2 Core Competencies and Competitive Advantages

A Leader in Small Aircraft Maintenance and Knowledge

Alaska has several distinct core competencies and competitive advantages which make it an ideal climate for the development of a strong, well-integrated UAS industry. The state has the largest number of pilots per capita, at a rate of three times the next highest state in the country. This high concentration of pilots has allowed the state to develop small aircraft and aviation as a core competency. Accordingly, the state's aviation support infrastructure and

expertise, including hundreds of remote airfields and aircraft service businesses, can be leveraged as assets for UAS development.

The importance of small aircraft has allowed this industry to develop within the state. The state possesses more than an adequate supply of trained small aircraft technicians and parts suppliers. Several specialized metal fabricators operate in Alaska that currently serve this niche market. For instance, one aircraft manufacturer in Southcentral Alaska manufactures components included on the Cessna Caravan, which are shipped all around the world to Africa, New Zealand, and Australia. This core competency also spills over into the state's educational institutions, which offer associate degrees and certifications related to aircraft maintenance and operations. When viewed in this context, the state of Alaska has the proper support infrastructure in place (relating to small aircraft) to compete effectively in the UAS industry.

A Harsh, Diverse Climate in America's Last Frontier

One of Alaska's greatest strengths is its harsh, varied climate and rugged topography, which make it a perfect testing site for emerging UAS technology and applications. Although these factors have historically inhibited economic development in Alaska, they provide nearly limitless applications for UAS technology. Such opportunities have been mentioned previously, and include the following:

- Volcano monitoring systems
- Oil pipeline monitoring
- Fish and Game monitoring
- Arctic weather deployment
- Mountain navigation and testing
- Extreme cold weather testing and innovation

Alaska provides opportunities for testing UAS in torrential rain (some Alaska locations receive the most rain in the US outside of Hawaii), extreme cold (temperatures in Interior Alaska can routinely reach -50 degrees Fahrenheit in winter), and in Arctic blizzards (a few of Alaska's cities can have extreme levels of snowfall compared to other locations in the US). This varied and extreme climate provides opportunities for the testing of UAS technology in some of the harshest of climates on Earth. This reality, combined with Alaska's other core competencies, makes it one of the best locations in the US for the development of this technology.

While the state can market its climate as a unique strength setting Alaska apart with regard to testing UAS capabilities, competitive locations will identify this as a disadvantage or weakness. Testing of UAS is typically conducted in clear, calm, dry locations. Poor weather conditions, icing, or strong winds may ultimately delay the ability to test UAS. Every day that testing is stalled costs associated with testing increase. Ultimately Alaska must communicate the benefits of unique mountainous terrain, cold weather, Arctic, and maritime testing

opportunities and work closely to assist industry with best times for testing.

Strong Leadership at the State Level

One of the chief advantages for Alaska with regard to the development of a strong UAS industry is the strong leadership shown at the state and university level. These entities have taken the lead to ensure that Alaska is among one of the six designated test ranges nationwide for UAS technology. This designation should ensure Alaska's place within this emerging industry. Furthermore, the state government has shown the necessary leadership to form a task force not only to identify opportunities and threats within the industry, but also to introduce proactive legislation to guide the industries development. This leadership has primed Alaska for success in the UAS industry.

Alaska's leadership has also played a prominent role in current efforts which strive to better understand the Arctic. Fran Ulmer (former Alaska Lt. Governor and UAA Chancellor) is Chair of the U.S. Arctic Research Commission. She was appointed by President Obama in March 2011. Additional state leaders are involved in the Arctic Council, an intergovernmental forum consisting of Arctic nations such as Canada, Denmark, Finland, and others. For instance, ACUASI's deputy sits on the UAS Expert Group, a committee of the Arctic Monitoring and Assessment Group, one of the standing committees of the Arctic Council. State leaders are also active in other Arctic groups such as Arctic Circle, a nonprofit organization which offers a dialogue for key Arctic stakeholders. Alaska's strong leadership in Arctic policy and Arctic issues will be a key asset in developing its UAS industry and furthering the Arctic applications and research of the technology.

In addition to a review of core competencies, a macro-marketing analysis was conducted to identify global and local factors that could potentially influence the UAS industry success in Alaska. This analysis is included as appendix 4.

6.3 Strategic Considerations

Critical to establishing an effective and growing UAS industry in Alaska is engaging all the players in a dialogue that purposefully focuses private sector firms along with economic development practitioners and public sector actors that with an interest in or the development of the industry. While the public sector should not be the driver of an emerging industry, **it is often the public sector that initiates the convening of industry members and may even fund an entity to serve as a public/private convening organization or designate staff to coordinate regular industry meetings.**

Pursuit of an anchor tenant or tenants is another strategy that often provides the ingredient for an industry to emerge. **Policymakers and economic development practitioners need to promote economic conditions supporting the emergence of a new industry via the**

attraction of firms interested in developing the industry. Business development practices might include support for academic programs, encouragement of a strong entrepreneurial climate, and even ensuring access to capital or incentives that may make the relocation of a firm to the area more economically viable.

Crucial to the establishment of an industry group is the interactions of competing and complementary firms. In Alaska, the leveraging of existing and mature industry sectors such as the military, aviation, and aerospace will provide crossovers when it comes to suppliers, professional service firms, distribution chains, customers. **It will be important to involve not just UAS related firms, but to reach across sectors to seek clear crossover competencies as well as other areas to be leveraged.** Key is ascertaining that firms and other economic actors derive some economic advantage from their proximity to and engagement with the various industry stakeholders.

7 STRATEGY AND POLICY CONSIDERATIONS

In light of Alaska's current strength in UAS and the economic potential, a strategic framework for the continued development of the industry is an essential next step. Timing is critical as other states implement their own strategies to grow and attract a UAS industry. Alaska must respond to this challenge.

Alaska has aspirations to achieve the following in an effort to grow the UAS industry sector:

- Promoting research, development, and innovation;
- Advancing education and human resource development;
- Infusing marketing and branding; and
- Educating and engaging the public sector.

To achieve the objective of moving Alaska's UAS industry toward global competitiveness leaders must advance six interrelated drivers concurrently. These drivers, listed below, and the following broad goal areas (innovation and entrepreneurship, education and training, communications, and public sector engagement) provide an actionable framework:

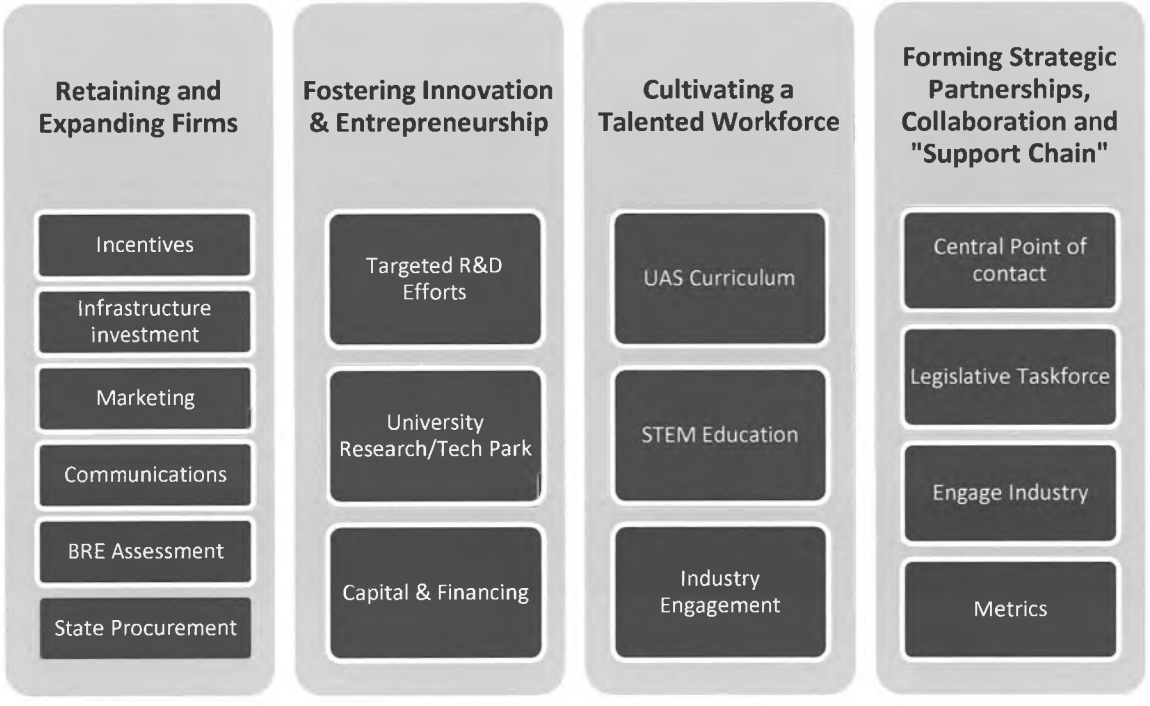
- Research and Networking
- Innovation and Technology
- Business Expansion
- Education and Training
- Commercial Cooperation
- Policy Action

The following strategies are intended to be implemented via a joint industry, government and university collaboration. The formation of an industry leadership council representative of these key anchors is an essential first step. The leadership council will further refine these strategies and then lead the implementation of critical actions. Implementing a joint industry, government and university strategy will bring cohesion and shared vision to growing the UAS sector.

The State of Alaska (including the Legislature) can play a role in convening the right leaders and industry stakeholders. The State of Alaska, specifically through its Department of Commerce, Community, and Economic Development, can serve a critical leadership role through the provision of staffing to the industry leadership council until the working council is firmly established. Over the long-term the leadership council will need to migrate towards self-structure.

A comprehensive strategy to grow and sustain a viable UAS industry for Alaska hinges

on four major elements: strengthening the overall business climate, fostering innovation and entrepreneurship, cultivating the talent of tomorrow, and growing strategic partnerships.



Collectively these strategies seek to create a stronger business climate via:

- **Strategically incentivizing UAS investment to attract anchor firms.** Nationwide, most states and regions offer financial incentives (often in the form of tax credits or abatements) to attract businesses seeking expansion and relocation.
- **Infrastructure investments.** Alaska must invest in critical infrastructure to support advancement of the industry: facilities, special use roads, airfields, or training centers.
- **A coordinated, branded marketing effort.** States in competition with Alaska for UAS investment feature marketing efforts to attract investment in targeted industries, such as "Diversify Nevada."
- **Clear communication of the state's assets.** The state offers more airspace for UAS testing than any other, a long history with defense and aviation related industry, deeply rooted UAS expertise, and nationally-renowned aviation training programs. These and other strengths need to be communicated clearly.

7.1 Goal Area #1 Retaining and Expanding Firms

The FAA test range designation is attracting major, mid-size, and small businesses wishing to expand their UAS presence in Alaska. As a result, Alaska must review its public policy and related business attraction tools to encourage a strong business climate which supports existing, and attracts greater, business investment. The development of a UAS industry in Alaska create a number of spillover effects, including the expansion of existing businesses with niche skills. Many small aircraft maintenance and fabrication shops, along with other types of support businesses, will likely benefit from a strong UAS industry in Alaska. There are also crossover applications from the small aircraft industry to the UAS industry, and these must be leveraged and expanded upon. While an industry development strategy will benefit small businesses, the reverse is also true: an industry cannot take shape without capacity expansion for the state's aviation-related firms. The following strategies aim to retain existing and expand on complementary firms that will support this sector.

To support an improved ability to attract outside firms, state and local governments could offer tax and other specialized incentives. Property tax abatement for new businesses at the borough or municipal level is one avenue. Recent legislation (HB 223) at the state level established a property tax exemption for Military Facility Zones, as mentioned earlier.

Infrastructure needs should be better documented and a plan established to address deficits. The Alaska Department of Transportation and Public Facilities has responsibility for managing and maintaining Alaska's aviation infrastructure, such as its international airports and airfields throughout the state. These are assets in a UAS industry development effort. A needs assessment should be undertaken to determine any deficits as well as a plan to address any discovered.

Establishing a UAS industry in Alaska will require stronger marketing. As one example, the State of Nevada is leading an aggressive marketing campaign to attract the interest of UAS businesses nationwide. The State of Nevada website (www.diversifynevada.com) is hosted through the Governor's Office of Economic Development. While web marketing and attraction efforts are not unique, the focus on UAS business development is. The UAS portion of the website focuses on the advantages of the state over its competitors. Further, Nevada has created an eight-page brochure on the multiple advantages and extensive history of UAS in Nevada.

While Alaska has attracted firms already due to our strong UAS assets and geographic location, improving efforts and producing more at-a-glance information packages will improve the overall understanding of Alaska for targeted firms. Marketing efforts should focus rebrand Alaska as the national and international leader for development of policies, procedures, and flight safety protocols relating to UAS entering the NAS.

