

**2-16-10  
Presenta-  
tion:  
Aviation  
Simulator  
Program**

<target><bill></bill><subject>2-16-10 Presentation Aviation  
Simulator Program</subject><comm>HMLV26</comm></target>

**ALASKA STATE LEGISLATURE**  
**HOUSE OF REPRESENTATIVES**  
**MILITARY & VETERAN AFFAIRS COMMITTEE**  
**REPRESENTATIVE CARL GATTO, CHAIR**

Committee Members  
Rep. John Harris  
Rep. Bob Lynn  
Rep. Kurt Olson  
Rep. Jay Ramras  
Rep. Bob Buch  
Rep. Scott Kawasaki



State Capitol Building, Room 108  
Juneau AK 99801-1182  
907-465-3743  
907-465-2381 Fax  
Rep\_Carl\_Gatto@legis.state.ak.us

MEMORANDUM

TO: Suzi Lowell, Chief Clerk

FROM: Rep. Carl Gatto  
Chair, Military and Veterans Affairs Committee

RE: Committee Meeting Schedule

DATE: February 11, 2010

A handwritten signature in black ink that reads "Carl Gatto".

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Tuesday, February 16<sup>th</sup> 1:00-3:00 Barnes 124

+ Presentation and Update by Medallion Foundation and E-Terra on the Visual Cue-based Training Program using the 3-screen flight simulator

Thursday, February 18<sup>th</sup> 1:00-3:00 Barnes 124

No meeting.

## AVIATION SAFETY PROGRAM

From:  
Rep. Carl Gatto



### AVIATION SIMULATOR OPEN HOUSE IN JUNEAU

The Aviation Safety Program (ASP) is holding an open house in the State Capitol for interested parties who would like to experience a flight demonstration or actually fly an aviation simulator. The simulator has advanced control/cockpit features and wrap around screens with high resolution graphics that depict actual flying conditions and terrain features in Alaska.

#### State Capitol Building

House Speaker's Chambers, 2<sup>nd</sup> floor

Wednesday, February 17, 2010 from 8 am- 3 pm

#### ABOUT THE AVIATION SAFETY PROGRAM

The ASP (aka: the Alaska Aviation Safety Project) was established in 2001 to address the high rate of fatalities resulting from aviation crashes in Alaska. Under a grant from NASA the ASP demonstrated 3D real-to-world scenery for training purposes in aviation simulators which do not endanger aircrews.

The AK-DOT/PF (ASP) has been placed under contract by the FAA for five years to address and reduce fatal aviation accidents that could be prevented by enhanced cue-based training. Cue-based training realistically simulates regional or local flying conditions in a low cost and safe environment inclusive of regional or local weather phenomena and ground terrain characteristics. This substantially increases a pilot's skills with regard to situational awareness and in-cockpit decision making. It also substitutes expensive in-cockpit training with inexpensive simulator training and pilot evaluation which is anticipated to be voluntarily embraced by airmen and operators alike.

The Medallion Foundation maintains an advanced aviation simulator for General Aviation and Part 135 use at the Civil Air Patrol facility in Juneau and throughout locations around the state. To schedule use of a simulator, go to the Medallion Foundation's website and register. <http://www.medallionfoundation.org/>

###

The ASP is a component of the AK DOT/PF-Aviation Division, and established the DOT multi-agency Joint Project Office (JPO) which is comprised of AK/DOT, FAA, NIOSH, NASA and the Medallion Foundation.

# AVIATION SAFETY PROGRAM



## AVIATION SIMULATOR OPEN HOUSE IN JUNEAU

**State Capitol Building**

**House Speaker's Chambers, 2<sup>nd</sup> floor**

**Wednesday, February 17, 2010**

**8 am- 3 pm**

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**Are you interested in experiencing a flight  
demonstration?**

**Come check out the Aviation Simulator!**

***No Appointment Needed!***



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41° Light Rain 7 day forecast

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NEWS

State



Home > News > State > New Palmer simulator aims to reduce aviation accidents

Wednesday, February 25, 2009 Story last updated at 2/25/2009 - 10:03 am

New Palmer simulator aims to reduce aviation accidents

Pilots can practice flying in various weather conditions in many different planes

By Rob Stapleton | Alaska Journal of Commerce



Courtesy of the Alaska Journal of Commerce Just like the real thing: The flight simulator installed at the Palmer airport has three 27-inch LCD monitors, as well as sound and instruments. The graphical interfaces provides realistic 3D terrain from satellite maps.

Pilots wishing to practice flying from the Palmer airport now have a new three-screen flight simulator to use at no cost to local aviators.

The new Aviation Training Device has three 27-inch LCD monitors, sound and instruments, and can emulate dozens of different aircraft. It is located at the New Horizon Building on the south end of the Palmer Municipal Airport.

The Medallion Foundation held an open house at the facility on Feb. 9 to introduce pilots to the \$10,000 training device.

"We put one of these at Lake Hood and pilots there are using it to practice flying places like Merrill (Field) and Rainey Pass two or three times before they get in their planes and go there," said Dennis Ward, executive director of the Medallion Foundation. "We hope this will get the same kind of use for the mountains and passes around here."

E Terra LLC and the state Department of Transportation provided graphical interfaces that provide 3D-type terrain from satellite maps.

The terrain is so realistic that pilots use the simulator to practice flight-seeing tours before actually making the trips.

Ward said DOT is also working with the Medallion Foundation to improve flight safety for tour aircraft using the simulators.

Called the Q-Based Training Program, the idea is to have a flight director sit with pilots play a typical flight used by tour operators in Hawaii and Alaska and show them what the flight looks like on a perfectly sunny day, and then show them what it looks like with one-mile visibility, according to Ward.

"Tour pilots can break their flights into four-mile legs and see what the terrain looks like at their reporting points and then what it will look like when the weather goes down," Ward said. "This should help a pilot make a safe decision before things get out of their control."

The Medallion Foundation plans to showcase the software the first week of April by putting a simulator in Juneau at the Baranof Hotel to show legislators and state officials, Ward said.

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# OUR STORY



THE AVIATION SAFETY  
PROGRAM-ALASKA

# OUR MISSION

# WHY IS THIS IMPORTANT?

## AK AVIATION STATISTICS

- ❑ A HUMAN LIFE HAS BEEN LOST EVERY TWO WEEKS OVER THE PAST TEN YEARS (236 Fatalities).
- ❑ NIOSH STATISTICS: Commercial pilots in Alaska are 4 times more likely to die in an aviation accident than pilots in the Lower48
- ❑ Alaska maintains approximately 10% of the nation's air carriers and commercial operators but accounts for 35% of aviation accidents.



