General Aviation Controlled Flight Into Terrain
Joint Safety Implementation Team

Streamlining Equipment Installation

Detailed Intervention Implementation Plan

Statement of Work

Existing terrain avoidance equipment is costly and not readily available to GA aircraft owners making equipage of most GA aircraft expensive and mandates impractical. Some of these devices are "new technology" while others have existed for some time, but only now are costs beginning to drop. There is an opportunity to affect the value verses cost ratio for this new equipment such that a large percentage of the general aviation aircraft owners will elect to purchase and install this safety enhancing equipment.

The following projects focus on initiation and/or increased support of programs that will expedite development, certification, and voluntary installation of low cost safety enhancing CFIT equipment.

- Publish simplified certification and installation guidance for manufacturers and avionics installers.
- Publish a Technical Standard Order (TSO) for low cost, look-ahead terrain warning systems available for voluntarily installed, low-speed general aviation aircraft.
- Make publicly available a "baseline" approved digital terrain elevation and obstacles database (DTED) provided by Federal government at very low cost or free. This is important to the aerial application and rotorcraft communities and therefore the obstacle database must include obstacles down to 100 feet.
- Augment programs that will speed up the development of low cost graphical displays that reduce pilot workload and improve situational awareness.

Lead Organization: ACE-111

Objectives

The goal of these projects is to realize a decreasing number of general aviation controlled flight into terrain accidents. This goal will be measured against the accident reduction metric developed by the Joint Steering Committee for general aviation.

1. Products: Publish simplified certification and installation guidance for manufacturers and avionics installers.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
ACE-111	Publish ACs 23.1309 and 23.1311 Electronic Displays			March 1999
ACE-111	Publish Streamlined Installation guidance that outlines different requirements for differing levels of operation and specifies FAA involvement for each level.	.35 FTE	$35K	
Industry Organizations and Manufacturers	Work with FAA to publish the "Streamlined Installation Order"	.25 FTE total	Personnel time and travel	
	Milestones: • ACE-111 and SAMA compile "lessons learned" from Capstone project installations STCs. • Industry determine what different installation "levels" are needed; i.e. VFR only aircraft, VFR only in IFR approved aircraft. • Industry and FAA determine if there is a need to address airplanes, helicopters, and AG operations separately.			1 year 1 year 1 year
ACE-111	GAMA Spec for Cockpit Standardization (Human Factors guidance for General Aviation aircraft)	.25 FTE[1]	$25K	Ongoing
AIR-130		Review		
Industry Organizations and Manufacturers	GAMA Spec for Cockpit Standardization (Human Factors guidance for General Aviation aircraft)	.25 FTE total	Personnel time and travel	Ongoing
	Milestones: • Complete final draft. • Distribute final draft to industry and FAA offices for comment. • Final GAMA Spec			2 Quarters 3 Quarters 1 year
Total Cost **FAA:** $60K **Industry:** Equivalent to 0.5 FTE plus travel				

[1] These resources have already been committed.

Related Products

- ACs 23.1309 and 23.1311 have already been published, but were still in draft form at the time of the JSAT recommendations.
- GAMA and FAA Small Airplane Directorate complete "phase 1" on a simplified certification program initiated to identify and change regulations and practices that are overly burdensome for little safety benefit. AC 23-15 was the result of phase 1. "Phase 2" started in 1998, targeting more detailed and/or subtle requirements. This effort is currently on hold because of the existing similar programs and workload of industry and government workers.
- GAMA Spec for Cockpit Standardization is already close to a final draft. It is an important document for both manufacturers and avionics installers because it should speed up product development and cockpit installation. It should do this by clearly defining up front many currently undefined human interface issues and by minimizing last minute changes that result from subjective evaluations.
- RTCA Task Force 4 offered specific certification streamlining recommendations that parallel the Small Airplane Directorate's efforts.

Measures of Effectiveness

- AC 1309 & 1311 – Rate of new products applying for certification.

- Streamline Installation Order – Rate of New Safety Enhancing Equipment Installations. Industry will provide numbers.

- GAMA Spec
  - Level of Standardization for avionics panel designs among new aircraft manufacturers
  - Level of intervention by field offices in certification of panel designs
  - Rate of New Safety Enhancing Equipment Installations

Risk Assessment

- AC 1309 & 1311
  - Not completely accepted in the field.
  - Overridden by TSOs in some cases.
  - Could cause increased workload to manufacturer by requiring more analysis.

- Streamline Installation Order – If too checklist oriented, may limit the flexibility.

- GAMA Spec
  - FAA desire to make it consistent with air transport HF standards.
  - May delay GA standard.
  - May not correlate to the variable needs of the GA environment.
  - May increase cost or complexity unnecessarily.

- Delaying the implementation of this plan may increase the FAA workload over the next few years. Without guidance, there typically is more ACO and Directorate involvement in STC projects that involve new equipment. The new generation avionics require human factors and flight test evaluation in addition to the systems certification review. Also, more FAA involvement is likely to result in a slower installation rate of IFR certified GPS and terrain warning devices.

Risk Mitigation

Implement plan on recommended schedule

Potential Impact Outside of General Aviation

None foreseen.

Map back to original JSAT Recommendations

- EQ14-3, FAA should complete the programs, Acs, and rulemaking targeting low cost certification.
- EQ14-5, The FAA and industry should work together to reduce certification cost for equipment that has a high benefit and targeted for the single engine segment of GA.
- EQ14-6, Promote the development of the low cost displays.

2. Product: Publish a TSO for low cost, look-ahead terrain warning systems available for voluntary installation in low-speed general aviation aircraft.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
AIR–130	Publish new TSO for terrain warning systems applicable for voluntary installation in low speed, small general aviation airplanes.	.25 FTE	$25K	
AIR – 110	Convene RTCA WG to modify WAAS-MOPS to provide guidance or terrain warnings in single sensor receivers (Gamma class)	.25 FTE	$25K	
ACE –111	Support AIR–130 in drafting new TSO.	.25 FTE	$25K	
Industry Organizations and Manufacturers	Work with FAA to publish the "TSO"	.50 FTE total	Personnel time and travel	
	Milestones: • Using the existing TSO C151 Class B TAWS, draft new TSO • Draft TSO out for comment • Final TSO published			1 year 1.25 year 2.25 year
Total Cost **FAA:** $75K **Industry:** Equivalent to 0.5 FTE plus travel				

Relationship to Current Aviation Community Initiatives

- Terrain Alert and Warning System (TAWS) TSO C151 and mandatory installation rule for transport airplanes and turbine airplanes with 6 or more seats are near completion.
- AGATE –The advanced general aviation avionics being developed for this program all incorporate some type of terrain avoidance feature.