Attraction of new firms is one aspect of economic development, but strengthening

existing businesses is another. A possible model for engagement is a traditional business retention and expansion (BR&E) effort, in which economic development organizations identify the needs of the business community through surveys or interviews and develop tailored strategies in response. To support this approach, the state must take inventory of such businesses to determine which are growth-oriented and what their specific needs are. The state should also provide these businesses with opportunities to participate in industry development efforts, as they will have a vested interest in its success.

Lastly, since state government has an interest in spurring private investment in UAS in Alaska, it should itself employ UAS services where appropriate. DNR, DEC, and the Department of Public Safety, for instance, all use manned aircraft for a variety of tasks related to their core missions. If the state began incorporating UAS, it could act as a large customer helping to develop the industry while realizing the increased safety and efficiency benefits provided by unmanned aircraft.

Focus Area	Strategy
Incentives	Incentives • Tax credits • Loans • Equity investments
	Venture Capital Competencies • Need to educate and develop potential VC's as investors make decisions locally
	AIDEA • Investment and Lending policies related to UAS
Infrastructure Investment	Airport(s) Readiness for UAS • Needs assessment
Marketing	UAS marketing presence through the State of Alaska or Public/Private entity marketing Alaska
	• Web presence
	• Collateral pieces (brochures, leaflets, etc.)

Communications	Clear, consistent and compelling messaging
BRE Assessment	Market access to airspace and varied environments. Develop financing and incentive programs.
	Identify private sector champions to support development. Seek avenues for industry participation (i.e. UAS Interest Group). Use BR&E approach to identify needs.
State Procurement of UAS	Create a policy of using UAS services as an alternative to manned aircraft for such activities as wildlife monitoring.

7.2 Goal Area #2 Fostering Innovation & Entrepreneurship

"Growing the Sector" & "Promoting Research"

This goal area requires that the state convey a clear message to industry that Alaska is open for business, encourage the growth of this economic sector, and allow Alaska to lead the country in aviation innovation.

A key driver for industry development will be Alaska's ability to develop useful technology related to UAS. **Although the state has been an early leader in the testing of UAS technologies, it must continue to innovate and harness the intellectual capital of the university system.** Alaska can build upon past successes by encouraging UAS manufacturers and operators to use Alaska as a laboratory, and partner with the university to benefit from its expertise. Alaska is well positioned to be on the front lines for research and innovation with regard to UAS deployment in a multitude of settings.

Each of the FAA test ranges relies heavily on the university system within their respective states. Further, each of the lead universities has developed partnerships with universities in other locations. UAF has partnerships with Oregon State University and the University of Hawaii, for instance. Increasing these partnerships will strengthen Alaska's position as a research hub. UAA would be a good choice as would other university systems in the Pacific Northwest (University of Oregon, Washington State University). The further development of international relationships may also prove beneficial.

Alaska will continue to serve as an important research laboratory for UAS testing, but

taking research forward to the point of commercialization will lay the groundwork for a sustainable future. The university and its research partners must seek avenues to connect this expertise to private sector firms in order to realize economic benefits. They could achieve these benefits through: assisting in the launch of startup businesses utilizing UAS, or making the expertise available to existing firms through customized trainings or technology licensing, if appropriate.

Focus Area	Strategy
Targeted R&D Efforts	Promote University of Alaska Research & Development • Data Collection • Data Analysis
	Become international hub for UAS research
	Pursue innovations (i.e. sensors, data collection, and data processing)
	Develop relationships and agreements with public entities and private sector firms to support shared research leading to commercialization
University Research & Technology Park	Pursue an FAA Center of Excellence designation for UAS
	Expand rapid prototyping capacity to provide support for UAS innovations (i.e. 3D printing, CNC millwork, CAD/CAM)
	Encourage growth of light manufacturing – critical UAS components and systems
	Establish a legislative increment to support research as well as technology transfer and commercialization operations at the UA system

Capital and Financing	Technology Park • Feasibility Study • Location Determination • Financial Plan Developed • Anchor Tenant(s) Identified • Business Plan
	Venture Capital Competencies • Develop potential VCs as investors make decisions locally
	AIDEA • Investment and lending policies related to UAS

7.3 Goal Area #3 Cultivating a Talented Workforce

The limited availability of skilled and semi-skilled workers has always been a challenge for Alaska's industrial development. A thriving UAS industry, however, requires a specialized workforce capable of piloting the vehicles as well as tending to the operational systems. The growth of the UAS industry in Alaska will require advancement of educational programs from pre-K through high school, vocational, and university levels.

Both UAA and UAF offer nationally recognized aviation-related coursework, including degree programs in piloting, aviation administration, air traffic control, and aircraft maintenance. The University of Alaska is already testing courses for the emerging UAS industry. The next step is to develop curriculum that will lead to a certificate or degree. A certificate or degree program will allow Alaska to better position itself as an educational leader, giving it a key competitive advantage over other regions.

The State of Alaska should undertake a labor needs assessment related to the UAS industry and identify ways in which the Department of Labor and Workforce Development can provide support.

Focus Area	Strategy
World-Class Training Infrastructure – Specialized coursework in UAS field	Support the targeted expansion of workforce training with objective of becoming international hub for training and education relating to aviation and in particular unmanned aircraft systems • Payload operators and pilots • Mechanics and maintenance workers • Technicians
Invest in STEM education	Strengthen STEM education focus throughout Pre-K to High School
Higher Education and Vocational-Technical	Establish clear programming and degrees for unmanned ground systems
Engage Industry - Statewide Workforce Development	Undertake needs assessment of workforce gaps. Explore development of apprenticeship programs related to UAS work, and make training funds available.
Training Legislation	Encourage legislation at the local and federal level to support diploma or airman certification prior to FAA regulations being in place.

Funding for Initiatives	Secure funding for a variety of training programs and infrastructure: • UAA aviation requires software change to add UAS component to ATC simulator • UAS component to 141 flight school • Performance Training Standard test • UAS staffing and staff training

7.4 Goal Area #4 Forming Strategic Partnerships, Collaboration and "Support Chain"

Alaska will need to act strategically to realize potential value from UAS industry development. In the coming years Alaska must transition from holding a lead test range designation to becoming a state recognized for its established UAS-industry. Other states with fewer strategic assets and even in some instances no test range designation are simultaneously ramping up to claim the mantle.

Alaska has a unique opportunity given its competencies as well as geographic location to advance strategic relationships and develop a new industry for the state. Alaska is well suited to position and market itself as a premier place to address the needs and challenges of integrating UAS systems into the NAS. In so doing, Alaska must link and align its assets to grow a prospering new industry that advances collectively all stakeholders.

A key component in the development of a UAS industry in Alaska will be establishing clear roles for both the private and public sector. The public sector must lead initially without competing with the private sector. Developing a framework by which the public sector can facilitate the success of the private sector will be of essential importance. Wherever possible, industry should champion and lead.

Establishing a central point of contact, such as formalizing the Alaska UAS Interest Group or establishing a like entity and providing it with the authority, responsibility and resources to lead will serve to further the industry in significant ways. A key scope of work envisioned for the organization is establishing working groups to address membership, finance, government and media relations, and workforce development initiatives. Ideally, this central point of contact would serve as chief liaison for the industry. This level of organization can facilitate a stronger collaboration across industry, academia and government agencies.

Working through the UAS Legislative Task Force, the State of Alaska (including the Legislature) can aid the solidification of a UAS industry in Alaska. Firms seeking to relocate or establish additional offices in Alaska will first review the state tax structure and incentives in place for industry. The Legislative Task Force can lead initiatives to establish or rewrite existing

incentive policies. Incentives should not only benefit industry, but also encourage behaviors desired of industry. For instance, incentives that support greater education and training investments, as well as research will serve to benefit anchors such as the university as well as industry. In addition to improving the structure of incentives, the UAS Legislative Task Force may also explore how to support industry having greater access to seed and venture capital as well as seeking to minimize any regulatory hurdles. Further, a special liaison to the central point of contact or UAS Interest Group will likely prove beneficial until the group can afford its own executive director.

Focus Area	Strategy
Central Point of Contact	Formalize UAS Interest Group or like entity – a standalone 501c3 model is envisioned • Programming – sharing of information • Membership – reaching stakeholders • Infrastructure needs • Capital and Financing • Government and Media Relations • Workforce Development
Legislative Taskforce	Provide recommendations and guidance to state policy to support UAS for public and private applications • Incentives • Seed and Venture Capital • Streamlining regulatory hurdles
Engage Industry	Seek ways to empower the private sector to lead
Metrics	Establish tool to ensure success measures are established and used • Incentive tracking

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APPENDIX 1. UAS TIERS DEFINED

Prior to jumping into a full market consideration discussion it is first important to understand how UAS are typically classified as this classification system drives market behaviors. An "Unmanned Aircraft System" can be applied to a broad range of vehicle types, configurations, and sizes. For the DoD, "tiers" are used to differentiate UAV by size, speed, flight ceiling, functionality and capabilities. This tier system was developed by military planners to ensure integration of various models in an overall use plan. The US Air Force and Marine Corps each has its own tier system, and the two systems are themselves not integrated. Additionally the Army has designated UAS based on the nature of support received from other units. The US Air Force categorizes UAS in five tiers including:

- Tier : Small/Micro, low altitude
- Tier 1: Low altitude, long endurance
- Tier 2: Medium altitude, long endurance
- Tier 2+: High altitude, long endurance conventional
- Tier 3: High altitude, long endurance low-observable

Table A1.1. developed by Unmanned Aircraft Vehicles and System Services to classify UAS.

UAS Description	Weight (Pounds)	Size (Feet)	Mission (Altitude)	Mission (Speed M/Hr)	Mission Radius (Miles)	Mission Endurance (Hours)
Nano	<1	<1	<400	<25	<1	<1
Micro	1 to 4.5	<3	<3,000	10 to 25	1 to 5	1
Small UAS	4.5 to 55	<10	<10,000	50 to 75	5 to 25	1 to 4
Ultralight Aircraft	55 to 255	<30	<15,000	75 to 150	25 to 75	4 to 6
Light Sport Aircraft	255 to 1,320	<45	<18,000	75 to 150	50 to 100	6 to 12
Small Aircraft	1,320 to 12,500	<60	<25,000	100 to 200	100 to 200	24 to 36

Medium Aircraft	12,500 to 41,000	TBD	<100,000	TBD	TBD	TBD

FAA Defined Manned Aircraft Weight Categories

While already confusing, additional UAS Categories are also referenced by Grouping from 1 to 5 according to maximum gross takeoff weight, normal operating altitude and speed.

DoD Unmanned Aircraft Systems (As of 1 JULY 2011)

General Groupings	Depiction	Name	(Vehicles/GCS)	Capability/Mission	Command Level
Group 5 • > 1320 lbs • > FL180		•USAF/USN RQ-4A **Global Hawk/BAMS-D** Block 10	•9/3	•ISR/MDA (USN)	•JFACC/AOC-Theater
		•USAF RQ-4B **Global Hawk** Block 20/30	•20/6	•ISR	•JFACC/AOC-Theater
		•USAF RQ-4B **Global Hawk** Block 40	•5/2	•ISR/BMC	•JFACC/AOC-Theater
		•USAF MQ-9 **Reaper**	•73/85* *MQ-1/MQ-9 same GCS	•ISR/RSTA/EW/ STRIKE/FP	•JFACC/AOC- Support Corps, Div, Brig, SOF
Group 4 • > 1320 lbs • < FL180		•USAF MQ-1B **Predator**	•165/85*	•ISR/RSTA/STRIKE/FP	•JFACC/AOC-Support Corps, Div, Brig
		•USA MQ-1 **Warrior**/MQ-1C **Gray Eagle**	•31/11	•(MQ-1C Only-C3/LG)	•NA
		•USN **UCAS**- CVN Demo	•2/0	•Demonstration Only	•NA
		•USN MQ-8B **Fire Scout** VTUAV	•14/8	•ISR/RSTA/ASW/ ASUW/MIW/OMCM/ EOD/FP	•Fleet/Ship
		•SOCOM/DARPA/USA/USMC A160T **Hummingbird**	•8/3	•Demonstration Only	•NA
Group 3 • < 1320 lbs • < FL180 • < 250 knots		•USA MQ-5 **Hunter**	•45/21	•ISR/RSTA/BDA	•Corps, Div, Brig
		•USA/USMC/SOCOM RQ-7 **Shadow**	•368/265	•ISR/RSTA/BDA	•Brigade Combat Team
		•USN/USMC **STUAS**	•0/0	•Demonstration	•Small Unit
Group 2 • 21-55 lbs • < 3500 AGL • < 250 knots		•USN/SOCOM/USMC RQ-21A **ScanEagle**	•122/13	•ISR/RSTA/FORCE PROT	•Small Unit/Ship
Group 1 • 0-20 lbs • < 1200 AGL • < 100 knots		•USA / USN / USMC / SOCOM RQ-11 **Raven**	•5628/3752	•ISR/RSTA	•Small Unit
		•USMC/ SOCOM **Wasp**	•540/270	•ISR/RSTA	•Small Unit
		•SOCOM SUAS AECV **Puma**	•372/124	•ISR/RSTA	•Small Unit
		•USA gMAV / USN T-Hawk	•270/135	•ISR/RSTA/EOD	•Small Unit

Source: US Department of Defense

APPENDIX 2. CENTRAL OREGON EXAMPLE

The Columbia River Gorge/Hood River example is provided to give further detail to how a specific area of a state is benefiting economically from UAS industry development. Oregon offers three specific Ranges including Pendleton, Tillamook and Warm Springs. The range designations have boosted what was already becoming a UAS focused cluster of Oregon startups and established companies.