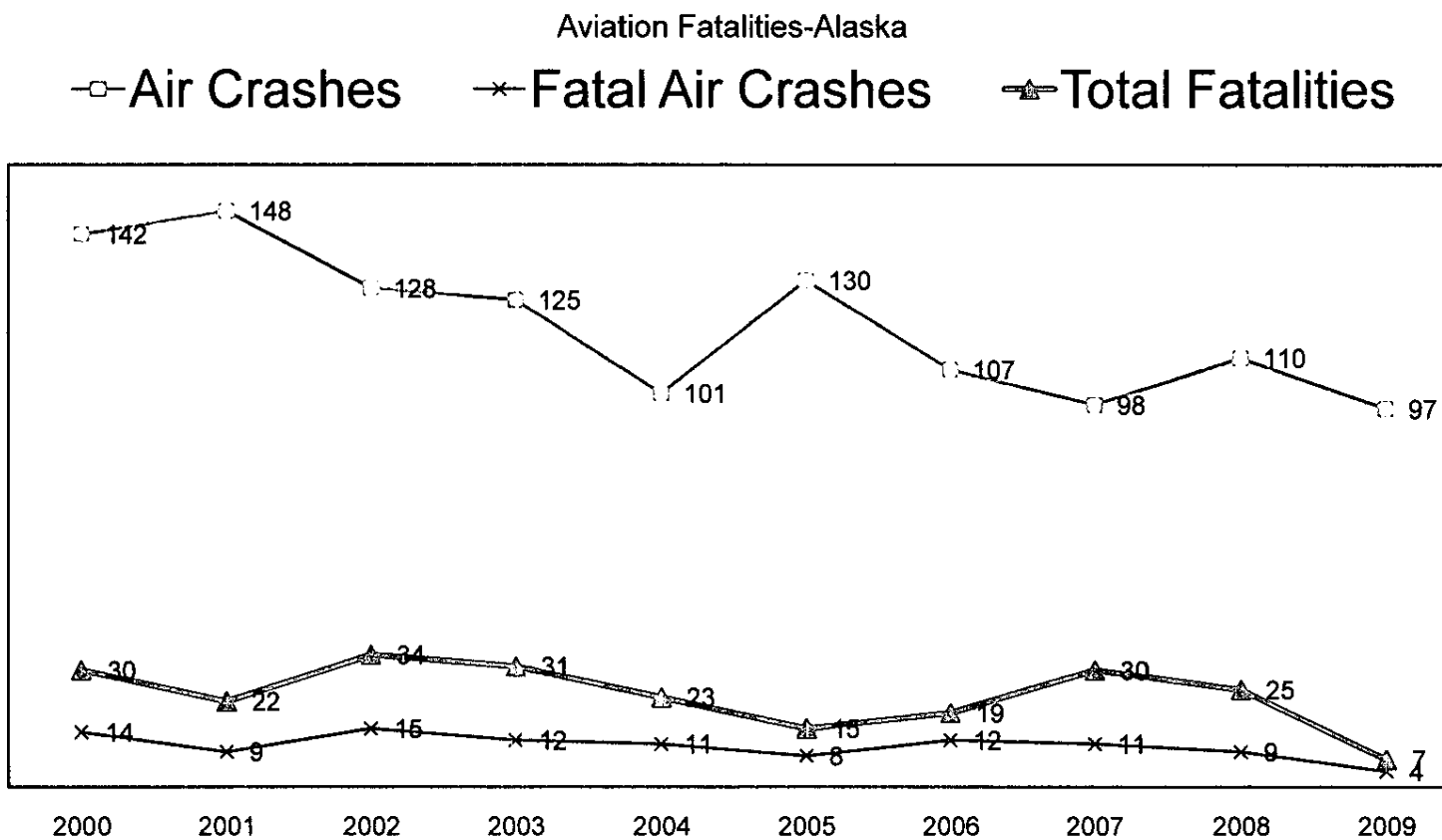
# WHY IS THIS IMPORTANT?

## **CONTRIBUTING FACTORS**

- Extreme terrain and weather;
- Inexperienced pilots unfamiliar with Alaska flying;
- Pilot turn-over, and
- The old culture of bush flying (always get through).
- STATISTICS ARE IMPROVING!**

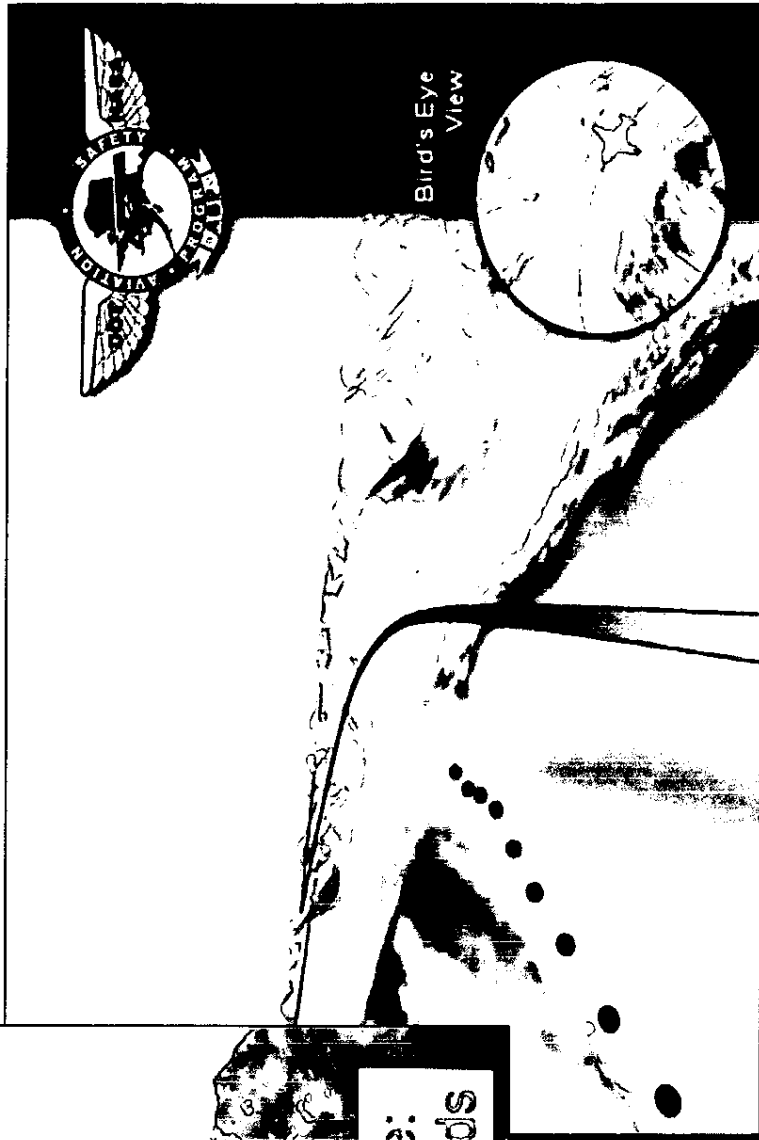
# WHY IS THIS IMPORTANT?