Measures of Effectiveness

- Short Term – Track the installation numbers of the equipment with help from the various associations.
- Long Term – Track future CFIT accidents, logging the aircraft that did and didn't have terrain warning equipment. This measure is predicated on improved accident investigation.

Risk Assessment

NTSB or FAA Office of Accident Investigation won't report the equipage of terrain warning equipment.
There would only be a deferred cost and not an increased cost from delaying work on this implementation plan. This plan will take FAA resources, but equipment that does offer terrain warning and greatly enhanced safety will come through the FAA for certification and use our resources anyway. We expect to see the first of this equipment spring of 2000. This equipment won't meet the higher level TSOs, but should be installed in the airplanes if we want to reduce the accident rate. In the long run, the FAA resource burden may be lower the sooner a TSO is in place.

Risk Mitigation

Implement plan on recommended schedule

Potential Impact Outside of General Aviation

None foreseen

Map back to original JSAT Recommendations

- EQ14-5, The FAA and industry should work together to reduce certification cost for equipment that has a high benefit and targeted for the single engine segment of GA.
- EQ14-6, Promote the development of the low cost displays.

3. Product: Make publicly available a "baseline" approved digital terrain elevation and obstacles database (DTED) down to 100 feet, provided by Federal government at very low cost or free.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
AIR-130, ACE-111 & ACE-7, AGC, NIMA	Certifies and packages database for distribution	1 FTE total	$95K	2 years
	Indemnify users from errors in the validated database			
Manufactures/ Industry	Agree on standard format and resolution or loadable terrain	.5 FTE total	Personnel time and travel	1.5 years
NASA	Listed below	1 FTE total	$87K	
	Milestones: • NASA conducts shuttle RADAR Topography mission. • NASA participates in setting international standards for approvable terrain databases. • NASA facilitates formulation of a government coalition (FAA, NIMA, NOAA, NASA) whose charter is to enable the approval of a worldwide terrain database with adequate resolution for synthetic vision applications. • AIR-130 coordinates with other government agencies necessary to make an approvable terrain database available to all manufactures building terrain displays and impact warning systems. • Manufacturers agree on a standard format and resolution for loadable terrain data. The government would make this terrain data base available with the expectation that the cost savings of having an approved data base already prepared would be passed on to the customer.			
Total Cost FAA: $182K Industry/ NASA: Equivalent to 1.5 FTE plus travel				

Relationship to Current Aviation Community Initiatives:

- RTCA Special Committee already working on database standards, including integrity (for both navigation and terrain).
- Several manufacturers (Jeppesen, Honeywell, UPS/AT) already have or are working on terrain database products, formats, and update processes.
- Equipage with GPS receivers is critical as the foundation for terrain avoidance equipage. The cost of data to support the use of these receivers has been identified as a significant deterrent to GPS equipage. The FAA should move forward with its initiative to improve the collection, storage, processing and dissemination of the navigation data to reduce the cost of updating GPS receiver databases and increase equipage.

Measures of Effectiveness

- Average purchase price for all database driven avionics will go down.
- Cost to maintain a current database, i.e. database updates, will go down.
- More manufacturers will bring products to the market and increase competition.

Risk Assessment

- All of the equipment recommendations are based on the assumption that FAA will Implement the Wide Area Augmentation System (WAAS) to provide precision GPS approaches and improved vertical accuracy and integrity to improve the performance and reduce the cost of terrain avoidance equipment performance
- FAA validation and approval of initial database.
- This includes relieving manufacturers of liability on the database itself
- There would only be a deferred cost and not an increased cost from delaying work on this implementation plan. It would most likely result in a slower installation rate of IFR approved GPS and terrain warning devices.
- Low equipage rate for GA aircraft.

Risk Mitigation

Implement plan on recommended schedule

Potential Impact Outside of General Aviation

There are numerous industries outside of aviation that will use this information.

Map back to original JSAT Recommendations

- EQ14-1, FAA should validate the existing National Imaging Mapping Agency terrain database and make available to avionics manufacturers (public) free.
- EQ14-2, Industry need a “hold harmless” arrangement for using the database.

4. Products: Augment programs that will speed up the development of low cost graphical displays that reduce pilot workload and improve situational awareness.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
NASA	Continue the efforts of the AGATE program through to certified products. This includes but is not limited to the Highway-in-the-Sky program and synthetic vision[2]. Work collaboratively with manufacturers to advance technologies to maturity levels required for affordable implementation.	.5 FTE	$45K	Continuing
ACE-111	Works with NASA and industry to develop the necessary standards for the Highway-in-the-Sky and synthetic vision.	.25 FTE	$25K	Continuing
AIR-130		.1 FTE	$8K	Continuing
Manufacturers	Build and certify affordable devices.		Personnel time and travel	Ongoing
Total Cost: **FAA:** $78K **Industry/NASA**: Equivalent to 0.5 FTE plus travel				

[2] The general term "synthetic vision" includes enhanced vision, which is a sensor-bases presentation, and artificial vision, which is generated using a terrain database.

Relationship to Current Aviation Community Initiatives

- Numerous AGATE programs.
- The NASA Highway-in-the-Sky (HITS) program.
- The NASA Synthetic Vision program.

Measures of Effectiveness

This is a long term project and would be hard to engage a measure of effectiveness.

Risk Assessment

All of the equipment recommendations are based on the assumption that FAA will Implement the Wide Area Augmentation System (WAAS) to provide precision GPS approaches and improved vertical accuracy and integrity to improve the performance and reduce the cost of terrain avoidance equipment performance.

There would only be a deferred cost and not an increased cost from delaying work on this implementation plan. This is basically already funded by NASA and they have the bulk of the expense. A synthetic vision system will reduce the risk of low visibility flying. This will have a tremendous effect on the accident rate. At the present program rate (in conjunction with other efforts), there is a good chance that synthetic vision will cost less than $10,000 and be standard in all part 23 *airplanes* within 10 years.

Risk Mitigation

Implement plan on recommended schedule

Potential Impact Outside of General Aviation

There are numerous industries outside of aviation that will use this technology.

Map back to original JSAT Recommendations

- EQ14-4, FAA, NASA, and industry must continue work already begun in the AGATE program.
- EQ14-6, Promote the development of the low cost displays.

General Aviation Controlled Flight Into Terrain
Joint Safety Implementation Team

Enhanced Pilot Training for CFIT Awareness and Prevention

Detailed Intervention Implementation Plan

Statement of Work

Current pilot training and testing does not adequately address CFIT awareness and prevention. This deficiency exists due to a lack of a CFIT awareness/avoidance focus in the Practical Test Standards (PTS), Knowledge Tests (KT), and related training and Advisory Circular (AC) material. This intervention will revise the PTS, KT, and related training and advisory material to include CFIT awareness/avoidance information. The training material will be targeted for use by general aviation flight instructors for training pilots at all certificate levels, and can be tailored according to the pilot's experience level and locale. The related advisory materials will also allow the instructor to tailor the training based on the pilot's experience and operating environment.