Pendleton: Located in eastern Oregon, the Pendleton UAS Range (PUR) is centered at the Eastern Oregon Regional Airport and City of Pendleton. The airport enjoys 347 visual flight days per year and can accommodate up to a Boeing 757. In addition to two conventional runways, the airport provides a 2,800 foot UAS dedicated strip and a full-service UAS operating area. Beyond the airport the range extends over 14,000 square miles: North to the Columbia River; east over the Blue Mountains and Umatilla National Forest; south into the Elkhorn Mountains; and west outlining the borders of Restricted Area 5701 to allow easy access for specialty testing.

Tillamook: Tillamook Range is managed by Near Space Corporation, specializing in engineering, manufacturing and stratospheric balloon operations. The Range spans across miles of Oregon coastline, home to a mild and wet climate with very little seasonal temperature variation due to its proximity to the Pacific Ocean offering interesting marine and coastal research options.

Warm Springs: This FAA designated airspace directly overlies Warm Springs Reservation in the central Oregon Cascade Range near Madras and is managed by the Warm Springs Tribe. The Range supports controlled access to 1,000 square miles from the surface to 18,000 MSL of high desert and forest for testing a variety of UAS missions.

Since 2010, Economic Development for Central Oregon (EDCO), the organization leading the region's economic and business development activities, has been spearheading an effort to create a local hub of unmanned aviation technology. The emphasis behind this effort comes from Central Oregon having expertise in aerospace and aircraft industry manufacturing since 1992, but following the economic recession new attention was placed here as a way to diversify the region's aviation industry. Initially focus was placed on manufacturing SUAS airframes, but shortly thereafter more emphasis was placed on manufacturing the equipment that rides on UAS as well as developing systems for obtaining data, including sensors and optics.

Central Oregon lies near the center of Oregon, encompassing the Deschutes River Basin. Central Oregon is separated from Western Oregon by the Cascade Mountain range, which extend from southern British Columbia through Washington and Oregon to Northern California. Central Oregon's weather is mostly dry and sunny in the summer, snowy and cold in the winter,

with light rainfalls and some cloud cover in the spring and fall. Central Oregon falls away from the Interstate-5 corridor nor does it provide access to a large population base, so resources had to be leveraged to draw in large companies. One of those resources is open air space.

Economic Development for Central Oregon launched the Oregon Unmanned Aircraft Systems Business Enterprise (OR-UAS), a 501(c)(6) nonprofit. Today, OR-UAS is known as SoarOregon. The intent of SoarOregon is to establish Oregon as a leader in civilian UAS development. The organization's goal is to create jobs and economic growth by capitalizing on the development of SUAS and their associated applications. One of the first activities of OR-UAS was to solicit grant proposals for projects that will create UAS-related jobs or generate other UAS-related long-term economic activity in Oregon.

SoarOregon's initial funding came from a two-year, $882,000 state grant from the Oregon Business Development Department and the Oregon Innovation Council, which was approved by the 2013 legislature. In the 2013-15 budget, the Legislature allocated $882,000 to create the Unmanned Aircraft Systems Center of Excellence — a research center and business incubator, that would include a flight-test site with proposed headquarters in Redmond or Bend. SoarOregon has worked to match this state funding with private investments, grants and other programs to get innovative projects off the ground and firmly establish a cluster of UAS activity.

The seed money provided by the state legislature to SoarOregon seeks to:

- Expand existing Oregon companies that support UAS technology;
- Assist Oregon companies in winning new contracts and grants;
- Recruit UAS firms to test vehicles, sensors, systems and applications in the state and to establish offices and facilities here; and
- Generate industry-leading applications that promote innovation

As Oregon hopes to position itself to be a national leader in the research, development, and manufacturing within the SUAS sector it has been working in close conjunction with its institutes of higher learning.

Oregon State University (OSU) has also raised the region's UAS profile, with about 20 faculty working on UAS-related research and technologies. OSU is working closely with Economic Development for Central Oregon, the US Department of Defense, OSU-Cascades Campus, the state of Oregon, Oregon Congressional leaders, private industry and others to help get the state involved. Specifically, Oregon State University's College of Engineering is growing its faculty expertise in this area, responding to burgeoning student interest, and offering the first SUAS engineering course in the Pacific Northwest this fall. "OSU's researchers are looking at unmanned vehicles for precision agriculture, forestry, snow pack observation, land-use

monitoring, wildlife tracking and oceanographic mapping," said Rick Spinrad, vice president for research at Oregon State University and board president of SoarOregon.

Similarly, Central Oregon Community College has established the Unmanned Aircraft Systems Degree Program. The Aviation Unmanned Aircraft Systems Operations (UAS) trains individuals to work as professional UAS operators in the national/ international arena. Students learn to operate UAS to include conducting mission and preflight planning, mission briefings, and programming. Students are also taught to perform limited UAS and ground support equipment testing, troubleshooting and maintenance.

Oregon is leveraging an advantage based on the growing cluster of UAS companies located in close proximity. Firms were initially concerned about not having product testing, but with the new test site designation that is no longer an issue. Not unlike the development of aviation systems in the early 1900's, the commercialization of UAS activity is taking off now as military uses are moving toward commercial uses.

Boeing-owned, Insitu Inc., which makes and designs unmanned aircraft systems including the Scan Eagle™, Integrator as well as other UAS systems, is the anchor tenant. The Bingen, Washington based company employs about 800 people in the Columbia Gorge region and has provided a pipeline of talented engineers and aviators who have spun out to create their own firms. Other UAS companies and those who supply the industry in the region include Aerovel, American Aerospace Engineering, Cloud Cap Technology, Hood Technology, Sagetech Corporation, Sightline Applications, Trillium Engineering, Custom Interface Inc., Innovative Composite Engineering, Prigel Machine and Fabrication, Real Carbon and Zepher. The Gorge Technology Alliance collected data regarding the economic impact of the UAS industry for the region and reported that the more than 1,000 employees working in the UAS industry enjoyed an average annual income of approximately $68,000 in 2012.

Oregon offers precision manufacturing, airframes, propulsion systems, applications and software from all corners of the state. From this core, suppliers followed and as aviation manufacturing slowed with the national recession, core competencies began focusing on UAS development.

The Portland metro area is also a rich hub for aviators. Companies include Columbia Helicopters in Aurora and Erickson Air-Crane Inc. in Portland. McMinnville-based Evergreen International Aviation operated both helicopter and UAV businesses before selling them off in advance of filing for bankruptcy protection. Outback Manufacturing currently boasts 20-40 percent of the company's business in manufacturing parts for the SUAS industry with this segment anticipated to increase in the coming years.

APPENDIX 3. INCENTIVES REVIEWED

	ED Incentive	Description	Advantages	Disadvantages
Tax Incentives	**Research and development tax credits (state level)**	The tax credit formula includes two components: • Credit rate (percentage of R&D expenses the tax liability is reduced;) • Base level (the minimum amount of an expenditure before the credit applies.)	• Increases the amount of R&D activity; • Helps attract businesses from other states; • Allows the private sector to decide about allocation of funds; • Usually neutral and not aimed at a specific industry;	• Shifts R&D activity between states rather than creating new expenditure; • Level-based R&D tax credits, with an increase in R&D expenses, the base level is also increasing every year and therefore it is more and more difficult to get a tax credit; • Aimed mostly at big companies rather than small businesses, as the base level is usually calculated based on reported average expenses in R&D. • May lead to projects with a low rate of return, unprofitable without tax credit.
Tax Incentives	**Hiring tax credits (state level)/Job Creation Tax Credit**	There are several variants of the hiring tax credit: • For employer: it may reduce a company's state income tax liability for hiring certain classes of employees or provide certain class jobs (rural, technology or high-wage) or enable hiring of certain employees with a specific level of payroll. • For employee: it may be provided to an employee for relocation to a particular state (may also exist in a shape of employee's relocation assistance program).	• Provides incentives for both employers and employees to relocate to the state; • Promotes efficient allocation of resources;	• Availability of tax incentives is only one factor among many that businesses consider when deciding about relocation, and it is not the main one. • Zero-sum game;

Tax Incentives	**Manufacturing tax credits**	Municipal or borough level: • Credits or exemptions for property; • Credits of exemptions for sales; State level; • Credits or exemptions for corporate income taxes;	• Allows tax money to stay in private hands and be used more efficiently; • Promotes efficient allocation of resources;	• Availability of tax incentives is only one factor among many that businesses consider when deciding about relocation, and it is not the main one; • Zero-sum game;
Tax Incentives	**Property tax abatements (municipal or borough level)**	In Alaska: an exemption or partial exemption from property taxes for up to 10 years if the property is in a military facility zone that creates or supports industry, development, or educational or training opportunities beneficial to a facility	• It is simpler and less restrictive than tax credit; • It is more useful for smaller projects. • Stimulates relocation of businesses to specific zones to which tax exemption is applied.	• Availability of tax abatements is usually limited.
Tax Incentives	**Sales tax abatements (municipal or borough level)**	These would allow local governments to exempt particular purchases, or businesses within particular industries, from sales taxes, if the company relocates and retains jobs within the state.	• It is simpler and less restrictive than a tax credit; • It is more useful for smaller projects.	• Availability of tax abatements is usually limited.

Investment incentives	Matching research and development grants	Funding from federal, state and private sources for research grants, research equipment acquisition, and product development/commercialization;	Promotes cooperative efforts between private businesses and the university system; Promotes early-stage research and development funding to advance technology;	Funding usually requires availability of matching funds.
Investment incentives	**Funding by AIDEA and the AHFC to projects within Military Facility Zones (MFZ).**	AIDEA has several financing programs: Loan Participation, Conduit Bonding authority, Loan Guarantees and Development Finance.	• Helps build UAS infrastructure within MFZ. • The trend of using these zones as a primary incentive tool has moved towards supplementing them with broader programs;	• Funding usually requires availability of matching funds.
Investment incentives	**Gap loans**	It is used when the banks and business owner are unable to secure funds necessary to complete the total project amount, leaving a "gap" between the two. Usually this type of financing is limited to specific geographical location.	• Provides business with cash to operate while waiting for the funding;	• Usually comes with high interest rate.
Investment incentives	**Equity financing**	The process includes selling shares of the company to raise capital. This incentive is efficient only if there are potential equity investors or business angels within the state.	• Cash infusion with flexible timeline to pay back; • Potential partnering with local professionals (business angels) which are aimed at positive financial results;	• Splitting profits with equity investor.
Investment incentives	**Venture capital assistance**	The process includes investing in startup companies, which are usually highly-technological. This incentive is efficient only if there are potential venture investors within the state. In Alaska one of the examples is Alaska Venture Partners, LLC.	• Potential investment is usually up to $5 million; • Access to knowledge and technical assistance.	• Venture investors expect large return on investment; • The necessity to share company equity.

Other Types of Incentives	**Job Creation Grants**	Depending on the industry, companies creating a minimum required a number of new jobs and making a minimum required capital investment is eligible to receive discretionary cash grants (e.g. job creation grants provided by SBA.)	• Stimulates small businesses to create new jobs.	• A lot of paper-work to apply for grant; • Competitive basis, so grant availability is not guaranteed.
Other Types of Incentives	**Energy Discounts**	Some utility providers may offer grants and reduced rates to projects resulting in new job creation and investment. This incentive may also exist in a view of energy incentive loan which includes a no interest loan to pay for energy costs for a particular period of time.	• Important incentive to stimulate businesses to relocate to Alaska as it helps reduce high energy costs; • Creates competitive advantage for the business;	• Usually limited to specific industries or projects.
Other Types of Incentives	**Free or discounted land**	Negotiated lease or sale of land owned by a locality or state, often at a below market cost. Approach is often used via a sole source contract to assist a company needed land for location or expansion.		
Other Types of Incentives	**Technical assistance**	Local economic development organizations may provide technical assistance for new businesses or companies relocating facilities.		

APPENDIX 4. REAL ESTATE DEVELOPMENT PROCESS DEFINED

The basic approach to developing a tech park is essentially similar to any business planning process. Elements include due diligence on the part of the owner and research surrounding market characteristics and product factors that then drive decisions surrounding the business venture. For a tech park in the Fairbanks area with an emphasis on UAS technology, these characteristics include land availability, access to airfields, and proximity to university facilities.