## AK AVIATION STATISTICS



# WHAT IS BEING DONE?

## ANIMATION PRODUCTS



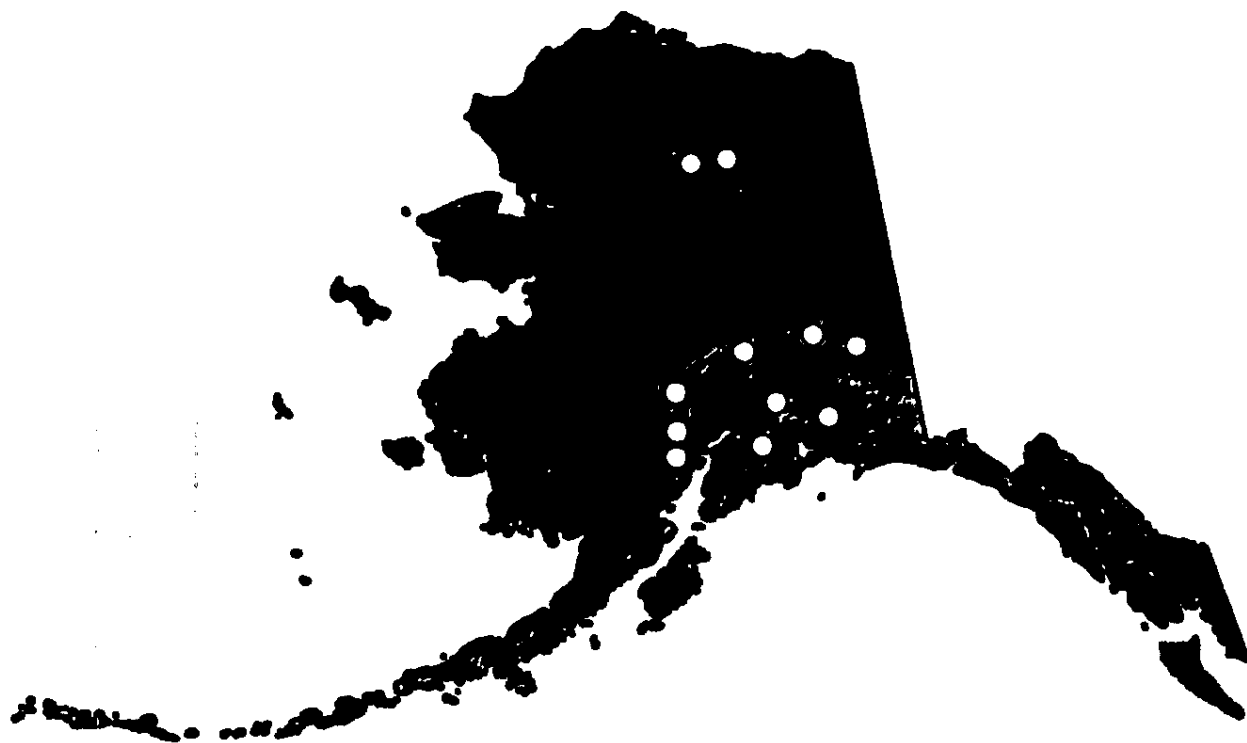
WHAT IS BEING DONE?

## SIMULATOR PRODUCTS



# THE TWELVE MOST DANGEROUS MOUNTAIN PASSES IN ALASKA:

- MERRILL PASS
- LAKE CLARK PASS
- RAINY PASS
- WINDY PASS
- PORTAGE PASS
- ISABEL PASS
- ANAKTUVUK PASS
- MENTASTA PASS
- ATIGUN PASS
- BROAD PASS
- THOMPSON PASS
- CHICKALOON PASS



# WHAT IS BEING DONE?

## 3D AIRSPACE PRODUCTS



MERRILL J. SEGMENT

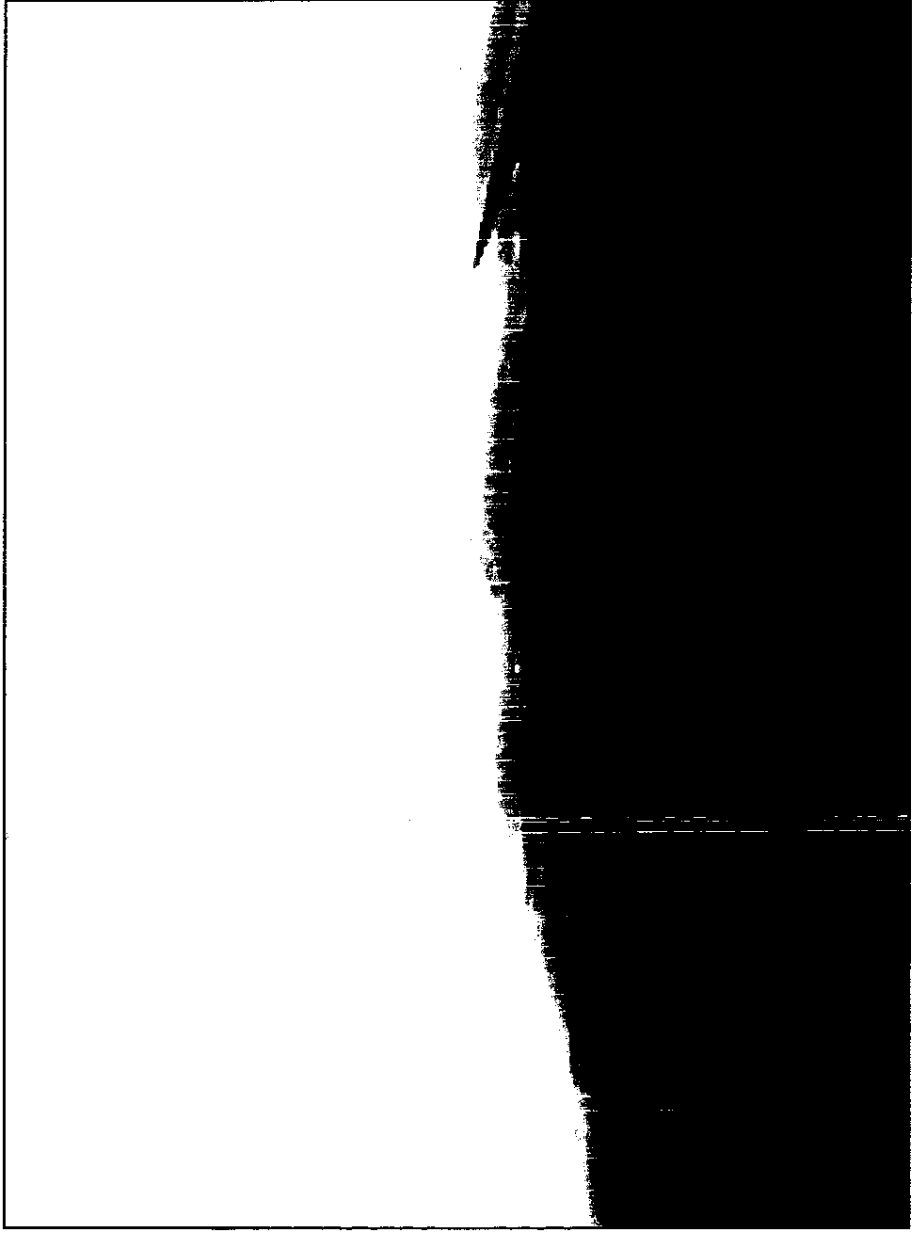
Elmendorf Runway 6

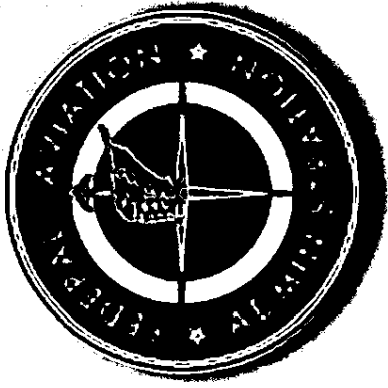
Centerline



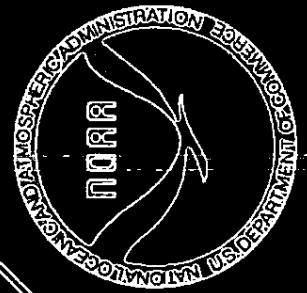
WHAT IS BEING DONE?