Lead Organization AFS-800

Objectives

Contribute to the reduction of the CFIT accident rate by improving pilot training, and ultimately understanding, of CFIT awareness/avoidance through enhanced training and testing products. Specifically, PTS, KT, and associated training materials will be revised to train and test knowledge of CFIT awareness/avoidance. Also, a new AC will be introduced to provide guidance and instructional material for flight instructors and Safety Program Managers (SPM) to specifically train CFIT awareness/avoidance at safety seminars and related forums. In addition, AC 61-98A will be revised to provide an enhanced focus on CFIT awareness/avoidance during the Biennial Flight Review. Due to similarities of the content of the individual products outline below, the training developers should work in concert to achieve a synergy and associated cost savings.

Products: As follows - completion estimates are from date of approval.

Product 1: Issue a new Advisory Circular (AC) to enhance CFIT Awareness. FSDO to distribute materials to their flight instructor/flight school community. SPM will provide safety seminars that include the material. Appendix 1 to this plan contains specific product suggestions to be included as part of this training.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates - Approval plus:**
FAA - AVR, AFS-800, AGC, ASY, National Aviation Safety Data Analysis Center, Industry associations, and aviation colleges and universities	FAA to develop AC with input from industry / academia	.75 FTE – FAA 1.5 FTE - Industry / academia	$65,250 Personnel time and travel	3 Quarters
FAA – AVR, AFS-800	Coordinate Advisory Circular for release	.15 FTE - FAA	$13,050	1 Year/ 1 Quarter
FAA – AVR, AFS-800	Publish and disseminate training materials (AC)		$50,000 to publish and disseminate training materials (AC).	1 Year/ 2 Quarters
Total Cost **FAA:** $128,300 **Industry/Academia:** Equivalent to 1.5 FTE plus travel				

Product 2: Revise AC 61-98A regarding the Biennial Flight Review to enhance CFIT training. Appendix 1 to this plan contains specific product suggestions to be included as part of this training.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates - Approval plus:**
FAA - (AVR, AFS-800)	FAA to develop AC with input from industry / academia	.75 FTE – FAA and 1.5 FTE - Industry / academia	$65,250 Personnel time and travel	3 Quarters
FAA – (AVR, AFS-800)	Coordinate Advisory Circular for release	.15 FTE - FAA	$13,050	1 Year/ 1 Quarter
FAA – (AVR, AFS-800)	Publish and disseminate training materials (AC)		$50,000 to publish and disseminate training materials (AC).	1 Year/ 2 Quarters
Total Cost: **FAA:** $128,300 **Industry/Academia:** Equivalent to 1.5 FTE plus travel				

Product 3: Revised Practical Test Standards, Knowledge Tests, and associated training materials to ensure CFIT understanding at all certificate levels. Appendix 1 to this plan contains specific product suggestions to be included as part of this training/testing. Note: This product to be delayed until new training addressed in Product 1 has been developed.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates - Approval plus:**
FAA - AVR	Coordinate with industry / academia to ensure all associated training materials are revised prior to implementing new tests (if not already addressed by Product 1 of this plan)	.25 FTE – FAA and .5 FTE - Industry / academia	$21,750 Personnel time and travel	1 year
FAA - AVR	Revise Practical Test Standards and Knowledge Tests at all certificate levels	.25 FTE - FAA	$21,750	1 Year / 2 Quarter (new tests fielded 1 quarter after all new training materials are in place)
Total Cost **FAA:** $43,500 **Industry/Academia:** Equivalent to .5 FTE plus travel				

Product 4: Develop and conduct user surveys of new CFIT training effectiveness.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates - Approval plus:**
FAA - AVR	Develop an effectiveness survey to be sent to a statistically significant number of pilots that received CFIT training while earning a new rating. The survey will also be distributed with the advisory material and made available on the FAA website.	.25 FTE – FAA	$21,750 Plus $3,500 to publish and disseminate survey	1 Quarter
FAA - AVR	Analyze / Summarize survey results	.25 FTE - FAA	$21,750	1 Year / 2 Quarter
FAA - AVR	Respondents to the surveys will be resurveyed one year after completing their original survey as a follow-up. Analyze / Summarize re-survey results	.25 FTE - FAA	$21,750 Plus $3,500 to publish and disseminate re-survey	2 Year / 2 Quarter
Total Cost **FAA:** $69,650				

Related Products

This intervention will focus government, industry trade association, and university resources to work in partnership by coordinating existing CFIT prevention training efforts and developing new initiatives. Existing CFIT training materials will be surveyed for inclusion in new products. Also, any CFIT training products resulting from the Commercial CFIT JSIT will be evaluated for applicability.

Measures of Effectiveness

By training roughly 90,000 pilots obtaining new ratings each year, we can raise CFIT awareness among a significant portion of the pilot population. We will also reach nearly 80,000 flight instructor through the AC materials, who will in turn pass on this knowledge to their students. SPM should be required to present CFIT training at 50% of their Safety Seminars over a two-year period. Also, all GA pilots receiving a BFR will be exposed to this material. An effectiveness survey will be sent to a statistically significant number of pilots that received this training while earning a new rating. A survey can also be distributed with the advisory material. Respondents to the surveys will be resurveyed one year after completing their original survey as a follow-up. The survey will also be available on the FAA web site. A target for the survey would be to have at least 50% of the pilots rate the training as effective or highly effective in helping them to avoid CFIT mishaps.

Risk Assessment

Timely implementation of this plan will provide a rapid and lasting increase in CFIT avoidance knowledge among GA pilots. This improved knowledge should contribute to a reduction in the number of CFIT accidents. Delays in deploying this plan will not affect the cost implementation, but will result in a higher overall cost to the GA community by delaying the benefits associated with a reduced CFIT mishap rate.

Risk Mitigation

Implement plan on recommended schedule.

Potential Impacts outside of GA community

Improving the CFIT awareness of all pilots obtaining ratings through the revised training and testing standards will ultimately benefit all operations employing FAA licensed pilots. Many pilots benefiting from this training will eventually be employed in scheduled airline or military flight operations.

Map back to original JSAT Recommendations

The following JSAT interventions are addressed by this plan. Training developers will incorporate these elements into the new material:

Increase Pilot Awareness on Accident Causes - CFIT JSAT TRN 15:

- Add "CFIT accident causes" section to private pilot training ground school.