From an economic development practitioner's perspective, project planners must follow an established process to establish a tech park. Much like any real estate project, steps include:

1. Pre-development
2. Feasibility – (market; financial and political)
3. Site characteristics and considerations (site and engineering analysis)
4. Financing
5. Contractor selection (negotiations and public approval process precede)
6. Construction
7. Marketing
8. Facilities occupancy and ongoing management

The pre-development phase focuses on aligning a business development idea such as a tech park with a specific site or sites. Typically the businesses targeted for the tech park have an idea of what they want and can well describe their ideal location. This phase typically includes a pre-feasibility or basic low cost assessment, to determine whether the concept "pencils out." It is critically important to engage in conversations early with all key stakeholders including tenants, owners, lenders, and partner organizations.

The feasibility phase is about determining the market; political and financial viability of the proposed development. With regard to a UAS tech park, the key question to be addressed is whether market demand is sufficient to offset the development and operational costs associated with the project. Political feasibility requires determining if the local political climate will support the proposed development. For instance, some communities are more concerned about UAS activities than others (for example: has the community supported any bans on UAS or business development?). Financial feasibility requires identifying the various costs associated with business and site operations and factoring these into a pro forma or financial analysis to prove to investors (debt or equity) that risks associated with the financial investment are less than the ultimate reward of financial returns.

Site review and engineering assessments include working with local municipal permitting and regulatory entities to determine if characteristics associated with the site will ultimately impact operations and plans for site development. This includes researching and

seeking expert opinion on items such as environmental impacts, flood plain characteristics, run off patterns, earthquake zone, parking requirements, special restrictions, egress and ingress characteristics, and similar concerns.

Financing is a critical hurdle for nearly every real estate development project. In most cases, multiple investors will negotiate terms and ownership interests in the development. In the case of a UAS tech park, investors may include stakeholders such as city or borough governments, the University of Alaska, federal agencies, Native Corporations, or private sector anchor tenants. In many cases both debt and equity investments are necessary due to the high costs associated with real estate development. For a public-private project such as a tech park, highly sophisticated and hybrid financing packages are typically needed to meet these expenses.

Contractor selection can be challenging if the developer is new to real estate development, particularly when led by a public sector entity. In short, this involves outlining the type of construction to be undertaken and providing bidding contractors with architectural and engineering schematics to follow. In some cases, contactors are asked to design and build, which can result in a less expensive and at times higher use property if there is cohesion of vision between the contractor and the developer. The contractual process can also be driven by financing requirements. For instance, if the public sector is contributing funds, a competitive bidding process will most likely be required.

Marketing is often a forgotten element, but really should be started early on in the process and may require an ongoing effort to lease all available space. At times, marketing is also necessary to raise capital for construction. In all circumstances, outreach and relationship building are essential to ensuring initial contracts with key anchor tenants are in order and confirm base operational costs are covered. For a UAS tech park, marketing efforts may form one component of an attraction program to recruit new businesses to Alaska. In turn, this may require tax or financial incentives to draw firms to the state. Of crucial importance is the targeting of firms that complement existing university research efforts.

The ongoing management of the property, once it is developed, typically involves two critical areas: day to day management and then longer-term renewal, replacement and eventual sale of the property. Both of these factors are of particular importance if the developers do not have real estate professionals on staff.

Appendix 4. Macro Market Environment Review

A macro-marketing analysis was conducted to identify global and local factors that could potentially influence the UAS industry success in Alaska. These factors include: political, economic, social, technological, maintenance, concept of operations, environmental, and legal considerations.

Political Considerations

All types of UAS have US domestic and international applications for law enforcement, land surveillance, wildlife tracking, search and rescue operations, disaster response, border patrol and photography, among many other tasks. Federal agencies, along with most states and foreign countries, are debating if and how this emerging technology should be regulated; taking into account privacy concerns, the benefits of use, and business interests. As mentioned previously, FEMRA established the program to integrate UAS into civilian airspace, including the formation of the six test ranges. This was a highly competitive process with at least 50 primary teams representing 37 states requesting FAA-portal access for proposal submissions. The international effort to incorporate UAS into respective airspace is primarily led by the International Civil Aviation Organization (ICAO) which "mirrors" many of the policies engaged by the FAA, but is aggressively leading the manned - unmanned airspace integration effort thus far. There continues to be an ever-changing political landscape in the United States relating to and for UAS. A recent FAA list, spurred by Freedom of Information Act lawsuits, indicates that an additional 81 public agencies have applied to the FAA for authorization to use UAS. Pending State Legislative measures focus on a variety of issues including:[34]

- Definition of a drone or unmanned aerial vehicle;
- Use of unmanned aerial vehicles by law enforcement and other state agencies;
- Use of UAS by the general public;
- Formation of various study committees;
- Bans and moratoriums on operations; and
- Resolutions requesting to be an FAA test site.

The Alaska Legislature adopted a joint Concurrent Resolution (HCR006C) in 2013, creating a Legislative Task Force on Unmanned Aircraft Systems (LTFUAS) tasked with reviewing FAA regulations on drones and creating written recommendations and legislation that "protects privacy and allows for the use of unmanned aircraft systems for public and private applications." In addition to members of the legislature, the task force is comprised of members representing the commissioner of public safety; the Adjutant General of the Department of

[34] National Conference of State Legislatures, website, http://www.ncsl.org/issues-research/justice/unmanned-aerial-vehicles.aspx

Military and Veterans' Affairs (DMVA); the ACUASI at UAF; the Academy of Model Aeronautics, the state Aviation Advisory Board and most recently a public representative and two industry members. The task force provided a final report to the Legislature on June 30, 2014.[35] In this report, the LTFUAS concluded that the FAA is adequately addressing the safety concerns of integrating UAS into the National Airspace System (NAS).

Alaska has prime airspace to prove an assortment of civil applications for UAS. "Alaska's extreme and ever-changing environment can put these systems to the test," Lt Gov. Mead Treadwell stated, "and the technology, along with our university's new supercomputer, can show how unmanned aircraft can support Arctic science, help manage natural resources and respond to emergency situations." Treadwell continued, "The synergy between the two technologies here in Alaska keeps us on the cutting edge of aerospace development....and an investment of $5 million approved by Gov. Sean Parnell to further the University of Alaska's UAS research helps too."[36]

Political debate, discussion and efforts to understand the consequences of UAS operating in the NAS will continue. Most of the debate stems from concerns regarding use in the military to the potential for invasions of privacy. At the core of the debate surrounding UAS advancement is uncertainty associated with the widespread use of a relatively new technology, and the potential for misuse by government or industry. The emerging regulatory framework should mitigate most of these concerns.

Economic Considerations

Economic issues such as federal sequestration and the continuance of budget resolutions are expected to keep producing uncertainty in the marketplace. Federal sequestration legislative actions took place in FY 2014 (and are further scheduled for 2015-21). Fiscal politics in congress currently attempt to cap defense and non-defense discretionary spending; a rise in one area will generally be offset elsewhere, limiting grants or R&D funding with potential impacts on UAS.[37]

According to the Unmanned Vehicle Systems International (AUVSI) 2013 "New Economic Report,"[38] the main inhibitor of US commercial and civil development of UAS is the lack of a regulatory structure. Due to current airspace restrictions, non-defense use of UAS has been, and will continue to be, extremely limited. This primarily affects *Tier I and II platforms,

[35] Legislative Task force on Unmanned Aircraft Systems, Final Report to the Legislature as required by Legislative Resolve 17 SLA-13, June 30, 2014.
[36] Alaska can be Arctic Proving Ground for UAS, Office of Lt Gov Mead Treadwell, 2012
[37] Center on Budget and Policy Priorities, website, various articles, http://www.cbpp.org/cms/?fa=view&id=3635
[38] The Economic Impact of Unmanned Aircraft Systems Integration in the National Airspace, AUVSI, March 2013, http://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf

whereas Tier III UAS is able to comply with FAA requirements for operations in the NAS with thorough coordination. **To better understand UAS tiers, please refer to appendix 1.*

AUVSI further projects an $82.1 billion infusion into the US economy due to UAS operations over the 10 years following the mandated 2015 integration deadline. Agricultural applications of UAS alone could pump $75.6 billion into the economy over the decade, according to an optimistic report published by AUVSI in March.[39] Public safety and "other applications, like natural resource management, will produce $3.2 billion each," the report claimed. The industry is projected to create just over 100,000 jobs during the same period, two-thirds of which will spring up in the first three years after integration into the NAS. Many of those jobs will be manufacturing positions that pay more than $40,000 annually.

AUVSI identifies the following criteria required before any viable UAS growth in the US:

- The FAA must develop new regulations integrating UAS into the nation's airspace; this effort is directly tied to the successful operation of the six test ranges.
- Job growth distribution in the US will mimic current aerospace manufacturing employment; reflective of UAS design/production and not necessarily applicable to UAS services support.
- There must be sufficient capital available to encourage smaller manufacturing companies.
- There must be financing available to UAS purchasers, foreign and domestic.
- There must be adequate insurance to cover liabilities associated with UAS design/production as well as operations.
- US Gross Domestic Product (GDP) needs to grow at least 3% annually over the designated time period for assumptions to hold.[40]
- Overall, NAS integration is the greatest factor effecting UAS market growth whereas Original Equipment Manufacturers (OEMs) will be more affected by the health of the economy.

Social Considerations

There are widespread public assumptions that domestic integration of UAS will result in "lethal war machines buzzing their neighborhoods" and personal privacy will diminish as result. Overcoming these fears will continue to be a challenge. Some opposition camps view the

[39] Booming Unmanned Aircraft Industry Straining to Break Free of Regulations, June 2013, http://www.nationaldefensemagazine.org/archive/2013/May/Pages/BoomingUnmannedAircraftIndustryStrainingtoBreakFreeofRegulations.aspx

[40] The Economic Impact of Unmanned Aircraft Systems Integration in the National Airspace, AUVSI, March 2013, http://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf

aircraft as a "Big Brother" technology that will bring prying eyes into citizens' homes.[41] Consequently, there continues to be a significant effort by states to understand and regulate UAS operations. Conversely, there is a growing realization of the economic value of the domestic UAS marketplace and associated opportunities for applying this technology across federal, academic, and commercial arenas.

Similar to the earliest days of manned aviation, increased education about UAS applications, cost-benefits, safe and regulated operations, and the ability to take the human risk out of the "dull, dirty and dangerous" jobs will eventually bring greater acceptance across society.

Technological Considerations

UAS technologies for UAS continue to develop rapidly. Small, *Tier I UAS appear to be generally developing faster than Tier II or III as manufacturers are able to enter the market more quickly and with less capital investment. Tier II UAS is led by Boeing-Insitu with their service-proven Scan Eagle™ mentioned previously, and follow-on program of record, "Integrator," primarily supporting DoD in the GWOT. The trend (for both Tiers I and II) is for vehicles that can carry an array of smaller, interchangeable, more capable sensor systems (Electro-optical, infrared, optical/Infrared/Multi or Hyperspectral); the addition of hard point for wing-mounted payloads; and standardized ground control systems. Tier III design has relatively slowed as the full range of capabilities have for the most part been demonstrated, and now the focus is on greater fidelity and expansion of sensor suites, along with reducing the overall operation and sustainment costs. There is also a significant cost barrier to enter the Tier III market, even as a service provider rather than an original equipment manufacturer (OEM).
**To better understand UAS tiers, please refer to appendix 1.*

Specific technology considerations include:

Vehicles: UAS can be fixed wing, rotary or a combination of both. Historically, the most common options have been fixed wing as these operate more quietly, with greater efficiency and longer duration. This is not necessarily true as technology is advancing rapidly. As an example, Rotary Tier I options are becoming more common in law enforcement (e.g. Aerovironet Qube) which can be tailored for low altitude/short range/short duration missions ranging from security support to precision agriculture.

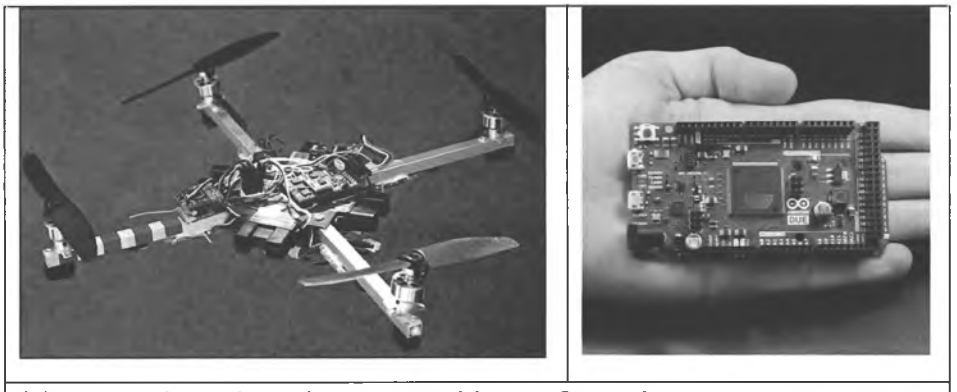
Payload/Sensor Suite: Primarily Electro-optical (EO), Infrared (IR), and Hyperspectral capabilities. Cameras are getting smaller, as well as integrated with higher fidelity. Synthetic Aperture Array-based Hyperspectral systems are rapidly being miniaturized

[41] Booming Unmanned Aircraft Industry Straining to Break Free of Regulations, June 2013, http://www.nationaldefensemagazine.org/archive/2013/May/Pages/BoomingUnmannedAircraftIndustryStrainingtoBreakFreeofRegulations.aspx

for small platforms. Overall, greater fidelity in data collection is being provided with smaller equipment, expanding the flexibility to meet customer needs.