**CUE BASE TRAINING PRODUCTS**



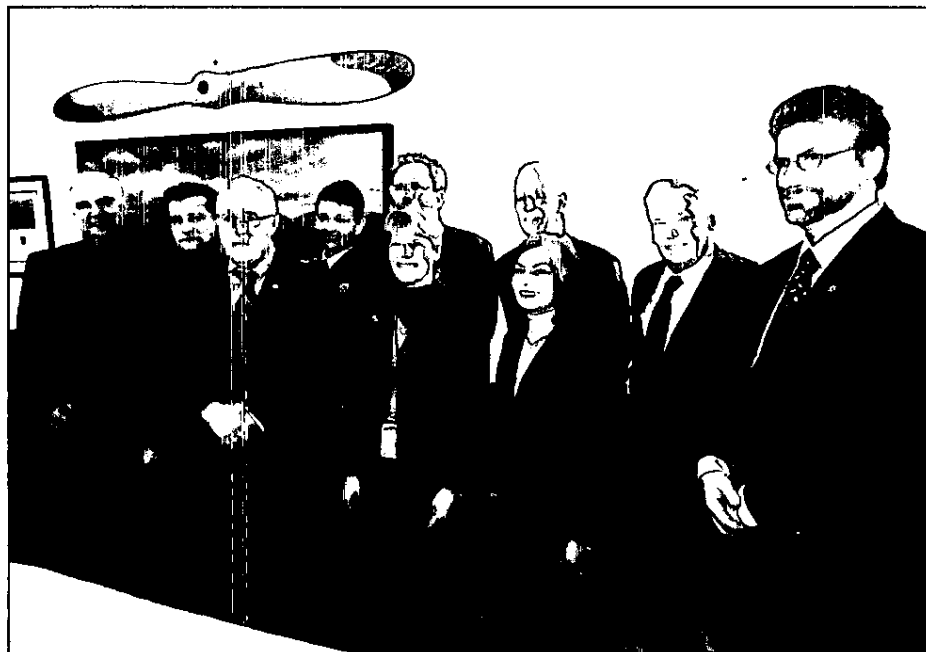


# JOINT PROJECT OFFICE



**- JOINT PROJECT OFFICE -**

OCTOBER 2009



**SIGNING CEREMONY**

**Alaska Aviation Heritage Museum**

**Lake Hood, Alaska**

# RESEARCH & DEVELOPMENT

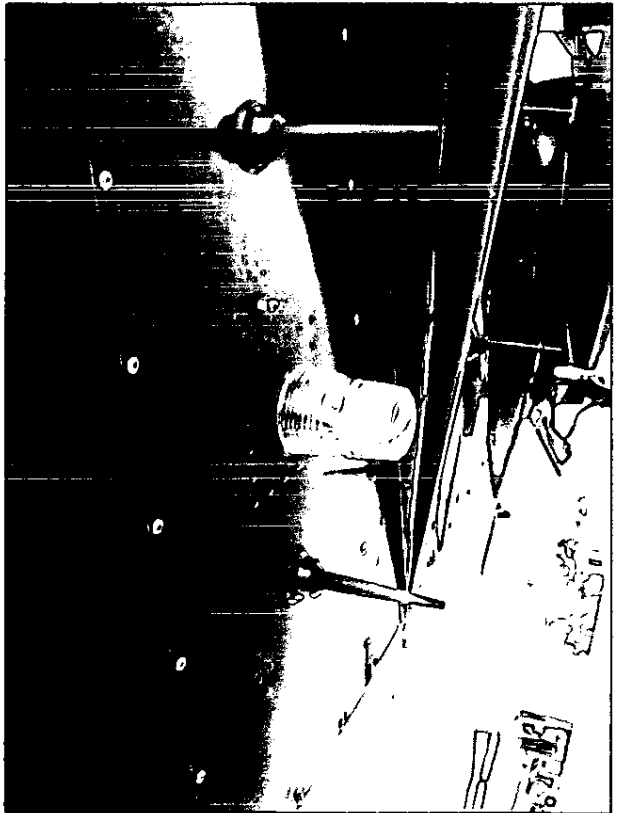
## **ADS-B / CELLULAR INTEGRATION**

- ADS-B Enhancement (coverage to the ground);
- Data Connectivity Between the Ground & Cockpit;
- Redundant System in Case of Failure (GPS or Primary);
- Commercial Off The Shelf (COTS) Devices, not Permanently Mounted in the Aircraft