Improve pilot training (i.e., weather briefing, equipment, decision-making, wire and tower avoidance, and human factors.) - CFIT JSAT TRN 3:

- Add ATC familiarization training for pilots.
- Improve night training to address the specific issues associated with this type of operation, including checking terrain elevations, understanding illusions like "black hole effect," and airport lighting.
- Consider new training approaches such as the Advanced General Aviation Transportation Experiment (AGATE) training package.
- Reinforce the training of the fundamentals; i.e., charts reading, operations uncontrolled airports, etc.

Increase Pilot Awareness on Accident Causes - CFIT JSAT TRN 15:

- View "CFIT accident causes" video or similar medium as part of the biennial flight review including regional CFIT accident summary/causes.

Improve pilot training (i.e., weather briefing, equipment, decision-making, wire and tower avoidance, and human factors.) - CFIT JSAT TRN 3:

- Provide a structured approach to initial and recurrent pilot training.
- Incorporate equipment training as necessary, for both rental aircraft and private aircraft.
- Improve pilot understanding of spatial disorientation and perceptual illusions.
- Develop CFIT-focused computer based pilot training, information, and proficiency programs that could be downloaded from sources such as the FAA website.

Improve safety culture within the aviation community - CFIT JSAT TRN 11:

- Develop safety-focused job aid for flight instructor use.

Enhance the Biennial Flight Review (BFR) and/or instrument competency check - CFIT JSAT REG 13.

General Aviation Controlled Flight Into Terrain
Joint Safety Implementation Team

General Aviation Safety Council

Detailed Intervention Implementation Plan

Statement of Work

Many of the General Aviation (GA) Safer Skies issues could be effectively addressed by establishing a General Aviation Safety Council (GASC). The GA CFIT JSIT proposes that a GASC be established. This Council will consist of safety program representatives from FAA, NASA, NTSB and all GA industries, including GA aviation insurance providers. The GASC will serve as a forum to transfer information to help spread safety related programs and information between organizations. The GASC's mission is to expedite the accident rate reduction by providing a forum to determine and then to implement effective safety programs. After the GASC is formed it is proposed that it be a permanent body meeting regularly to address all GA safety related issues meeting three times a year.

Lead Organization

FAA, Flight Standard Service, General Aviation & Commercial Division, Safety Branch, AFS-803

Objectives

The GASC will serve to identify, measure, facilitate, promote and provide incentives for training and educational programs that focus on minimizing the GA accident rate. The forum created by the GASC will enable GA safety program representatives a wide source of ideas and contacts to aid in augmenting and/or developing GA pilot-training and education programs. The GASC will also attempt to involve GA insurance providers in the activities of the Council and encourage them to consider incentives to participants of GA safety programs and consider sharing accident data with the GASC.

1. Product: Establish a GA Safety Council to coordinate training and educational programs for general aviation.					
OPR	**Action**	**People**	**Costs**	**Milestones**	**Completion Date**
FAA-AFS-803	Identify appropriate groups to sit on Council, extend invitations to join Council	FAA, NASA, national GA organizations and GA insurance organizations.	Administrative costs to establish first meeting. 0.0625 FTE, or $5,437.5	Organize first meeting.	1st Quarter Subsequent to Adoption of Plan.
Total Cost FAA - $5437.5					

2. Product: Initial meeting of the GASC					
OPR	**Action**	**People**	**Costs**	**Milestones**	**Completion Date**
FAA-AFS-803	Draft GASC Charter Inventory existing GA safety and educational programs, measure their effectiveness, encourage each group to establish its own program, develop an incentive program to support and/or establish GA safety programs, facilitate information exchange of existing programs.	FAA, NASA, NTSB, national GA organizations and GA insurance organizations.	Travel, labor and administrative costs for all participants. $1,200 for each group in travel costs to meet 3 times a year. .125 FAA FTE or $10,875 to organize and attend.	Establish the mission and the goals of the GASC.	2nd Quarter Subsequent to Adoption of Plan
Total Cost: FAA - $14,475					

3. Product: Incorporate GA aviation insurance partnership in GASC.					
OPR	**Action**	**People**	**Costs**	**Milestones**	**Completion Date**
FAA-AFS-803	Have GA insurance representation on GASC (2nd Quarter Subsequent to Adoption of Plan) Encourage GA Insurance representatives to consider sharing their accident data with GASC (4th Quarter Subsequent to Adoption of Plan) GA Insurance representatives consider providing incentives to participants of GA safety programs (6th Quarter Subsequent to Adoption of Plan).	AFS-803, GASC with GA insurance representation.	Administrative costs to incorporate GA insurance representation within GASC. As GA accidents decrease as a result of developing and/or improving more effective safety programs, the potential for reduced settlement payout costs for insurance companies.	GA insurance representatives full participation in the GASC.	2nd Quarter 2001

Related Products

There are many pilot training and educational programs that already exist in the GA Community. They include programs by the National Air Transportation Association, the Helicopter Association International.

The National Business Aviation Association (NBAA), through its Best Practices Committee, also puts on training programs for its members. NBAA also has a safety award program that provides awards to accident-free pilots.

The Aircraft Owners and Pilots Association's (AOPA) Air Safety Foundation also has safety programs. They include local fly-in programs, mountain flying safety programs and instrument refresher courses. AOPA also has flight instructor refresher courses and offers 350 safety seminars throughout the year. AOPA also has a spin off of the FAA's pinch hitter program, educating non-pilots to provide assistance with piloting duties in the cockpit.

In addition the National Agricultural Aviation Association produces the Professional Aerial Applicators Support System (PAASS). The primary goal of PAASS is to reduce the number of drift incidents and aviation accidents associated with the aerial application of crop protection products. The PAASS program provides advanced educational opportunities for pilots and operators active in the industry that strive to enhance the profession of the commercial aerial applicator and improve critical decision-making skills. The PAASS program is offered in approximately 22 states as part of a state's pesticide applicator license re-certification program. Some companies that provide insurance coverage to agricultural aviation operators provide rebates of 5-10 percent to those policyholders that participate in the PAASS program.

Measures of Effectiveness

An increased number of individual safety programs. Increased collaboration between GA groups in sharing ideas about their safety programs.

Risk Assessment

- Delay in developing GASC
- Some of the GA groups may not have the resources to devote to GASC or the establishment of safety programs.
- Delay in establishing GASC pilot training and educational programs
- FAA may not be able to come up with the resources to fund administration of GASC.
- Different sectors of GA and GA insurance groups may not see the advantage of establishment of GA pilot-training programs and educational programs and hence, not participate.

Mitigation

Construction and implementation of GA safety and educational programs will significantly drop the GA accident rate. Once a tool is developed to gauge these programs' effectiveness, it can be used to indicate to the FAA leadership the importance of complete and full funding for the GASC and its objectives. The information can also be used for the GA groups as support material for their leaders to continue their participation in the GASC. Furthermore, insurance companies, because of their participation in GASC programs, will significantly enhance GA safety resulting in fewer outlays to settle accident claims for their industry.