Data storage/transfer/analysis/processing: Data storage (physical volume, weight, cost-per-Giga Byte) continues to plummet, which translates to a greater ability to collect and store more streams of data simultaneously aboard the platform. Likewise, data transfer algorithms and processing power have become more efficient (and compact). Manufacturers, universities and even hobbyists are now able to create sophisticated *Tier I UAS platforms (e.g. Tier I Quad Copter) using open-source processing (e.g. Arduino, Raspberry PI). This disruptive technology, is in essence aiding in the creation of a new market that may displace an earlier technology. As a result, this technology may produce similar changes in the UAS industry, like the introduction of personal computing over 40 years ago. **To better understand UAS tiers, please refer to appendix 1.*

Figure 10: Tier I Quad Copter



(L) – An Arduino based copter. Hobbyists & Academics are using open source hardware (R) that puts a computer in your hand. < $ 75 / unit via Amazon or Radio Shack.

Training/Simulators: The DoD's "Report to Congress on Future UAS Training, Operations, and Sustainability," of April 2012 provides details regarding the requirements and initiatives being addressed regarding UAS in the NAS for UAS Executive Committee (EXCOM) activities (DoD, DHS, FAA, and NASA) out to 2017.[42] Of note:

- UAS will not achieve their full potential or utility unless they can achieve the same freedom of navigation, responsiveness, and flexibility as manned aircraft.

[42] DoD Report to Congress on Unmanned Aircraft Systems Training, Operations, and Sustainability, Under Secretary of Defense for Acquisition, April 2012, https://www.fas.org/irp/program/collect/uas-future.pdf

- Many DoD UAS now require rapidly expanded access to the NAS and international civil airspace to support operations, training, testing, and broader governmental functions.

Traditional training provided by OEM as part of the UAS sale and sustainment logistics support, is giving way to smaller companies specializing in UAS training across a range of different UAS platforms (particularly with the standardization of ground control systems). Some customers (DoD and most foreign countries) are requiring the OEM to support a "train the trainers" approach so that training can be accomplished "in-house" to save money. Some of this is the result of DoD acquisition managers' efforts to reduce the life cycle sustainment costs of UAS developed under "programs of record" and by foreign countries to develop their own capabilities, avoiding the continued dependence on foreign OEMs. Simulators are quickly being developed to support training in lieu of having to coordinate limited airspace for flight time, affording operators and maintainers the opportunity for platform and payload training.

Maintenance Considerations

Logistics and field maintenance support became critical as UAS were incorporated into the battle force within combat zones. Consequently, focus expanded to include requisite field maintenance of software and hardware, requiring Subject Matter Expertise (SME) functions to be continuously available. Configuration management and field upgrades resulted in total integration of civilian contractors into the military combat environment. Those same contractors have brought their expertise back to the home front where they anxiously await integration into the NAS.

Concept of Operations Considerations

Two types of approaches are prevalent in the UAS marketplace: own/operate and fee for service (FFS). Own/operate follows the conventional model with direct purchase of a UAS product from an OEM (or a growing number of independent integrators tailoring specific UAS for customer needs, like UAV Factory (http://www.uavfactory.com/). Training and sustainment support derives from the OEM directly or thru certified vendors. Each OEM provides the customer a UAS product from a growing array of available platforms. Typically the systems are highly proprietary (not "plug & play") with various additional sensor packages/equipment purchases required. The customer, in this case is also responsible for upgrades, training and sustainment requirements.

The FFS model primarily grew from the incorporation of Boeing-Insitu's Tier II Scan Eagle™ and AAI's "Aerosonde" in support of the US Marine Corps operating out of Iraq in 2005, and expanded into Afghanistan and elsewhere around the world. This customer-focused approach requires the contractor or vendor to identify user mission requirements, or "end-product," and provide everything needed to meet those requirements: UAS platform and ground equipment, training, certification, sustainment/upgrades, and data collection/transfer

to the customer.

Overall, as UAS proliferate into non-DoD applications, mission profiles must also accommodate ever-changing requirements while minimizing costs to customers. A UAS program with customer-driven focus on securing requisite data of the highest quality at the least cost will require the right platform/sensor selection to meet mission requirements, and effective planning of sustainment costs.

Legal Considerations

The regulations and standards affecting the UAS community are in a rapid state of change and modernization.

The latest legal information regarding State legislative actions are found at: http://www.aclu.org/blog/technology-and-liberty/status-domestic-drone-legislation-states

Alaska Airports and Aviation
2014 Annual Report

Alaska Department of Transportation & Public Facilities
4111 Aviation Avenue • Anchorage, Alaska 99502
www.dot.alaska.gov

2014 Alaska Airports & Aviation Annual Report

Message from: John Binder Deputy Commissioner

2014 was another successful year in Alaska aviation. Despite a challenging winter characterized by multiple freeze/thaw events that brought unprecedented icy conditions, our Alaska Department of Transportation & Public Facilities (ADOT&PF) personnel continued to operate the nation's largest airport system and provide the aviation lifeline essential to Alaska. Several accomplishments and initiatives posture us well for what looks to be an equally challenging year.

Rural Airport System

Last year's rural aviation strategic plan provided a mechanism by which several key initiatives were achieved. Performance metrics were developed that will soon be incorporated into the Alaska Aviation System Plan (AASP) website, providing critical insight into those areas where we are performing well and those that can use improvement. An emphasis on employee development resulted in an annual training plan that is benefitting airport maintenance and operations (M&O) personnel statewide, both within and outside ADOT&PF. Finally, a refined communication plan will ensure consistent dialogue and collaboration between the myriad stakeholder groups critical to Alaska aviation.

2015 Statewide Aviation Strategic Plan

Purpose

To sustain and improve the quality of life throughout Alaska.

Core Values

Integrity, Innovation, Excellence, and Respect

Vision

By 2025 we will lead the world in rural aviation reliability, service, and safety management.

Initiatives/Improvement Projects

- Performance Scorecard Development
- Capital Project Optimization
- Airport Database
- Non-Standard Aircraft Policies
- Revenue Optimization

This year's initiatives will focus on adapting to new technologies, and optimizing both capital project development and revenue opportunities as we continue to be good stewards of our limited resources.

Working Together

As I mentioned with the airport training, ADOT&PF continues to make a concerted effort to partner with local, state, and federal agencies as we all advance our aviation interests. A ADOT&PF panel at the Alaska Air Carriers Association conference in February was able to facilitate valuable discussion on a variety of topics impacting the state from obstruction marking and lighting, to snow and ice control, to adjusting operating hours to accommodate industry needs. We truly do want to know about any issues or concerns the traveling public may have, and appreciate the opportunity to work together towards solutions.

A trip to Washington D.C. in February provided an opportunity to meet with FAA and TSA directors to address several national policies that present challenges to Alaska aviation. Meetings like these, and the subsequent opportunity to show several of our federal agencies the "real" Alaska during their travels this year, continue to be invaluable to ensuring strong partnerships and cooperation moving forward. As the fiscal climate becomes increasingly challenging at both the state and national level, cooperation is vital in maintaining a safe aviation system that continues to meet the needs of our residents.

The Great Alaska Aviation Gathering, a legislative trip to the Mat-Su valley, and several Governor's Aviation Advisory Board meetings provided many opportunities to hear from communities and stakeholder groups. A common theme is the increasing demand for airport development opportunity, particularly at those airports in the most rapidly growing regions of the state. DOT&PF will be looking closely at this issue and developing options for meeting the growing need.

Progress

On the capital project front, 2014 saw a better than expected allocation of FAA Airport Improvement Program (AIP) funding of ~$200 million that facilitated large Runway Safety Area projects in Kodiak, Nome, and Kotzebue as well as multiple runway rehabilitation projects in Hooper Bay, Koliganek, Ambler, Petersburg, Barrow and Juneau. In addition, multiple pieces of Aircraft Rescue & Fire Fighting equipment were purchased, Snow Removal Equipment Building projects begun, and several aviation planning studies initiated. Kudos to all of the people and sections responsible for another outstanding grant cycle.

Alaska International Airport System

The Fairbanks and Anchorage International Airports comprise the Alaska International Airport System (AIAS). Ted Stevens Anchorage International was honored for the second year in a row by Air Cargo World as the best cargo airport in North America. The award serves to acknowledge not only the tremendous airport staff, but also the partnership and dedication of the air carriers, ground handlers, and local community in making TSAIA such a great team.

Both Anchorage and Fairbanks finalized airport master plans culminating 18 months of rigorous public engagement, analysis, and planning to develop a common sense strategy for addressing forecast growth. These master plans were unique in that they incorporated "trigger points" for future capital improvements rather than focusing on a specific date. As the airports work in collaboration as an airport system, much of the analysis included how the airports can cooperate to accommodate cargo and passenger activity using current infrastructure, so as to maximize the system's potential prior to initiating new construction. The completed plans can be viewed at the following websites: www.ancmasterplan.com and www.pdcprojects.info/FAIMasterPlan
Lake Hood Seaplane Base just began its master plan process, which will continue throughout 2015. I encourage all Anchorage residents, pilots and passengers alike, to be involved in the process so that the final product represents the interests of all stakeholders.

Finally, while cargo activity through AIAS has continued to slip slightly year to year, I'm pleased to report that passenger traffic continues to rise. Furthermore, we were thrilled to hear that Dynamic Airways will begin weekly, international passenger service between Changsha (a community of 7 million people), in the Hunan Province of China, and ultimately Los Angeles, Las Vegas, Boston, and New York. Each flight will stop in Anchorage for refueling and for customs/immigration processing providing not only a tremendous tourism opportunity in Alaska for Changsha citizens, but also providing Alaskans non-stop service to several new cities both nationally and abroad. Beginning with charter operations, the flights will transition to regularly scheduled passenger service in the spring of 2015.

I close with sincere appreciation for the tremendous work our airport personnel do each day to keep our aviation system operating safely in the face of ever increasing challenges. It truly is the lifeline to most of our rural communities, and their professionalism each and every day sets an example to be emulated by all.

Fly safe Alaska and Happy New Year!

John

ADOT&PF Photo credits:
Cover: ANC Airfield Maintenance Team, Zaramie Lindseth
Painting runway markings at Cold Bay Airport, Hap Kremer
Back page: Unalaska Airport , Lynn Cason

DOT&PF Maintenance & Operations Crews Efficient and Innovative

By Mike Coffey
Chief, Statewide Maintenance and Operations

The Department's Maintenance and Operations (M&O) personnel are responsible for the State's transportation system that includes over 5600 miles of state owned roadways, 254 airports, 845 bridges, 720 State owned and/or managed buildings, and over 7,000 State vehicles and equipment. Alaska's transportation system lies within one of the most extreme and challenging environments on the planet with temperatures ranging from 100F to -80F, snowfalls as high as 974 inches of snow at Thompson Pass, and 80% of the State is under laid by ice-rich permafrost.

M & O responsibilities include pavement maintenance and preservation, highway and airport anti-icing and deicing, snowplowing, snow hauling, avalanche hazard mitigation, vegetation management, guardrail repair, sign maintenance, street/traffic light repair, drainage structures, fence maintenance, airport light repair, airport rescue and firefighting, airport security, and facility repairs. It also includes responding to all emergency/weather related situations such as snow and ice removal, fallen trees, mud and landslides, and roadway/airport flooding.

The Department is continually promoting workplace efficiency; seeking innovative ideas; and providing training. The following are new programs and highlights from this year:

Everyday Lean Innovations & Ideas

The Everyday Lean Innovations and Ideas initiative was developed to promote sharing of innovations and ideas of the DOTPF workforce. An excellent example of a great employee innovation is the "Yeti" (shown below). The "Yeti" is the brainchild of John Frison, a Mechanic Auto Advanced Journeyman at the Fairbanks International Airport. The Yeti provides several benefits and efficiencies by allowing field maintenance staff to fracture ice and create pockets with a pathway to the underlying asphalt so the deicing chemical can get under the ice and start to work versus melting down through the ice. It will also help in the actual removal of ice by leaving pockets for sand to sit in and give texture to provide traction for aircraft operating on the active surfaces. Finally, the unit will be much easier to maintain as each individual tooth can be replaced separately. The width of the unit is approximately 9.5 feet and costs approximately $18,000 dollars to fabricate. The commercially available ice breaking units range in cost from $30,000 to $45,000 so this represents a significant cost savings to the department. This is just one example of the many outstanding innovations and ideas that are developed within the ranks of the ADOTPF workforce. Checkout the Everyday Lean Innovations and Ideas webpage at https://web.dot.state.ak.us/everydaylean/index.shtml.