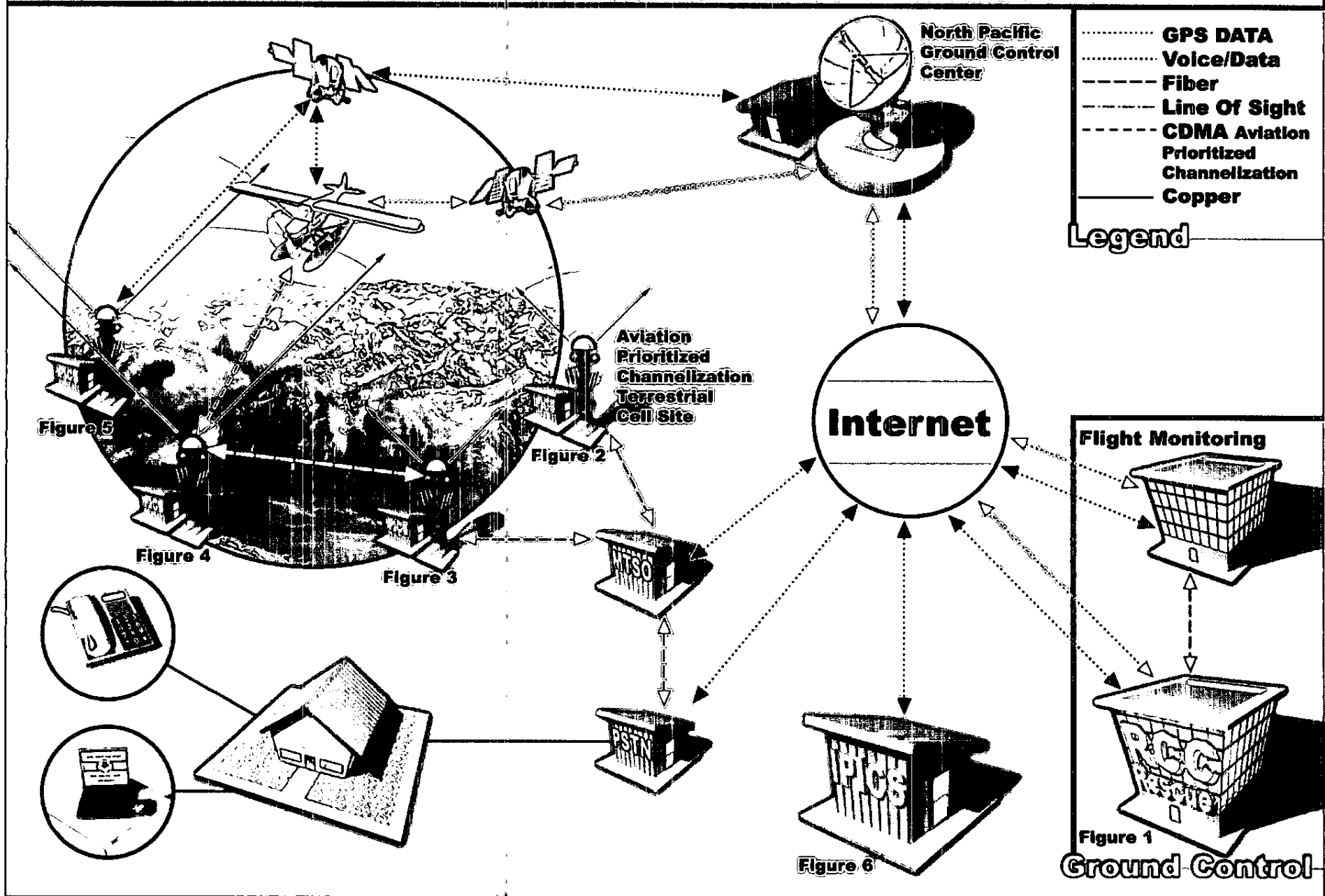


# WIRELESS TESTING

## ADS-B / CELLULAR INTEGRATION

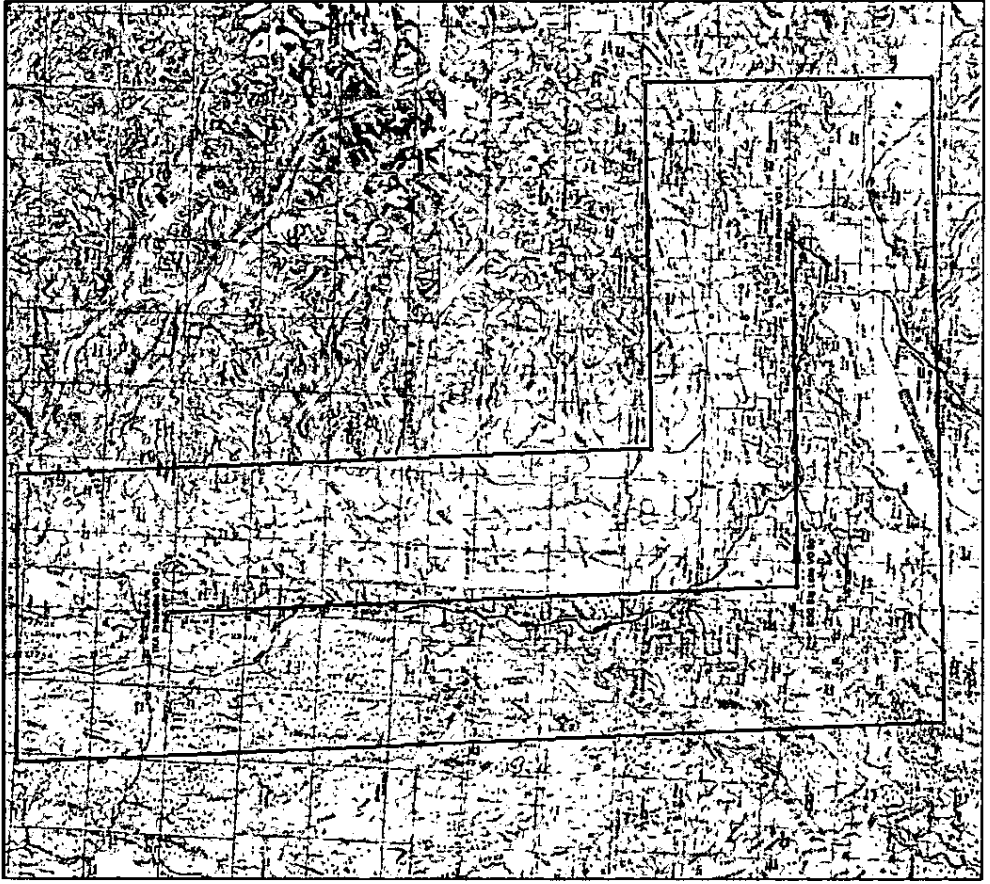


# WIRELESS AVIATION NETWORK TOPOLOGY CHART



# WIRELESS TESTING

## FCC WAIVER



# HOW HAS IT BEEN DONE?

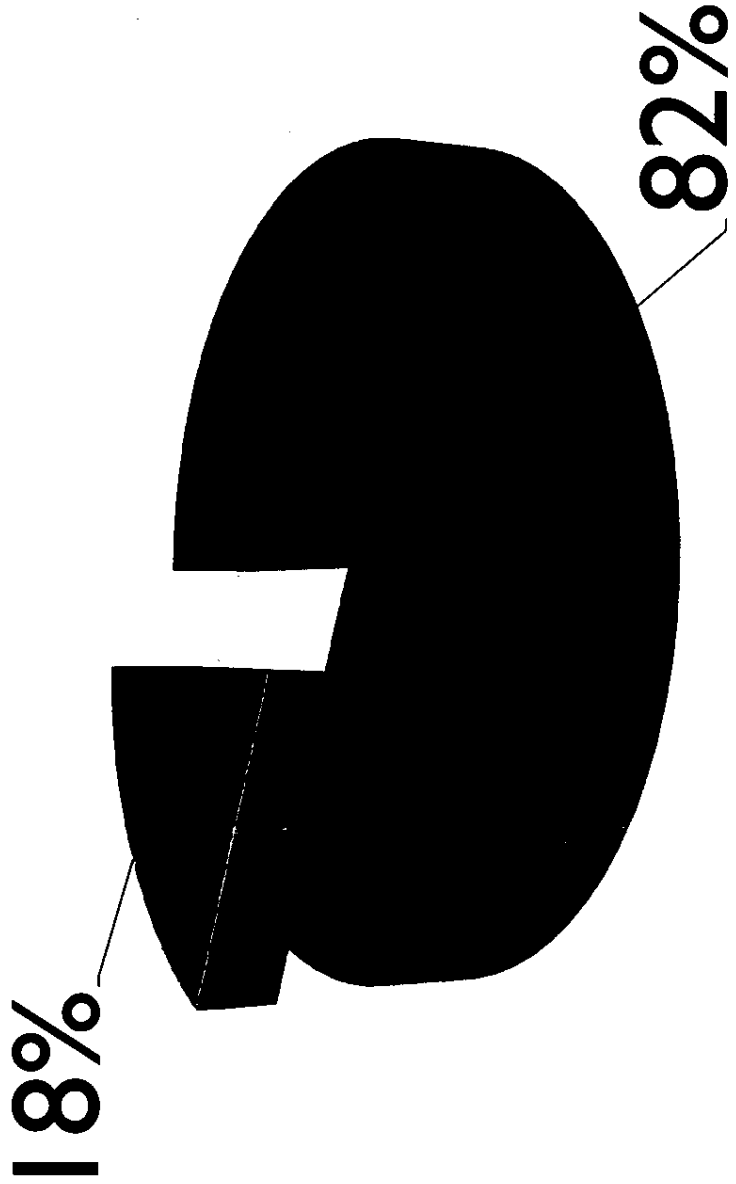
## ASP - FUNDING HISTORY

DATE OBLIGATED	FEDERAL SOURCE	FEDERAL AMOUNT	STATE AMOUNT	GENERAL ACCOMPLISHMENT
2001	NASA	\$ 600,000	\$ 0.00	ORTHO IMAGERY / DEM ACQUISITION COMPLETION OF FIRST TWO MTN PASSES
2004	NASA	3,000,000	-	COMPLETION OF 13 MOUNTAIN PASSES
2006	NASA	2,980,000	-	COTS WIRELESS TRACKING & INTEGRATION OF CELLULAR CAPABILITIES WITH ADS-B (CAPSTONE)
2006	-		500,000	DATASET EXPANSION
2007	-		500,000	DATASET EXPANSION
2008	-		500,000	CUE-BASED TRAINING DEVELOPMENT
2009	NASA	1,500,000		CELLULAR/ADS-B INTEGRATION
2009	-		400,000	CUE-BASED TRAINING DEVELOPMENT
2009	CDC/NIOSH	50,000		CUE-BASED TRAINING DEVELOPMENT
2009	FAA	425,000		CUE-BASED TRAINING DEVELOPMENT
2009	MEDALLION	50,000		CUE-BASED TRAINING DEVELOPMENT
<b>TOTAL</b>		<b>\$8,605,000</b>	<b>\$1,900,000</b>	

# HOW HAS IT BEEN DONE?

## ASP FUNDING ANALYSIS

■ FEDERAL ■ STATE



# WHAT IS THE IMPACT?

## **ECONOMIC IMPACT**

- Human fatalities trending down (\$2M/life);
- Search & Rescue 5 Year Average 2001-2005:
  - SAR/Recovery Missions: 477
  - Average Cost/Hour: \$4,185
  - Average Annual Cost: \$4.11 M/Year
- Economic Impact of NASA Funding (UAA/ISER):
  - Direct & Indirect Employment 136 jobs \$4.8M
  - Spending & Re-spending \$12.1 M

## Alaska Aviation Safety Project

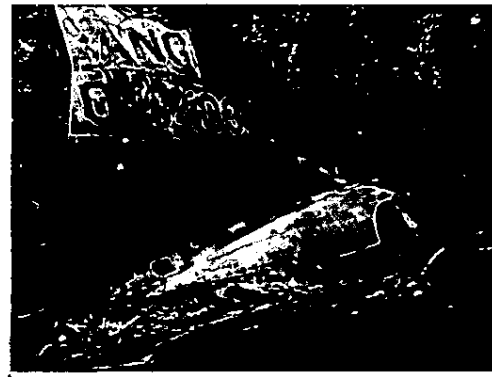


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**For every 12 days that passed in 2007, an Alaskan life was lost due to an aircraft accident. Every three days, somewhere in Alaska, an aircraft crashes.**

(NTSB Safety Statistic Database 2008)

General aviation flights are the primary transportation link between most communities in Alaska. With more small aircraft per capita than anywhere else in the world, pilot safety, aircraft communications and de-confliction are of utmost concern. The Alaska Aviation Safety Project (AASP) is an initiative to increase general aviation safety by enhancing pilot situational awareness



through the integration of advanced remote sensing and aviation technologies. Funded cooperatively by NASA and the State of Alaska (SOA), the AASP represents a partnership of aviation, public, and commercial stakeholders who collectively examine the safety challenges facing Alaska's general aviation community and work together to build low-cost, publically useful training and awareness tools.

### **Mission Statement**

*To increase pilot awareness and reduce aviation accidents in Alaska through the integration of existing technologies and improved education.*