Potential Impacts Outside of the GA Community

The potential impact of formation of the GASC and implementing its mission is that the general aviation accident rate will drop significantly. Furthermore, another impact is that it will show how successful a program can be when the private sector and the government form a partnership, provide incentives and urge compliance through volunteerism.

Mitigating GA CFIT accidents will result in less public and private property damage. It will also benefit the economy by reducing insurance and litigation costs. Furthermore, safety programs under the GASC can be shared with the commercial aviation industry and other forms of transportation safety.

Map Back to Original JSAT Recommendations

Formation of the GASC with its objectives to promote general aviation pilot-training and educational programs stems from the April 1999 Final Report GA CFIT JSAT. Two of the top recommendations from the JSAT were to increase pilot awareness on accident causes and to improve the safety culture within the aviation community. More specifically, under the "improve the safety culture" recommendation, the JSAT stated that successful industry programs be identified and encouraged. The GASC, and its mission as outlined above, was developed from these specific JSAT recommendations.

GA Controlled Flight Into Terrain
Joint Safety Implementation Team

Increased Pilot Awareness on CFIT Accident Causes

Detailed Intervention Implementation Plan

Statement of Work

This intervention will create a new World Wide Web "page" on the FAA's internet site. The page is intended to increase pilot awareness of CFIT accident causes and will showcase actual first person accounts of "almost CFIT" accidents. The page will also offer a new and targeted approach in conjunction with other JSIT's (such as the GA Weather JSIT) which will identify pilot ratings, flight time, locale, and seasonal anomalies where CFIT accidents are most likely to occur. It will also provide quarterly updates of CFIT accidents in order to provide as much information as possible to the general aviation pilot and community. Additionally, establishment of a "CFIT" field on NTSB accident reports will simplify searches of the accident database and further efforts to target causes of CFIT accidents.

Lead Organizations

FAA's Office of System Safety (ASY-300) and Office of Accident Investigation (AAI-220)

Objectives

Reduce the CFIT accident rate by improving pilot awareness of CFIT accident causes.
Publish a quarterly summary of CFIT accidents for the aviation community review.

Product 1: Development of a World Wide Web site in which state-of-the-art automation media is used to depict actual, first-person, pilot accounts of near CFIT encounters to emphasize risk areas and flight operations where there is an increased risk of CFIT. Source of these first-person accounts will be the FAA/NASA Aviation Safety Reporting System (ASRS). These accounts will be used to enlist interest and then present broader, system-wide information.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA - ASY-300 ASY-100 AAI-220 AFS- to include Regional Safety Program Coordinators NASA ASRS	Selection of ASRS reports for "Callbacks" and reporters concurrence to use the report.	4 FTE's - FAA	$50,000	2 Quarters
Total Cost FAA: $50,000				

Product 2: Develop a targeting system based on accidents and incident will be developed and implemented to direct pilots to the Web site who are at an increased risk, based on their pilot's ratings, flight time, locale, and seasonal anomalies. Publish the quarterly CFIT summary via the web site.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA – ASY-300 ASY-100 AAI-220 AMC **Industry** – HAI, NATA, NBAA, AOPA	This will be developed based on the Aircraft and Airmen Registry and Airmen medical applications. Identification of selected pilot rating, flight time, locale and seasonal increased risk areas through the National Aviation Safety Data Analysis Center and the ASRS database.	3 FTE's - FAA 1.5 FTE's - Industry	FAA - $75,000 Industry – Personnel time	2 Quarters
Total Cost FAA: $75,000 Industry: 1.5 FTE's				

Product 3: Collect and distribute and publish quarterly a CFIT accident summary on the FAA NASDAC and FAA AAI websites to be used by industry writers for CFIT safety articles.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA - ASY-300 ASY-100 AAI-220 **Industry** - HAI, NATA, NBAA, AOPA	Establish a joint committee to select CFIT accidents for inclusion in the quarterly summary. Publish quarterly CFIT articles under Safer Skies initiative. Include CFIT in industry focus areas.	FAA - .5 FTE Industry – .2 FTE's	FAA - $50,000 Industry - $35,000	2 Quarters
Total Cost **FAA** - $50,000 **Industry** - $35,000 plus 2 FTE's				

Product 4: Addition of "CFIT" field in NTSB accident reports.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA – ASY-300 ASY-100 AAI-220 AFS **NTSB**	Development and agreement on updating investigator guidance, databases and forms.	FAA - .2 FTE NTSB - .3 FTE	FAA - $50,000	2 Quarters
Total Cost **FAA:** $50,000				

Related Products

The use of ASRS data is consistent with recommendations contained in the National Academy of Public Administration (NAPA) Review of the Aviation Safety Reporting system. In the FAA and NASA Task Force response to the NAPA review dated December 15, 1994, the Task Force "[agreed] that ASRS is a rich source of human factors information and that FAA should make increased use of the system."

Measures of Effectiveness

- Significant reduction occurs in the number of CFIT accidents.
- Readership among pilots of the Web site reflects a high percentage of the respondents are from targeted pilots.
- Assessment of effectiveness through comments and feedback; and feedback via the Web site questionnaire is favorable.
- Pilots include comments that indicate their behavior was changed which reduced their CFIT risk.
- Quarterly CFIT Accident Summary developed using new "CFIT" field.

Risk Assessment

These first-person accounts will be taken from NASA Aviation Safety Reporting System (ASRS) reports and "Callbacks" to reporters who agree have their information used in this fashion. If there are accidents/incidents, pilot deviations or operational errors with identifying information and similarities to the occurrence, the reporter's identity may be compromised.

Delayed Implementation: Delay of informing pilots of the causes of CFIT accidents precludes a very cost effective method of preventing CFIT accidents.

Risk Mitigation Plan

Conclusive identifying information will not be included in the Web site unless the reporter and ASRS agrees. No loss of the ASRS immunity provision shall result to the reporter if they agree to have their report published in this manner.

Relevant GA Operations

The GA Weather JSIT may use a similar approach for disseminating causes of GA weather accidents. This method of conveying safety information could also be used in Flight Instructor Refresher Clinics (FIRC's) to highlight areas of risk receiving priority dissemination, or Aviation Safety Seminars.

Path Back to JSAT Recommendation

This intervention is based on GA CFIT JSAT Intervention TRN 15 – Increase pilot awareness on accident causes.