The department is constantly exploring new technologies, procedures, and methods for accomplishing our mission in a more cost-effective and efficient manner. ADOT&PF is the first in the world to deploy a TowPlow to an airport. This winter the Kodiak Airport will be utilizing a TowPlow, a specialized piece of equipment that is towed behind a normal snow plow that allows one truck and operator to do the work of more than two conventional snow plow trucks. The TowPlow is also good for the environment. It reduces the number of vehicles required to clear a given airport/roadway and, in turn, reduces fuel usage.

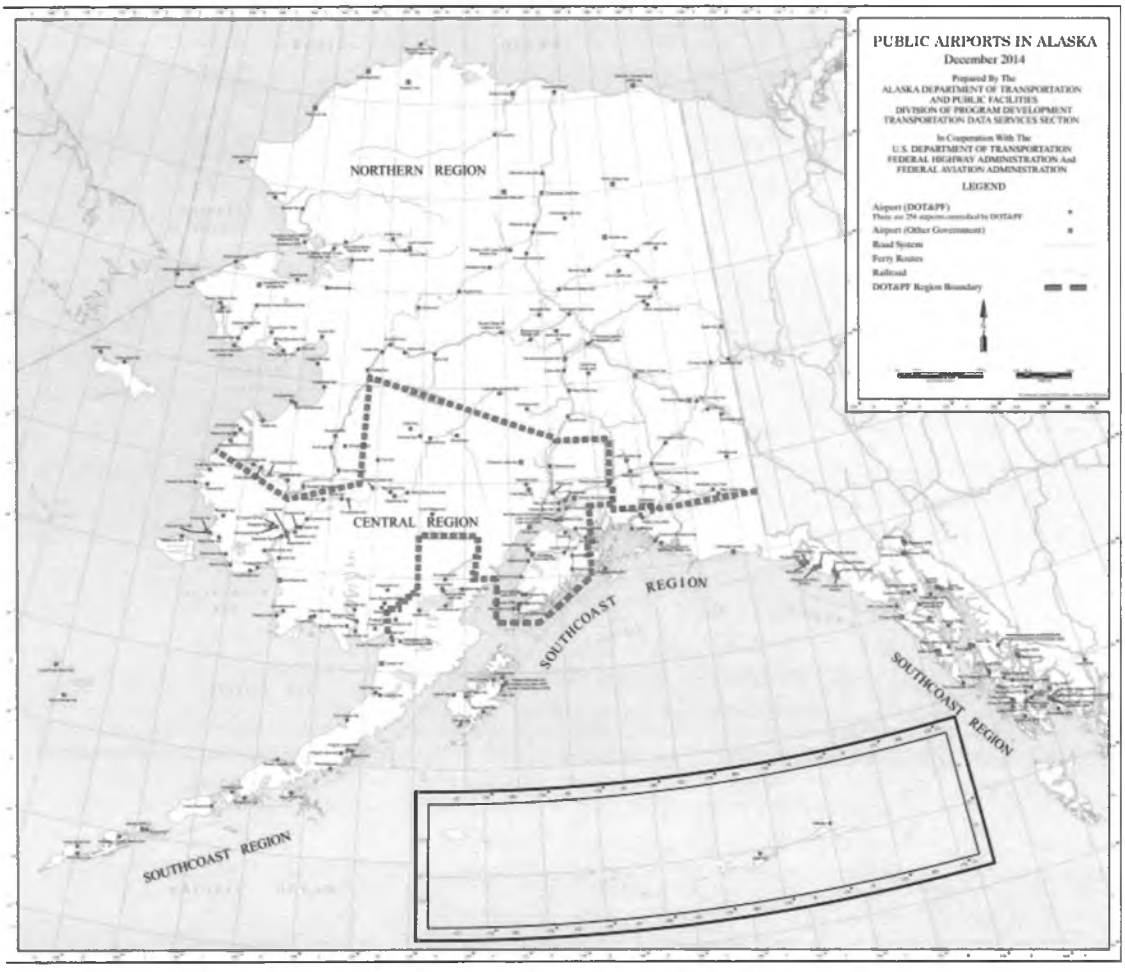
In an effort to mitigate the challenges associated with winter airport and highway maintenance decisions, the ADOTPF initiated a pilot program aimed at developing an Alaska specific winter enhanced Maintenance Decision Support System (eMDSS). The primary goal of the MDSS program is to provide objective guidance to winter road and airport maintenance decision-makers concerning the appropriate treatment strategies to employ to control snow and ice during adverse winter weather events. The eMDSS utilizes current weather observations and numerical model predictions from multiple sources to produce route/ airport-specific analyses and forecasts of environmental conditions. The broad needs met by the Alaska specific MDSS include the following:

Enhanced strategic planning capability
Improved tactical response capability
Improved adverse road weather notification
Operation-specific decision support

The department recently created a new maintenance foreman position in Bethel that combines the skills of an airport maintenance professional with that of a skilled aircraft pilot. By requiring the maintenance foreman to possess a pilot's license the department has been able to dramatically increase the Level of Service provided at the 64 rural airports in the Southwest District. Prior to the creation of this position, the SW District had attempted to inspect each remote rural airport once a year but tended to concentrate efforts on reacting to reported problems rather than being proactive. In the first six weeks after this position was filled, 26 airports were inspected and a vast amount of airport maintenance was performed to include; brush cutting, runway lighting repair, windsock repair, runway grading, beacon repair and contractor training. The airport inspections also included the equipment and buildings. State Equipment Fleet and Facilities have also utilized the aircraft when weather and schedules allow.

Photo - LJ Davis, DOT's Flying Maintenance Foreman at the Tuluksuk Airport. ADOT&PF leased a Cessna 182 to assist with airport maintenance in rural Alaska.

As part of its commitment to developing leaders for the agency, ADOTPF created the Alaska Maintenance Leadership Academy (AMLA). The AMLA is helping superintendents, foreman, airport managers, and lead men become more effective and efficient supervisors. The Academy is a five-day intensive, interactive series that prepares our leaders for the challenges of today and tomorrow. The first leadership academy was held in October 2012, and four have been completed to date. We are proud to say that approximately 110 of our leaders have graduated from AMLA.



New Southcoast Region

Southeast Region's boundaries are expanding to include the majority of southern coastal communities and will be renamed the "**Southcoast Region**." We are updating our website content to reflect this change as quickly as possible. This transition is on-going so your patience is appreciated. Fact sheet available online at www.dot.alaska.gov

Mail Delivery in Hooper Bay, Rich Sewell, ADOT&PF

Cargo Delivery at Galena Airport, Shawn Crites, ADOT&PF

Alaska Aviation System Plan

Being charged with the management of North America's largest airport system is no easy task. It takes a long range vision and extensive planning to ensure the safe, effective and efficient operation of Alaska's 251 state-owned airports. The FAA certainly sees the value in planning as they provide annual grants for ADOT&PF to build the Alaska Aviation System Plan (AASP), a compilation of policies and plans that guide the future design, maintenance and operations of our airports. The implementation of the AASP will address the many challenges facing aviation in the last frontier and lay the foundation for our vision to lead the nation in rural aviation reliability, service, and safety management by the year 2030.

An online report that covers the AASP's multiple studies and products from 2008 through mid-2013 is available at this link:
www.alaskaasp.com/media/998/aasp_final_report.pdf

An evaluation of the effectiveness and outcomes of prior AASP work is available at this link:
http://www.alaskaasp.com/media/1278/d61408.01.evalofprioraasps.tmm.lrh.062014.tjc.pdf

Key accomplishments of the AASP in 2014 include:

- Evaluation of the Prior AASP Efforts & Deliverables
- Pavement Classification Number (PCN) Reporting
- Capital Improvement & Maintenance Program (CIMP) (web-based)
- Rural Airport Rates & Fees Study
- Inventory Updates & Website Updates
- Airspace Coordination & Backcountry Airstrips Working Groups

Airport inspection in Holy Cross this past summer. Photo credit - Jason Sakalaskas, DOT&PF

The future of the AASP involves strategic planning and implementation of the plans goals, objectives, and recommendations. The plan will continue to include inter-agency and public coordination, special studies to address pertinent issues, development of the web-based information systems and tools, and periodic assessment of plan goals and performance measures.

The following tasks are proposed for future aviation system planning work:

- Strategic Planning
- Website Enhancement & Updates
- Weather Coordination Working Group
- Capital Improvement Plan (CIP) Development Integration
- APEB Automation
- Public Involvement
- Capital Improvement & Maintenance Program (CIMP)
- Performance Measures Scorecards

It's important that the story of aviation in Alaska be told to as many people, organizations, and agencies as possible, and to be told often. The AASP is a tool to tell that story as well as assist those working to make Alaska aviation stronger, safer, and more efficient now and in the future.

ALASKA
Aviation System Plan

2014 Alaska Airports & Aviation Annual Report

Alaska International Airport System (AIAS)

"To Keep Alaska Flying and Thriving"

The Alaska International Airport System - comprised of Ted Stevens Anchorage and Fairbanks International Airports - is home to over 30 international and domestic airlines providing passenger and cargo service throughout Alaska, the United States, Europe, and Asia. Both airports are equipped to handle any size and type aircraft, anytime, with state-of-the-art landing systems and terminal facilities. They are important economic engines; serving nearly 6 million passengers per year and accounting for 1 in 10 jobs in Anchorage and 1 in 20 jobs in Fairbanks.

Ted Stevens Anchorage International Airport (ANC)

ANC is renowned as the 6th largest airport in the world for cargo throughput and the 2nd largest in the United States for landed weight.

The airport was honored with the Air Cargo Excellence award as the best cargo airport in North America. A testament to the collaborative efforts in the cargo operations at the airport and its focus on providing first class service to the aviation community.

2014 Air Cargo Award

"As a carrier, UPS is proud of the outstanding partnership we have with the Ted Stevens Anchorage International Airport," said UPS Airport Properties Manager Kevin Hoffmann. "We are not surprised that Anchorage has won this award. Anchorage plays a vital role in our global network, helping us serve customers in more than 220 countries and territories around the world."

Lake Hood Seaplane Base

Lake Hood Seaplane Base (LHD) has been serving Alaska's general aviation needs for generations. On a busy summer day, LHD seaplane base and 2,200' gravel runway can see more than 400 operations by float and wheeled aircraft. A 2013 study found that LHD has a total economic impact of $42 million.

A Master Plan Update was initiated in 2014 to reassess LHD issues, needs, and priorities, and provide a blueprint for responsible airport development and operation for the next 20 years. Public involvement is critical and there will be multiple opportunities to participate in the coming months. More information and contacts available here: www.lhdmasterplan.com

Lake Hood - Busiest Seaplane Base in the World!

Construction projects were in full swing last summer at ANC - including reconstruction of Taxiway E2 (above), Taxiway M, Taxiway L, and Runway 7L.

Fairbanks International Airport (FAI)

As Alaska's second busiest passenger airport, FAI serves as a hub for more than 50 communities in Interior and Northern Alaska that rely upon air freight, mail, and commuter services.

The airport also plays a role in the state's tourism industry. In 2014, the airport documented more than 1,000,000 passengers at FAI. Passengers traveling to or through Anchorage, Seattle, and seasonal traffic to Minneapolis, Minnesota accounted for more than 80 percent of the traffic with the remaining traffic heading to outlying communities.

With the addition of the Holland America Princess flights to Dawson City, Yukon, FAI saw more than 14,000 passengers enplaned and deplaned for international flights, representing 1.4 percent of total passenger traffic at the airport.

Some of the larger projects this past year included completing the airport master plan, rehabilitating the Airport Rescue & Firefighting/warm storage building (ARFF), constructing a sand and chemical storage building, re-roofing the FAA Base/Tower building, remodeling the pilots lounge, and upgrading gate security.

ARFF building at FAI was rehabilitated in 2014

AIAS Business Report 2014

Overall, AIAS experienced a generally improved year. Our managers did a superb job of providing for a safe and enjoyable travel experience while remaining within budget. A significant increase in the cost of deicing chemicals made remaining within budget a noteworthy achievement. The diversification of airline customers generally continued with passenger traffic growing slightly better than 3%. Aircraft weight (our primary revenue driver) did not grow as fast due to continued airline efficiencies from higher load factors and fleet upgrades. In addition, cargo volume growth was generally flat for the year. Our capital improvement program tracked within expectations and AIAS was able to early retire approximately 7% ($35.7 million) of outstanding long-term bond debt.

This past year we focused on our vision of AIAS becoming a global AeroNexus for aviation-related commerce by the year 2030. Solid progress was made in areas such as business development, information technology, metrics development and employee engagement.