### **The Goal of the AASP**

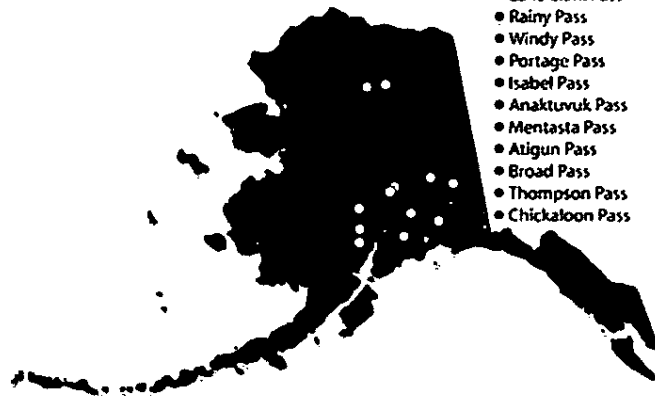
To decrease the frequency of airplane crashes through education and tools that bridge the gap between historical knowledge and technology supporting the general aviation community.

### **Safety Solutions**

The principal distribution channels for AASP products are the

Medallion Foundation's training programs, the University of Alaska Aviation Technology Program, the Federal Aviation Administration, various public forums, and this portal. As a charter supporter, the Medallion Foundation leverages a variety of the AASP solutions to provide teaching content and technology for their Circle of Safety and Medallion Flyers programs. Offering a variety of mapping, simulation, and visualization

solutions, the AASP has helped pilots to prepare for Alaska's unique navigational and inclement weather conditions since 2001. While new products are released regularly, examples of AASP solutions include, but are not limited to the following:



- Microsoft Flight Simulator X (MSFS) datasets to support flight training scenarios throughout Alaska's most dangerous and frequently traversed passages.
- Visual Nature Studio interactive models of airspace and landmark objects for the Anchorage Bowl.
- 3D Renderings of mountain passes highlighting the unique navigation, de-confliction, and weather response challenges of each area.
- Remote Sensing products that provide the basis for real-to-world aviation related visualization capabilities.
- Map Portal that showcases AASP solutions and aviation safety functions in a spatial environment.
- Anchorage Airspace Navigation training video to acclimate aviation stakeholders from outside of Alaska to the complexities of approach to, and departure from, Anchorage Bowl airspace.

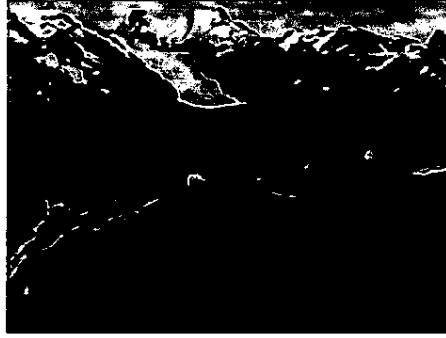
### Research Overview

- **Phase I** - Proved that remote sensing terrain data can be used to visualize real to world flight experiences.
- **Phase II** - Expanded on this concept by using these visualization products as the basis for flight simulation in aviation training devices (ATD) and fixed perspective fly-through animations.

- **Phase III** - Built upon this training potential by exploring the value of free-flight interaction with 3D models and leveraging remote sensing data as context for communicating complex airspace interactions.
- **Phase IV (currently underway)** - Serves as a transition from building preparatory tools to exploring the potential for real-time support of general aviation flight safety. The proposed solutions build upon historical lessons by exploring decision support training scenarios and en-route safety resources that will tie preparatory experiences to real-time challenges.