Controlled Flight Into Terrain (CFIT)
Joint Safety Implementation Team

Education, Awareness, and Training Modules For CFIT Prevention

Detailed Intervention Implementation Plan

Statement of Work

This project is about training, both for awareness and behavioral change in pilots regarding risk. It consists of several sub-products including general pilot risk analysis and mitigation training to include the risk of pilots face by trying to complete a trip to the planned destination when flight conditions or other factors make completion too risky. In addition this project will address specific risk factors associated with mountain flying operations. It is envisioned that these products will follow the format of the currently available personal minimums checklist training.

Lead Organization AVR-1

Objectives

Substantially reduce or eliminate the CFIT accidents by training pilots regarding risk factors associated with flight. Specifically, the training will consist of modules for general risk factor awareness and mitigation, mission completion risk factors, and mountain flying risk factors.

est, and implement a national media campaign to educate relevant aviation constituencies about general risk n flight, including risk mitigation tools.			
Action	**People**	**Costs**	**Completion**
A to develop with input from industry / academia	.50 FAA FTE for research .50 FAA FTE for development and implementation and 1.5 FTE – Industry / academia	$200,000 for research $100,000 for development and implementation Personnel time and travel	1 year for product development- 90 days to field test, 90days to field implement 18 months for full implementation

Product 2: Develop, test, and implement a national media campaign to educate relevant aviation constituencies about general risk factors associated with mission completion pressures.				
Product	**Action**	**People Resources**	**Costs**	**Completion**
Campaign for Personal Minimums Mission Completion product	FAA to develop with input from industry / academia	.50 FAA FTE for research .50 FAA FTE for development and implementation and 1.5 FTE - Industry / academia	$200,000 for research $100,000 for development and implementation Personnel time and travel	1 year for product development- 90 days to field test, 90days to field implement 18 months for full implementation
Total Cost **FAA** - $300,000 **Industry** - 1.5 FTE plus travel				

Product 3: Develop, test, and implement a national media campaign to educate relevant aviation constituencies about general risk factors associated with mountain flying operations.				
Product	**Action**	**People Resources**	**Costs**	**Completion Estimates - Approval plus:**
Mountain Flying Educational Training Program	FAA to develop with input from industry / academia	.25 FAA FTE for development and implementation and 1.5 FTE - Industry / academia	$100,000 for development and implementation Personnel time and travel	6 months for product development- 90 days to field test, 90days to field implement 1 year for full implementation
Total Cost **FAA** - $100,000 **Industry** - 1.5 FTE plus travel				

Related Products

Currently existing personal minimums checklists

Measures of Effectiveness

- 80% of the target audiences will distribute and use this training and surveys of users will positively support the continued use of this product.
- 80% of the target audiences will distribute and use this training and surveys of users will positively support the continued use of this product.
- 80% of the target audiences will distribute and use this training and surveys of users will positively support the continued use of this product.

Risk Assessment

For all projects: That R, E, and D efforts will not clearly discern a practical way to train risk assessment and mitigation.

Risk Mitigation

Implement plan on recommended schedule.

Potential Impacts outside of GA community

None

Map back to original JSAT Recommendations

The following JSAT interventions are addressed by this plan. Training developers will incorporate these elements into the new materials.

- TRN 3-1 Expand the pilot personal minimums program.
- TRN 8-2 Develop and implement regional flight clinics sponsored by FAA SPM and industry and supported on national level.
- TRN 8-3 FAA develop an interactive training program on the FAA's website.
- TRN 11-2 FAA/industry national media campaign to educate the relevant constituencies about safety, including risk factors.

General Aviation Controlled Flight Into Terrain
Joint Safety Implementation Team

Standardization and Expansion of Requirements for Enhancing the Visibility and Detection of Wires, Support Structures and Towers

Detailed Intervention Implementation Plan

Statement of Work

Controlled Flight Into Terrain (CFIT) accidents, which occur when a properly functioning aircraft under the control of a fully qualified and certificated crew is flown into terrain, water, wires, towers or other obstacles with no apparent awareness on the part of the crew, could be substantially reduced by the enhanced detectability of wires, towers and structures that support wires, and other types of towers not necessarily associated with electrical power transmission. There currently are no criteria for the marking of such obstacles or hazards. Further, the currently available means of physically marking such obstacles for visual detection, avionics equipment for sensing such obstacles, or databases to plot and display such obstacles in the cockpit are inadequate to alert pilots to these hazards.

The following products would significantly enhance pilot awareness of wires, towers, support structures and other similar obstacles by focusing upon establishing a national standard for marking wires and towers, and developing both passive and active means for the detection of wires, towers and similar obstacles:

Develop a nationally applied, standardized criteria by which wires, towers, support structures and other similar obstacles, that stand 100 feet above ground level (AGL) or higher, could be more effectively, efficiently, and feasibly marked for visual and/or sensor detection.

Compile a comprehensive obstacle database of wires, towers, support structures and other similar obstacles that stand 100 feet AGL or higher, to be updated on a regular schedule and available to the pilot for both preflight planning and for display on appropriate avionics in the cockpit. (Addressed under Aircraft Equipment Products 2, 3 and 4.)

Develop technologies that will enhance both passive, i.e. visual, and sensor detection, with a cockpit display of wires, towers, support structures and other similar obstacles.

Lead Organization ATA-400

Objective

Substantially reduce the number of CFIT accidents that involve flight into wires, towers, support structures and other obstacles, by enhancing the pilot's ability to see or detect such hazards or to plan the flight in advance so as to avoid such obstacles.

1. Product: A national criteria for marking wires, towers, support structures & other obstacles of 100 feet or more in height.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA, FCC, DOT, Utilities & Aviation Industries	Convene Working Group to establish marking criteria.	One representative from @ identified government/ industry entity	Personnel time and travel	Three Months from Plan Approval
	Milestones: Identify all interested or affected entities. Develop Working Group charter. Establish timelines for progress reports. Develop consensus for what is to be marked and how, utilizing latest technologies for passive detection.		Six meetings of 1 to 2 days each	1st Qtr 1st Qtr 2nd Qtr 4th Qtr
ATA-400	Publish consensus document detailing marking criteria.		.5 FTE	One Year From Plan Approval
	Milestones: Complete final draft. Distribute final draft to FAA, FCC, DoT and industry for comment. Final government/industry criteria established.			5th Qtr 5th Qtr 6th Qtr
Utility/Aviation Industries	Develop implementation plan for voluntary marking of wires, towers and other obstacles.	Representatives of Utility/Aviation Industries	Personnel Travel/ Time	Two Years From Plan Approval
	Milestones: Identification of high-density traffic and risk areas. Timetable developed for marking obstacles. Education Program established.		Two to Three Meetings of 1-2 days	7th Qtr 7th Qtr 8th Qtr
Total cost: **FAA** - $50,000				

Related Products

None

Measures of Effectiveness

- National standard developed and agreed to by government and industry.
- New wires, towers and support structures are marked by established criteria.
- Existing wires, towers and support structures are retro-marked by established criteria.
- Decrease in the number of CFIT accidents involving wires or towers.