In the coming year, we expect continued moderate (1-2%) growth in passenger traffic and a partial recovery in the all-freighter cargo traffic due to lower fuel costs and continued West Coast port labor disputes and related congestion. Significant prolonged reduction in global energy costs over the next year would likely serve to stimulate both passenger travel and air cargo traffic volumes. Our main market remains the all-cargo freighter traffic travelling between Asia and the US. We have benefitted from significant growth in cargo freighter traffic between Asia and Mexico and are well positioned to support greater growth in trans-pacific. The majority of imports to Alaska via air cargo are perishables from the contiguous US. Very few exports travel by air, fresh fish exported to the contiguous US being the largest by weight. The type of imports and exports has not changed significantly in recent years.

2015 Major Rural Airport Projects

Adak Airport:
Construct runway safety area

Ambler Airport:
Rehabilitate all runway surfaces, extend the main runway, runway safety area work, replace runway lighting and new equipment building

Barrow Airport:
Runway 07 surface variation repair

Coldfoot Airport: Resurface all operational surfaces and install new lighting, clear brush and trees obstructing the airspace, and protect the runway and airport access road from imminent erosion by the Koyukuk River

Deadhorse Airport: Airport Fire & Rescue Bay addition with sand storage - Stage 1

Hooper Bay Airport:
Apron, runway and taxiway resurface

Koliganek Airport:
Apron, runway and taxiway resurface and access road realignment

Kodiak Airport:
Continue work on runway safety area

Kotzebue Airport:
Continue work on the runway safety area - Stage II, lighting system, wind cone installation, new gates, and North apron access road embankment and surface course placement, and security fence

Nome Airport:
Runway safety area and apron Improvements - completion date September 2016

Pilot Station Airport:
Complete design, survey, and purchase native allotments for proposed airport relocation

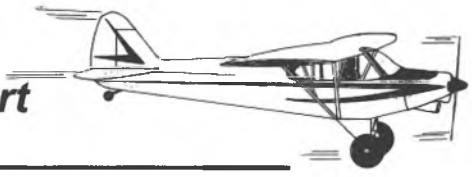
Shismaref Airport:
Resurface the runway, taxiway, and apron

Tununak Airport:
Continue work on airport relocation including new taxiway, apron, access road, snow removal equipment building, airport lighting and other improvements as needed

Kotzebue Airport - view of new runway safety area constructed on runway east end.
Photo credit - Neil Strandberg, DOT&PF

Nome Airport - new runway safety area constructed on Runway 3. DOT&PF Project Photo

2014 Completed Rural Airport Projects



Dillingham Airport:
Completed runway safety area

Ketchikan Airport:
Apron and taxiway paving and lighting repairs

Petersburg Airport:
Runway and taxiway paving

Platinum Airport:
Completed runway extension

Unalaska Airport:
Completed runway safety area

Key Aviation Planner Contacts:

- Jeff Roach
  Northern Region
  (907) 451-2381
  jeff.roach@alaska.gov
- Jennifer Witt
  Central Region
  (907) 269-0520
  jennifer.witt@alaska.gov
- Verne Skagerberg
  Southcoast Region
  (907) 465-4477
  verne.skagerberg@alaska.gov

Aviation in Alaska is Huge!

- Alaska has 8,066 active pilots and 9,515 registered aircraft
- Aviation contributes $3.5 Billion to the state economy (includes operations of airports and direct spending associated)
- 47,000 jobs, represents 10% of all jobs in Alaska

What Are AIP Funds?

The Airport Improvement Program (AIP) provides grants to public agencies for the planning and development of public-use airports. Funds for the AIP come from the Airport and Airway Trust fund, which is supported by user fees, fuel taxes, and other similar revenue sources. In general, AIP funds are used for projects that enhance airport safety, capacity, security, and environmental concerns. Airport planning, surveying, design, construction and right-of-way acquisition are eligible for AIP funds.

How Does FAA Determine Which Projects Receive AIP Funds?

Because the demand for AIP funds exceeds the availability, the FAA and ADOT&PF fund projects based on each agencies highest priorities. Airports sponsors who accept a grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly.

How Are Rural State Airport Projects Identified and Prioritized?

Airport projects are submitted by ADOT&PF regional planning sections with significant input from community representatives, the FAA, legislature, and aviation stakeholders.

After the airfield improvement projects have been identified they are evaluated and scored by the Airport Project Evaluation Board, a six member board that meets annually. After projects are scored, Statewide Aviation develops the rural airport system spending plan and reports.

KNOW BEFORE YOU FLY

Unmanned aircraft systems (UAS), or drones as they are often called, are increasingly available online and on store shelves. Prospective operators—from consumers to businesses—want to fly and fly safely, but many don't realize that, just because you can easily acquire a UAS, doesn't mean you can fly it anywhere, or for any purpose. "Know Before You Fly" is an educational campaign that provides prospective users with the information and guidance they need to fly safely and responsibly.

Among the basic guidelines is:

- Don't fly drones above 400 feet
- Keep your drone within eyesight at all times.
- Users MUST contact airport or control tower before flying within five miles of airport.

The Alaska Unmanned Aircraft Systems Legislative Task Force has issued a handout to help users and provide safety guidelines. This information and more is available at - www.alaskadrones.org

Know Before You Fly was founded by the three leading organizations with a stake in UAS safety – the Association for Unmanned Vehicle Systems International (AUVSI), the Academy of Model Aeronautics (AMA) and the Small UAV Coalition. The Federal Aviation Administration (FAA) is partnering with the founding members to spread the word about safe and responsible flying.

Additional safety resources:

FAA What Can I Do With My Model Aircraft?

AMA National Model Aircraft Safety Code

Airport Managers & Operators Receive Training

Alaska's airport managers and staff are receiving advanced airport technical training through certification programs offered by the American Association of Airport Executives (AAAE). AAAE trains thousands of airport employees each year, and our department has been working to bring these programs to Alaska.

Three programs were held in 2014; ACE Operations, ACE Trusted Agent, and Certified Member Academy. The trusted agent program focused on understanding the requirements for vetting, issuing, tracking and auditing airport credentials and TSA Security Directives. The CM Academy is a week-long comprehensive overview of airport management that keeps our airports and state in compliance with FAA and TSA regulations.

The ACE Operations program brought together 49 airport managers from across the state including many from non-ADOT&PF airports. The 5 day course covered all aspects of airfield operations including airport surfaces, safety areas, lighting, air traffic control, emergency response, and wildlife management. The program ended with a 3 hour written exam and ACE designation for those that pass.

Participants in the ACE Operations Program board the Anchorage International Airport bus for an airfield tour.

Tradeshows, Conferences, and Community Outreach Efforts

ADOT&PF Division of Aviation managers and staff can be found throughout the year at numerous trade shows, conferences, and events with the goal of educating, increasing communication, and providing better customer service. Aviation stakeholders, and the general public can find information on airport projects, aviation policy issues, airport activity surveys, contacts, business opportunities, and more at these events and on the Department's website - www.dot.alaska.gov You can also, sign up there to receive notifications, news alerts, and press releases.

Subscribe to Receive News & Updates

(L-R) Ms. Jane Tian, KPA Cargo Consultant and Trudy Wassel, Division Operations Manager for Anchorage International Airport at The International Air Cargo Association Exhibition in Seoul Korea. Staff from both ANC and FAI travel to Asia frequently to meet with existing customers and network with new industry contacts.

Members of the Birchwood Airport Association and ADOT&PF staff painted markings on the Goose Bay Runway to assist pilots wanting to practice short take-off and landings. Currently there are six airports around the state participating in this program. Volunteers are always needed - please contact Rich Sewell for more information - 269 -0725

One of the bigger events kicking off the summer flying season is the Valdez Fly-In. Over 300 aircraft from all over the state and lower 48 compete in a poker run, STOL competitions and Flour Bombing! Fly-ins are held at many airports around the state including Fairbanks, Anchorage, Talkeetna and Kenai Airports. Photo Credit - Melissa Osborn, ADOT&PF

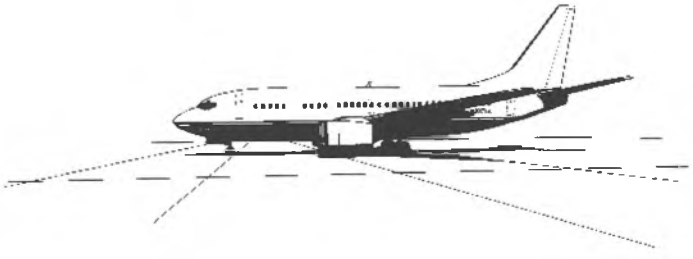
(L-R) Senator Huggins, Commissioner Kemp, Rep. Neuman, and Deputy Commissioner Binder participated in a briefing and tour of Mat-Su airports. ADOT&PF coordinates many airport visits and briefings for state and federal officials providing them with a first-hand look at challenges and issues facing Alaska's airports.

2014 Alaska Airports & Aviation Annual Report

Certificate of Compliance

Alaska Statute 02.40.020 Certification of Compliance of Air Carriers requires all air carriers operating in Alaska to have a Certificate of Compliance to show they have ample and current liability insurance. SWA manages the Certificate of Compliance and issued 157 Certificates to air carriers in 2014.

For more information please call (907) 269-0730 or email megan.byrd@alaska.gov



Statewide Airport Leasing

Statewide aviation leases property to the general public at rural airports owned by the State of Alaska. Leasing manages lands at over 200 rural airports. There is also a statewide tiedown program with spaces available for rent at these airports: Aniak, Homer, Nome City, Bethel, Iliamna Field, Big Lake, King Salmon Talkeetna, Birchwood, Kotzebue, Tok, Dillingham, McGrath, Unalakleet, Gulkana Nome, and Willow.

eLeasing - is the on-line system for processing applications for leases, building permits, land-use permits, mobile fuel dispensing permits, and aircraft tiedown permits at airports owned by the State of Alaska.

Information on leasing regulations, leasing and tiedown documents, concession fee report forms, and more is available on the leasing **webpage**.

eleasing
AVIATION LEASING

Emergency Airport Lighting Program

Top –DLG's new runway lights trailer fits into smaller aircraft that serve rural airports.
Bottom - on a clear night emergency lights are visible 5 miles out on approach to the airport.

Cheaper, quicker, brighter! Our crew at the Dillingham Airport (DLG) reconfigured the trailer for our deployable emergency runway lights from a bulky four-wheel design to a slender two-wheel design. Previously the aircraft required to transport the 4-wheel trailer was a cargo aircraft such as a Skyvan, but now the lights packed in the two-wheel trailer will fit into more aircraft types, such as the smaller and less expensive Cessna 207.

Norm Heyano and John Dunson worked with Tom Eveslage, owner of Northern Welding & Machine to come up with the innovative design that not only saves money, but will ensure better service for our rural airports. Great job DLG!

Aviation Advisory Board

The Governor's Aviation Advisory Board (AAB) met four times in 2014 in Juneau, Anchorage, Nome, and Fairbanks. The board advises and provides recommendations to the Commissioner on public policy related to the department's exercise of its aviation functions assigned by law. The board represents many user groups and stay engaged with aviation stakeholders to ensure statewide aviation issues and concerns are known and addressed where possible.

The meeting in Nome included a tour of the Nome, Shismaref, Port Clarence, and Wales airports. Nome Airport is a state owned, public airport that functions as a critical element of the transportation network of the Bering Strait, serving over 59,000 passengers and 19,000 tons of cargo and mail annually.

Board members and the user groups they represent are as follows:

Jim Dodson
(Mayors of Fairbanks & North Star Borough)
Tom George
(Statewide organizations of pilots, aircraft owners & other aviation supporters)
Bob Hajdukovich
(Alaska Air Carriers Association)
David Karp
(Alaska International Airport System Operating Agreement Signatory Airlines)
Ken Lythgoe
(Non-Airline Tenants, Anchorage)
Dale Shaw
(All Cargo Air Carrier)
Frank Neitz
(Unorganized Borough)
Tom Nicolos
(Public)
Lee Ryan
(2nd Judicial District)
Mike Stedman
(Regional Air Carriers)
Steve Strait
(Mayor of the Municipality of Anchorage)

Lee Ryan is the Board Chair and can be contacted at ***dot.aviationadvisory@alaska.gov***

More information on the Board available here: ***www.dot.alaska.gov/stwdav/AAB.shtml***

(L-R) DOT&PF Commissioner Kemp, Shismaref Airport Manager Curtis Nayokpuk, and Deputy Commissioner Binder toured rural airports with the AAB during the Nome meeting.

The Board toured Lake Hood Seaplane Base (LHD) and met with tenants last April. LHD is undergoing a master planning effort that will help guide further development and reassess needs, issues, and priorities.

From:
Statewide Aviation
Alaska Department of Transportation & Public Facilities
P.O. Box 196900
Anchorage, Alaska 99519

NationalJournal

Few Privacy Limitations Exist on How Police Use Drones

Only 14 states require law enforcement get a warrant to use drones for surveillance.