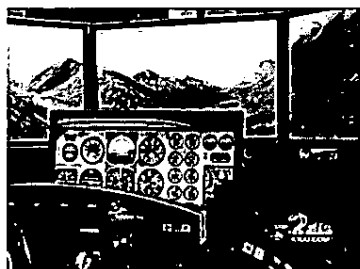
**Cooperative Partners**

Department of Defense	Intermap Technologies, Inc
Department of Transportation	Space Imaging, Inc
Federal Aviation Administration	Medallion Foundation
Federal Communications Commission	UNAVCO
National Aeronautics and Space Administration	NVision Solutions Inc
National Oceanic & Atmospheric Administration	E-Terra, LLC
United States Coast Guard	Alaska Airman's Association
Department of Public Safety, State of Alaska	Alaska Civil Air Patrol
Department of Military and Veterans Affairs, State of Alaska	Port Graham Development Corporation
Department of Administration, State of Alaska	Alaska Air Carriers Association
University of Alaska (Anchorage and Fairbanks)	Alaska Sportfishing Association
Anchorage Air Cargo Association	Alaska School Activities Association
NTSB	NIOSH/CDC/OSHA

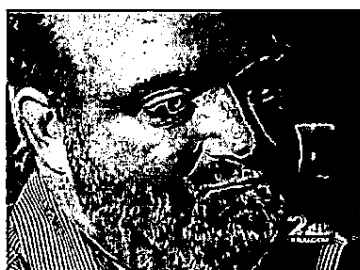




## New flight simulators teach air safety on the ground



New flight simulators being deployed across the state will allow pilots to navigate Alaskan airspace on the ground. (Carolyn Hall/KTUU-DT)



Programmer Sean Ruddy says he's seen experienced pilots recognize landmarks in the simulator. (Carolyn Hall/KTUU-DT)

by Jason Lamb  
Friday, October 30, 2009

ANCHORAGE, Alaska -- State and national officials unveiled a new partnership to improve air safety Friday at the Alaska Aviation Heritage Museum. Behind the partnership: development of high-tech flight simulators with lifelike detail to train pilots.

Given Alaska's high rate of aviation accidents over the years, officials said Friday this new partnership between federal and state agencies, the Medallion Foundation and the National Institute for Occupational Safety and Health is just what pilots in Alaska need.

Software programmer Sean Ruddy knows about flying.

"These are our highways," said Ruddy. "This is how you get around Alaska. There are so many parts of Alaska you can't get to without an airplane."

He also knows flying in Alaska poses challenges you won't find anywhere else -- challenges that can prove deadly.

"There's many wrong turns you can make in Alaska that you can end up dead," Ruddy said. "You go in the wrong box canyon and you won't be able to turn around in it, and there's aluminum up there to prove it."

That's why he's part of a development team that helped design this program, specifically the real-life Alaska terrain and scenery that most other flight simulators lack.

"You can fly through Rainy Pass, say, if you haven't done it in a while or you've never done it," Ruddy said.

The officials who announced the program want to put more of these detailed high-tech simulators in training programs across the state.

"The difficulty in flying Alaska is demonstrated in the high number of accidents we've had in the past," Ward said.

Not all parts of Alaska are now in the simulators; for instance, the Juneau area was only recently added. But officials hope to use funds from the new task force to further upgrade the simulators, adding more regions and features to let new pilots experience flight challenges common in Alaska.

"We've developed systems for placing clouds in certain areas," Ruddy said. "We've had experienced pilots looking at it and going, 'Oh yeah, that's the rock I use to see if I can get through over to Whittier.'"

More importantly, officials say, the new features and simulators funded by the partnership will hopefully give pilots more confidence to face the real thing -- to avoid the real consequences of when things go wrong thousands of feet in the air.

Contact Jason Lamb at [jlamb@ktuu.com](mailto:jlamb@ktuu.com)



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## Karen Sawyer

---

**From:** sruddyeterra@gmail.com on behalf of Sean Ruddy [sruddy@e-terra.com]  
**Sent:** Wednesday, February 10, 2010 2:16 PM  
**To:** Karen Sawyer  
**Subject:** my eterra contact info

Sean Ruddy

work 907-562-1500

cell 907-399-1595

[sruddy@e-terra.com](mailto:sruddy@e-terra.com)



# Air Carrier Certification



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 Thursday, February 4, 2010  
 Phone: 732-927-4336

## Getting Started

You want to become an FAA certified air carrier so that you may conduct on-demand air charter and air taxi operations for hire. As the owner of the certificate you must:

- be a US Citizen.

All required management personnel must be US Citizens.

**Your First Decision:** You should use the help of a consulting organization such as USAC Aviation.

- You will achieve certification better, faster, easier, and cheaper.
- The national average of six to eighteen months (from when the FAA begins processing your application) is reduced by 50%.
- The quality of your submission will be significantly higher.
- The cost of a consulting organization is quickly recovered via charter revenue.

**Prerequisites:** The prerequisites listed here are non-negotiable. There are four items required by the FAA before you get started:

- an aircraft,
- qualified flight crew,
- commercial aircraft insurance, and
- qualified management personnel (Full 135 Operator).

**Minimum PIC Flight Experience Requirements** Part 135.243(b) and (c) require that a PIC who does not hold an ATP certificate and who conducts operations that do not require an ATP certificate must have acquired a minimum number of flight hours before serving as a PIC.

Pilot	Total	Cross-Country	Night
VFR PIC	500	100	25*
IFR PIC	1,200	500	100

\*These 25 hours must be night cross-country hours.

**Pre-Application:** Your pre-application activities will include contacting your Flight Standards District Office (FSDO) and letting them know of your intent.

- Prepare a pre-application statement of intent.
- Contact your FSDO and make an appointment.
- Visit your FSDO, sign in, and view a certification video.

You will be assigned a Principal Operations Inspector (POI). Our certification service will prepare your pre-application statement of intent.

**Next Steps:** The next steps are described in the following pages. They include:

- Application - Letters, Forms, and Documents
- Document Preparation - Manuals and Forms
- Aircraft Conformity - Preparation and FAA Inspection
- Training - Company Specific Training
- Check Ride - FAA Practical Exam as per FAR 135.293-299.

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# Air Carrier Certification



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## Selection/Order

**Single-Pilot Operator:** Our Single-Pilot Operator website provides forms and examples for you to self-prepare FAA documentation in order to become a single-pilot Part 135 operator. Features include:

- One single-engine or multi-engine aircraft.
- One pilot crew.

**Single Pilot-in-Command:** This is a step up from the single-pilot operator and allows up to three copilots to be used in the operation.

- Typically operators have one single-engine or multi-engine aircraft, but this is not a limit.
- Pilot-in-Command and up to three Second-in-Command pilots.
- No General Operations Manual required.
- No Training Manual required.
- No Director of Operations required.
- No Chief Pilot required.
- Director of Maintenance may be required for turbine-powered aircraft.

**Basic 135 Operator:** The Basic 135 Operator certificate is the same as Full 135 Operator; except, the Director of Operations and Chief Pilot can be fulfilled by the same person. There is a limitation of no more than 5 pilots and no more than 5 aircraft. It is possible for a Full 135 Operator to get a waiver allowing the two positions to be combined thus alleviating the need for this level of certification.

### Full 135 Operator:

- Exclusive use of at least one single-engine or multi-engine aircraft.
- There are no restrictions on the number or type of aircraft.
- There are no restrictions on the number of pilots.
- A General Operations Manual and Training Manual are both required.
- A Director of Operations and Chief Pilot are required.