Risk Assessment

- Apprehension within Utilities industry about cost and liability issues.
- Environmentalist concerns regarding the enhancement of visibility of wires and towers.
- Questionable responsibility for marking millions of miles of abandoned wires and towers.

Cost of Delay

Delay in the implementation of this plan will result in a status quo in the current inadequacy of marking wires and towers. Lacking a national consensus on the criteria for marking wires and towers, utility companies and other owners of wires and towers will remain reluctant to mark these hazards due to indemnity issues. With over 100,000 new cellular transmission towers to be built over the next five years, the hazards within the "wire environment" will continue to expand, resulting in a greater number of CFIT accidents due to flight into wires, towers and other similar obstacles.

Potential Impact Outside General Aviation

Environmentalists may oppose actions that increase visibility, advocating instead less visibility.

2. Product: Sensor devices, materials and avionics designed to actively detect wires, towers, support structures and other obstacles in an aircraft's flightpath.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
Utilities and Aviation Industries	Establish criteria for obstacle display.	Utilities/Aviation/ Government Representatives	Personnel, Travel Cost	Six Months from Plan Approval
	Milestones: Industry agreement on distance, height, bearing of obstacles from flight path; variable selection and sensitivity of parameters to reduce clutter. Provide criteria to avionics manufacturers.		Three to four meetings of 1-2 days	2nd Qtr 3rd Qtr
Utilities and Avionics Industry	Develop lightweight, low cost materials that could be applied/attached to obstacles and either passively or actively sensed by avionics equipment.	Utilities/Aviation/ Government Representatives	Personnel, Travel Cost	One Year from Plan Approval
	Milestones: Identify limitations for application to wires, towers; i.e. weight, wind resistance, tolerances. Engineer compatible reflectors/transmitters; i.e. reflective tape, solar powered transmitters, etc.		Two to three meetings, 1-2 days	2nd Qtr 4th Qtr
Avionics Industry	Engineer avionics suitable to detect passive reflectors and/or active signals from "obstacle alert" transmitters.	Avionics Technicians	Personnel, Materials	Two Years from Plan Approval
	Milestones: Prototype developed. FAA certification.			8th Qtr 12th Qtr
Total Cost: **FAA** - Less than $10,000				

Related Products

- TAWS
- EGPWS
- Synthetic Vision technology
- Radar Altimeters

Measures of Effectiveness

- Number of wires, towers and obstacles equipped with reflective materials or alert transmitters
- Installation of avionics into GA aircraft increases.
- Cost of avionics equipment declines
- Number of CFIT accidents involving wires, towers and other obstacles declines

Risk Assessment

- Reluctance of utilities industry to apply materials/sensors per a national standard
- FAA validation and certification of equipment
- Indemnity issues regarding unmarked wires, towers and other obstacles

Cost of Delay

Delay in the implementation of this plan will result in a status quo in the current inadequacy of marking wires and towers. Lacking a national consensus on the criteria for marking wires and towers, utility companies and other owners of wires and towers will remain reluctant to mark these hazards due to indemnity issues. With over 100,000 new cellular transmission towers to be built over the next five years, the hazards within the "wire environment" will continue to expand, resulting in a greater number of CFIT accidents due to flight into wires, towers and other similar obstacles.

Potential Impact Outside Aviation

This technology has numerous applications to industries outside of aviation.

Map back to original JSAT Recommendations

The following CFIT JSAT interventions are addressed by this plan:

- CFIT Regulations 12, Standardize and expand the use of markings for towers and wires.
- CFIT National Airspace System 2, Use high visibility paint and other visibility enhancing features on obstructions.

Controlled Flight Into Terrain (CFIT)
Joint Safety Implementation team

Routes for GPS Waypoints for Mountain Passes

Detailed Intervention Implementation Plan

Statement of Work

This intervention involves depicting mountain pass routes via GPS waypoints. This intervention is controversial as in 1979; depicted mountain passes were removed from visual aeronautical charts. Pilots who survived mountain pass accidents said the pass symbols had caused or contributed to their accidents.

The JSIT believes that the accurate navigation now offered by GPS should be utilized to improve the safety of mountain pass flying, as appropriate. GPS navigation will mitigate the likelihood of pilots inadvertently mistaking an area for a mountain pass. Counter arguments have been made to this intervention by experienced mountain flying instructors who indicate that it conveys an false ease by which to accomplish the complex, risky and demanding task of flight in a typical general aviation aircraft through high altitude mountain passes.

Appropriate cautions and warnings must accompany charted or GPS mountain routes to inform pilots of the dangers of specific routes. The JSIT recognizes that GPS waypoints or charting of mountain pass routes is not a substitute for a thorough mountain flying course. GPS offers significant benefits for increased situational awareness, however, for pilots who are competent in mountain operations.

The JSIT recommends a phased approach to avoid imposing additional risk, to improve the safe utility of general aviation aircraft for mountain pass flying. This will be initiated on lower mountain pass routes where non-turbocharged general aviation aircraft will not be near their service ceiling. Alaska offers mountain passes which meet these criteria. The Alaska passes are more often flown by Part 135 operators and will offer a greater degree of control and monitoring during initial implementation.

Lead Organization: ASY

Objectives

Improve pilot awareness and navigation accuracy when flying mountain pass routes leading to a reduction in mountain pass accidents.

Product: GPS waypoints for mountain passes and mountain pass depiction on visual aeronautical charts and determination of safety and effectiveness.				
Organization	**Action**	**People Resources**	**Costs**	**Completion Estimates**
FAA – ASY, AVN, ATO (Cartographics)	• Determine the effectiveness and risks and the extent to which general aviation users now have formal or semi-formal navigation coordinates for mountain passes. A review of any existing information will be completed.	1 FTE - FAA	FAA - $75,000	2 Quarters
	• Flight checking should be conducted to insure the integrity and accuracy of GPS mountain pass GPS waypoints. The risk of antenna "shading" in mountainous areas should be addressed. Implement phased-approach.	1.5 FTE's - FAA	FAA - $750,000	+ 2 Quarters
	• R&D flights using subject pilots	1 FTE – FAA	FAA - $175,000	+1 Quarter
	• Follow-up study to assess operations and maintenance once waypoints are available on aeronautical charts. This should include: targeted user survey reports and Aviation Safety Reporting System "Callbacks" performed by NASA contractor.	.75 FTE – FAA/NASA	FAA - $150,000	+3 Quarters
Total Cost **FAA:** $1,150,000				

Related Products

The GA Weather JSIT has an Intervention (5-1) to enhance operational procedures for mountain operations. This will include listing recommended weather information sources and safety criteria. The GA Weather JSIT also has a plan (Intervention 5-2) to provide lower, minimum en route altitudes using GPS-defined routes. This is to exploit new communications, navigation and surveillance systems in mountainous areas to improve ability of pilots to safely fly below the freezing level or cloud bases. It may be possible to combine these efforts with those of the GA CFIT JSIT.