BY KAVEH WADDELL

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+ An operator lands a commercial drone on July 4, 2014 in Sydney, Australia. (Brendon Thorne/Getty Images)

February 5, 2015 As drones become cheaper and more capable, more police departments across the country are asking for and getting federal approval to use them for law enforcement.

But the Federal Aviation Administration only takes safety into consideration when it grants a law enforcement agency approval to use drones, leaving privacy protections to legislation—which, depending on the state in question, may or may not exist.

Agencies as large as the Michigan State Police and as small as the Grand Forks County [N.D.] Sheriff's Department have received FAA approval to use drones. Most departments use them for missions like search-and-rescue or for photographing a crime scene or an accident site.

But unless a law enforcement agency is within one of the 14 states that have passed privacy legislation [http://www.ncsl.org/research/civil-and-criminal-justice/current-uas-state-law-landscape.aspx] limiting how police can use drones, there's little in theory keeping it from using a drone for a less innocuous end—such as surveillance without a warrant. "While the federal government retains responsibility for the airspace, under most circumstances a state/local government can impose restrictions on the agencies for which it's responsible," an FAA spokesperson said in an emailed statement.

Members in the House and Senate introduced bills in the previous Congress that would have required police everywhere in the country to obtain a warrant before using drones for surveillance, but the bills died at the end of the year.

"In the states that don't require warrants, it's pretty much a Wild West" in terms of what's allowed, says Jay Stanley, senior policy analyst at the American Civil Liberties Union. "There's nothing stopping a police department from using [drones] in all kinds of ways to spy, except for the Constitution."

Within that unregulated "Wild West," police have very different approaches to their drone programs. One of the longest-running law enforcement drone programs is at the Mesa County Sheriff's Office in Colorado. Ben Miller, its director, says the department has a 17-page policy that outlines when and how it can use drones and for how long it retains data.

The department has never run a surveillance mission with its drones, Miller says, which are generally used for search-and-rescue and crime-scene photography. "If we had a need to look into an area where someone would have a legitimate expectation of privacy, we'd get a warrant," he says.

Colorado is one of the states [http://www.ncsl.org/research/civil-and-criminal-justice/current-uas-state-law-landscape.aspx] without any legislation about drones at all, according to the National Conference of State Legislatures, which means that the limitations on the Mesa County drone program were instituted at the department's prerogative.

Unlike the Mesa County Sheriff's Office, some law enforcement agencies have been less than forthcoming with their drone programs. Last year, the San Jose Police Department in California secretly bought [http://www.mercurynews.com/crime-courts/ci_26279254/san-jose-police-apologize-secret-drone-purchase-promise] a $7,000 drone, and was faced with uproar in the community when freedom-of-information requests brought the purchase to light six months later.

The police department said the drone was meant for helping bomb technicians access hard-to-reach places, but left the door open for using the drone to address "dangers such as active shooters, hostage taking, or other such tactical situations where lives might be in immediate danger."

And this December, the sheriff in Alameda County, Calif., revealed [http://www.sfgate.com/crime/article/Alameda-County-sheriff-reveals-that-he-s-bought-5930981.php] that he spent $97,000 of his own department's money to buy a pair of drones after he was barred from using federal funds to make the purchase. The sheriff told the *San Francisco Chronicle* that the drone won't be used for surveillance "in any shape, manner or form," but California, like Colorado, has no state law that requires warrants for surveillance.

The California state assembly passed a bill last year that would have required police to obtain a warrant to fly drones in any event other than an "emergency situation." But Gov. Jerry Brown vetoed it [http://www.cnet.com/news/california-police-can-fly-drones-without-a-warrant/] in September, because he said the exceptions the bill allowed "appear to be too narrow."

While advocates are worried that law enforcement could use drones in ways that violate citizens' privacy, there's little fear that they're being abused yet. "Safety restrictions are so strict that most police departments are still using them in quite limited ways," the ACLU's Stanley said. "This is still an issue of looking down the road to what we know is coming."

The technology is new enough that police groups are still grappling with its implications and limitations. "We're doing some research right now to come up with some model policy," said John Thompson, deputy executive director of the National Sheriffs' Association. "We don't have a statement or opinion on it at this point."

Miller, who runs the drone program at the sheriff's office in Mesa County, says he often hears from other law enforcement agencies who need help getting their drone program off the ground. But there's no formal coordination: "It's all very word-of-mouth," he said, and suggested that others find him simply by searching the Internet.

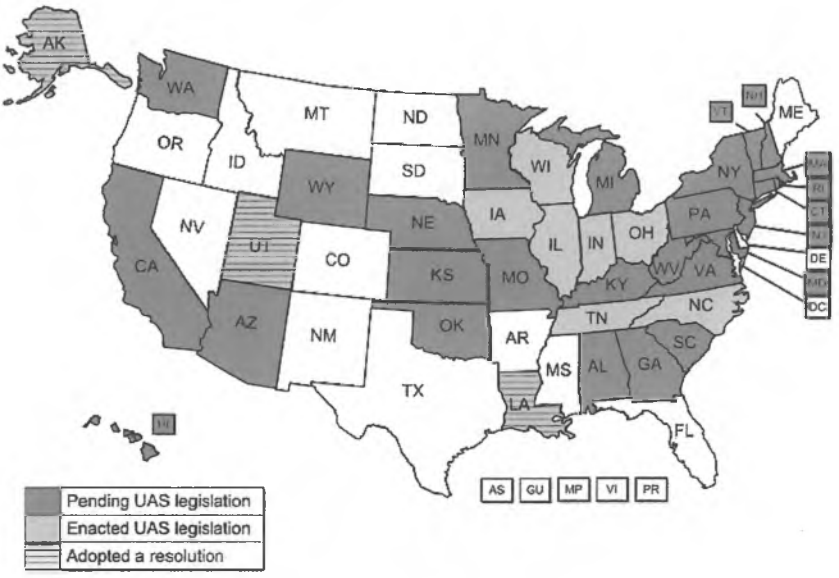
For the time being, privacy advocates are not focusing on fighting for federal legislation. "For activists, it's generally easier to do things at the local and state level," says Nadia Kayyali of the Electronic Frontier Foundation, a privacy and free speech advocacy organization. "Any fight at the local level is more likely to see results, but also does take a much more significant investment in time."

2014 STATE UNMANNED AIRCRAFT SYSTEMS (UAS) LEGISLATION

9/16/2014 Rich Williams

In 2014, 35 states considered UAS or UAV (also commonly called drones) bills and resolutions; 10 states enacted new laws.

State UAS Legislation



Alaska enacted HB 255 creating procedures and standards for law enforcement's use of unmanned aircraft, as well as, regulations for the retention of information collected with UAS. It requires law enforcement agencies to adopt procedures that ensure: the appropriate Federal Aviation Administration flight authorization is obtained; UAS operators are trained and certified; a record of all flights are kept and there is an opportunity for community involvement in the development of the agencies' procedures. Under the law, police may use UAS pursuant to a search warrant, pursuant to a judicially recognized exception to the warrant requirement and in situations not involving a criminal investigation. Images captured with UAS may be retained by police under the law for training purposes or if it is required as part of an investigation or prosecution. The law also authorizes the University of Alaska to develop a training program for operating UAS. The state senate also adopted a resolution HCR 15 to extend the operating time and expand the duties of the state UAS task force.

Illinois enacted SB 2937 creating regulations for how law enforcement can obtain and use information gathered from a private party's use of UAS. The law requires police to follow warrant protocols to compel third parties to share information, and if the information is voluntarily given to police, authorities are required to follow the state's law governing UAS data retention and disclosure. The law also loosens regulations around law enforcement's use of UAS during a disaster or public health emergency.

Indiana is the first state to enact a UAS law in 2014. HB 1009 creates warrant requirements and exceptions for the police use of unmanned aircraft and real time geo-location tracking devices. It also prohibits law enforcement from compelling individuals to reveal passwords for electronic devices without a warrant. If law enforcement obtains information from an electronic service provider pursuant to a warrant, the provider is immune from criminal or civil liability. The law provides that if police seek a warrant to compel information from media entities and personnel, then those individuals must be notified and given the opportunity to be heard by the court concerning issuance of the warrant. The new law also creates the crime of "Unlawful Photography and Surveillance on Private Property," making it a Class A misdemeanor. This crime is committed by a person who knowingly and intentionally electronically surveys the private property of another without permission. The law also requests that the state's legislative council study digital privacy during the 2014 interim.

NAVIGATE

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Military and Veterans Affairs
Redistricting
State-Tribal Institute
Telecommunications and Information Technology
Transportation

Iowa enacted HF 2289, making it illegal for a state agency to use a UAS to enforce traffic laws. The new law requires a warrant, or other lawful means, to use information obtained with UAS in a civil or criminal court proceeding. It also requires the department of public safety to develop guidelines for the use of UAS and to determine whether changes to the criminal code are necessary. The department must report on their findings to the general assembly by Dec. 31, 2014.

Louisiana enacted HB 1029, creating the crime of unlawful use of an unmanned aircraft system. The new law defines the unlawful use of an unmanned aircraft system as the intentional use of a UAS to conduct surveillance of a targeted facility without the owner's prior written consent. The crime is punishable by a fine of up to 500 dollars and imprisonment for six months. A second offense can be punished by a fine up to 1000 dollars and one year imprisonment.

North Carolina enacted SB 744 creating regulations for the public, private and commercial use of UAS. The new law prohibits any entity from conducting UAS surveillance of a person or private property and also prohibits taking a photo of a person without their consent for the purpose of distributing it. The law creates a civil cause of action for those whose privacy is violated. In addition, the law authorizes different types of infrared and thermal imaging technology for certain commercial and private purposes including the evaluation of crops, mapping, scientific research and forest management. Under the law, the state Division of Aviation is required to create a knowledge and skills test for operating unmanned aircraft. All agents of the state who operate UAS must pass the Division's knowledge and skills test. The law enables law enforcement to use UAS pursuant to a warrant, to counter an act of terrorism, to oversee public gatherings, or gather information in a public space. The bill creates several new crimes: using UAS to interfere with manned aircraft, a class H felony; possessing an unmanned aircraft with an attached weapon, a class E felony; the unlawful fishing or hunting with UAS, a class 1 misdemeanor; harassing hunters or fisherman with a UAS, a class 1 misdemeanor; unlawful distribution of images obtained with a UAS, a class 1 misdemeanor for; and operating a UAS commercially without a license, a class 1 misdemeanor. The law addresses launch and recovery sites of UAS, prohibiting their launch or recovery from any State or private property without consent. In addition the law extends the state's current regulatory framework, administered by the chief information officer, for state use of UAS from July to December 31, 2015.

Ohio enacted HB 292 creating the aerospace and aviation technology committee. One of the committee's duties is to research and develop aviation technology including unmanned aerial vehicles.

Tennessee has enacted two new laws in 2014. The first, SB 1777, makes it a class C misdemeanor for any private entity to use a drone to conduct video surveillance of a person who is hunting or fishing without their consent. SB 1892 makes it a Class C misdemeanor for a person to use UAS to intentionally conduct surveillance of an individual or their property. It also makes it a crime to possess those images (Class C Misdemeanor) or distribute and otherwise use them (Class B Misdemeanor). The law also identifies 18 lawful uses of UAS, including the commercial use of UAS under FAA regulations, professional or scholarly research and for use in oil pipeline and well safety.

Utah enacted SB 167, regulating the use of UAS by state government entities. A warrant is now required for a law enforcement agency to "obtain, receive or use data" derived from the use of UAS. The law also establishes standards for when it is acceptable for an individual or other non-governmental entity to submit data to law enforcement. The new law provides standards for law enforcement's collection, use, storage, deletion and maintenance of data. If a law enforcement agency uses UAS, the measure requires that agency submit an annual report on their use to the Department of Public Safety and also to publish the report on the individual agency's website. The new law notes that it is not intended to "prohibit or impede the public and private research, development or manufacture of unmanned aerial vehicles."

Wisconsin enacted SB 196, requiring law enforcement to obtain a warrant before using drones in a place where an individual has a reasonable expectation of privacy. The law also creates two new crimes; "possession of a weaponized drone" and "use of a drone." Use of a drone creates a class A misdemeanor for a person who, with intent, observes another individual in a place where they have a reasonable expectation of privacy. Possession of a weaponized drone is a class H felony.

NCSL Resources

Criminal Justice homepage

Unmanned Aircraft homepage

Denver

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Denver, CO 80230
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Washington

444 North Capitol Street, N.W., Suite
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Tel: 202-624-5400 | Fax: 202-737-10(

SITE: Offnet

COMMITTEE: JUNM

DATE: 2/11/2015

SUBJECT OF MEETING: Privacy issues and "drones"

BILL#

UPDATE #: 1

TESTIFY KEY:
Y = yes
LO = Listen only
? = Available for questions

NAME	COMMUNITY	REPRESENTING/AFFILIATION	DO YOU WANT TESTIFY
Mike O'Hare	Anchorage	Department of Military and Veterans Affairs	?
Bill Tart	Beltsville, MD	Arctic Slope Regional Corp. Federal	?