- The Director of Operations and Chief Pilot can be combined for non-turbine powered aircraft upon approval of a waiver and as long as the operation is simple.
- Director of Maintenance is required.

**Optional Authorization:**

- Minimum equipment list (optional).
- Extended over-water operations (optional).
- Canadian Foreign Air Carrier Certificate (optional).

**Fast Track:**

- Excellent for large aircraft owners who need to generate revenue in the shortest time possible.
- Purchase a Full 135 Air Carrier and be fully operational within weeks.

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**Alaska Aviation Safety Project**

**FY2009 Request: \$500,000**  
**Reference No: 40060**

**AP/AL:** Appropriation  
**Category:** Public Protection  
**Location:** Statewide  
**House District:** Statewide (HD 1-40)  
**Estimated Project Dates:** 07/01/2008 - 06/30/2014

**Project Type:** Health and Safety  
**Contact:** John Cramer  
**Contact Phone:** (907)428-6009

**Brief Summary and Statement of Need:**

The Alaska Aviation Safety Project (AASP) is a multi-faceted, multi-year research project funded primarily by NASA and has received national recognition. The mission of the AASP is to reduce aircraft related fatalities in Alaska. The National Institute of Occupational Safety & Health (NIOSH) reports for the time period 1990-2004, Alaska accounted for 21% of all commuter air taxi related fatalities in the United States. Alaska averaged 123 air crashes per year between 2001 and 2006. In the first 9 months of 2007 there were 59 air crashes in Alaska. The AASP supplied 3-D simulator data has been widely used by Alaskan pilots to increase terrain familiarity and decrease air crash incidents.

<b>Funding:</b>	<b>FY2009</b>	<b>FY2010</b>	<b>FY2011</b>	<b>FY2012</b>	<b>FY2013</b>	<b>FY2014</b>	<b>Total</b>
Gen Fund	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$3,000,000
<b>Total:</b>	<b>\$500,000</b>	<b>\$500,000</b>	<b>\$500,000</b>	<b>\$500,000</b>	<b>\$500,000</b>	<b>\$500,000</b>	<b>\$3,000,000</b>

<input type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input checked="" type="checkbox"/> Phased - underway	<input type="checkbox"/> On-Going
0% = Minimum State Match % Required		<input type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill	

**Operating & Maintenance Costs:**

	<u>Amount</u>	<u>Staff</u>
Project Development:	0	0
Ongoing Operating:	150,000	2
One-Time Startup:	0	
<b>Totals:</b>	<b>150,000</b>	<b>2</b>

**Additional Information / Prior Funding History:**

Four federal research grants from NASA were received: \$300,000 in in-kind assistance from NASA plus funds for the following federal fiscal years: Phase I-FY01 - \$300,000; Phase II-FY04 - \$3,000,000; Phase III-FY05 - \$2,980,000; Phase IV-FY06 - \$1,500,000. A \$3 million NASA grant is anticipated in FFY09. Funding (GF) of \$500,000 was received for both FY07 and FY08.

**Project Description/Justification:**

The Alaska Aviation Safety Project (AASP) commenced in 2001 based upon a mandate from Senator Ted Stevens to reduce the number of aircraft fatalities resulting in Alaska. The AASP has been and continues to research the usefulness of repurposing existing technology to improve aviation safety.

The primary funding advocate of the AASP has been the National Aeronautics and Space Administration (NASA). The significant economic investment of this project has increased the local economy by \$12.12M due to instate spending and re-spending while creating an estimated payroll of \$4.84M. While matching funds have not been required in the past, the congressional delegation has requested the state have some level of financial participation in funding our element of this project as a good faith gesture.

Funds received to date have been used to rectify 12 high risk mountain passes, three high capacity airdromes and eight remote approach zones. These were then manipulated by software into 3-D renderings suitable for use in aviation simulators. These renderings have been made available to the general aviation community through the Medallion Foundation's flight simulators located throughout Alaska for training and familiarization purposes. The University of Alaska-Anchorage's school of aviation will also be provided the data for use in their simulators. The data sets completed thus far have more than adequately demonstrated proof of concept as acknowledged by NASA and confirmed by follow-on funding of research. Existing data sets, when exacted to ground truthing, will allow for dynamic real time in-cockpit display of an aircraft's positioning and orientation with respect to terrain regardless of weather or environmentally related conditions affecting visibility thereby increasing a pilot's situational awareness.

The next phase of the AASP research will examine primarily the interoperability between the GPS capabilities of E-911 mandated wireless commercial-off-the-shelf (COTS) devices and their ability to send and receive (in-cockpit) large quantities of data critical to aviation safety. Key to this is the XYZ GPS coordinates supplied by the E-911 enabled wireless COTS devices. Additionally, unmanned aerial vehicles (UAV) and unmanned aerial systems (UAS) figure prominently in this research. Of particular interest is the proposed broadband wireless connection between air and ground which provides a significant solution to command and control issues as well as air space deconfliction. The foundation of this important research lies in the successful demonstration that large amounts of data can be relayed wirelessly (IP) to and from an aircraft or UAV, in flight, from the terrestrial wireless network.

Finally, it is believed an airframe could become a highly mobile and very agile weather data gathering platform. It is conceivable that an aircraft, while in flight, could gather valuable weather data and relay that data to a central ground station for weather reporting and prediction purposes. This concept entails an IP wireless link to a satellite and/or terrestrial system connected to a control gate that would simultaneously ping all equipped aircraft and receive weather data with the precise associated GPS coordinates (longitude, latitude, and altitude). This data could then be used in a weather prediction model to improve weather reporting and prediction procedures. This is anticipated to be done in conjunction with partnering agencies FAA, NOAA, and NASA.

It is conceptually theorized and reasonably believed the repurposing of existing technology can and will substantiate the initiatives of the AASP, which then becomes the basis for the following advances in aviation safety:

- ? Interactive Cockpit Aide to Navigation
- ? Real Time Flight Monitoring
- ? Live In-Flight Weather Updates
- ? Mobile Weather Data Capture, and
- ? UAV/UAS: Command and Control, Air Traffic Deconfliction and Wireless Data Link.

**Key Milestones Along the Critical Path of Development:**

1. **Designation of Alaska as Wireless Testing Area:** Alaska is the only state that can offer large remote areas of uncontrolled airdromes for research that does not harbor a substantial quantity of RF interference commonly associated with urban and metropolitan sprawl.
2. **FCC COTS Waiver for Research in Alaska:** a waiver to the existing law regarding the use of wireless devices onboard aircraft must be secured with respect to research and development specific to Alaska. Upon securing that waiver, Alaska may attract other similar research and development activity and capture that economic investment.
3. **Improved Weather Gathering and Prediction:** By improving the weather data gathering method, weather prediction is improved. The subsequent milestone would be to improve aviation weather reporting and distribution (i.e., wireless data link to and from the cockpit and ground).
4. **Patent and Copyright Applications:** patent and copyright applications will be submitted in the name of the State of Alaska for the public good.

This illustrates both the social and economic advantages the AASP believe is possible through the research it is conducting. The AASP further believes the greatest value of its research is in saving and preserving lives while substantially reducing search and rescue expenses to the State of Alaska.