It is recommended that "The Personal Minimums Checklist" be expanded to include the completion of a mountain flying course prior to initiating flights in mountainous terrain.

Measures of Effectiveness

The GPS charted mountain passes will be assessed for accidents/incidents and ASRS reports related to the safety of the GPS waypoint initiative.

This intervention will be considered successful if, within a three year period after implementation, the charted mountain passes have shown a general improvement in mishap rates and an increase in safe utility with no new undue risks caused by the GPS waypoints.

Risk Description

- Pilots fail to take into account altitude requirements and use accurate GPS guidance without required aircraft climb or high altitude performance.
- Experienced mountain flying instructors who indicate that it conveys an false ease by which to accomplish the complex, risky and demanding task of flight in a typical general aviation aircraft through high altitude mountain passes.
- Pilots use plotted GPS mountain pass routes as assurance that terrain clearance will be maintained and willfully fly in instrument conditions.
- The United States Department of Commerce, NOS, has recommended to the FAA in a letter of August 1999, that mountain pass routes not be depicted as "mountain pass VFR Waypoints could imply a government recommended route through mountains and could further serve to merge following and opposing traffic in an already confined area. According to NOS General Counsel, the case of Medley v. U.S. held the U.S. Government liable for the recommendation of a route through the mountains without informing pilots of the dangers of the specific route.

Risk Mitigation Plan

Minimum altitudes are specified with suggested climb performance noted on charts.

The likelihood of encountering changing weather conditions and need to maintain VFR while on the routes will be emphasized.

Delayed Impact Assessment

Delays for this intervention may limit the additional situational awareness benefits offered by GPS navigation and contribute to mountain mishaps where pilots were unable to correctly identify the correct mountain pass for the selected route. Delays in visual charting of mountain passes reduce the utility of visual aeronautical charts and may contribute to pilots inadvertently selecting mountain pass routes beyond their aircraft's altitude capability.

It is recommended that "The Personal Minimums Checklist" be expanded to include the completion of a mountain flying course prior to initiating flights in mountainous terrain.

Potential Impacts outside of GA community

There is a relationship to selected airline operations using special authority to fly GPS approaches with special equipment and a terrain database.

Path Back to JSAT Recommendations

- TRN 8-1; Develop VFR routes with altitudes and publish latitude and longitude of mountain passes, specifically at entry and exit points.

- TRN 8-4; Clearly depict commonly used VFR mountain valley and pass routes on VFR sectional charts and state aeronautical charts.

GA Controlled Flight Into Terrain
Joint Safety Implementation Team

Enhance DUATS to Provide Density Altitude Advisories

Detailed Intervention Implementation Plan

Statement of Work

Pilots filing flight plans and seeking weather briefs through Direct User Access Terminals (DUATS) would receive a density altitude (DA) advisory at departure and destination airports any time the DA exceeds the mean sea level (MSL) field elevation by a predetermined factor. Additionally, when terrain elevation along the pilot's route is expected to reach a predetermined density altitude, this information would be provided to pilots in their pre-flight briefing.

DUATS would analyze the latest weather information along the proposed flight, the higher elevations along the flight plan, and then provide the pilot with an advisory where DA can be expected to differ significantly from pressure altitude.
DUATS would be reprogrammed to:

- consult a database listing the maximum elevations along the proposed flight plan;
- incorporate the anticipated weather expected during the flight, and
- provide the pilot with an advisory if the conditions are likely to produce a DA hazard at the departure airport, destination airport, or enroute.

Lead Organization

FAA's Air Traffic Operations Program - specifically ATP-300

Objectives

The implementation strategy would reduce the number of CFIT accidents by forewarning pilots of potential density altitude risks on their proposed flight.

that would compare flight plan information provided with weather and elevation data along the evaluate the information to determine whether a given flight might encounter a density altitude

Action	People Resources	Costs	Completion Estimates
ntract to modify DUATs tside scope of current ntract) **lestones:** Incorporate the rogram/model into existing DUATs. Test the model for ccuracy and ease of use. Bring the program on line. Solicit comments from sers and refine the program	1 FAA FTE for 15 months.	$108,750 Contractor costs of (tbd).	• four quarters after project begins • five quarters after project begins • five quarters after project begins • six quarters after project begins ongoing thereafter

Related Products

Weather JSIT team is working on an intervention plan to enhance DUAT functionality by incorporating into the Operational and Supportability Implementation System (OASIS). This will give DUAT users the ability to view better and more graphical products and have a database common to the flight service station (FSS) specialists.

The current DUAT contract was awarded in 1996 to GTE Government Systems (GTE) and Data Transformation Corporation (DTC). As part of the contract, the vendors were encouraged to add enhanced capabilities to their service with no cost to the FAA

Measure of Effectiveness

Reduced number of density altitude-related CFIT accidents

- Indicator: positive feedback from pilots about how the model influenced their decision making process
- Indicator: decrease in number of density altitude-related CFIT accidents

Risk Assessment

- Litigation--There is a possibility that the enhancement will not provide a density altitude warning when appropriate and a pilot will have an accident that can be partially blamed on the false sense of security provided.
- AGC staff will provide a disclaimer. Users will receive a warning that info provided should be used as a guide or information source, and not an official FAA sanction to conduct the flight.
- Disincentive to use DUATS--Pilots may wish to avoid using DUATS if they believe the FAA is recording their inputs and might fine pilots who intentionally fly after receiving DA alerts.
- FAA will want to assure DUATS users that they will not in anyway be penalized for doing so.

Potential Impacts Outside GA Community

No known impacts

Path Back to JSAT Recommendations

This project plan evolved from the GA JSAT Group's Implementation Plan "Training 3." One of the 13 specific intervention recommendations was to "develop a weight and balance template in DUATs that is easy for pilots to use. It has since been

modified in an attempt to make it more user friendly, thus increasing the number of users and it's potential safety impact.

The GA JSAT found that Training 3 would be feasible and effective for Part 91 fixed wing and Part 135 Helicopter operations:

- Part 91 Fixed Wing—high effectiveness, medium feasibility
- Part 135 Fixed Wing—high effectiveness, medium feasibility
- Part 91 Helicopter—high effectiveness, medium feasibility
- Part 135 Helicopter—high effectiveness, medium feasibility