Federal Aviation Administration

Safer Skies:

A Focused Safety Agenda

General Aviation

Controlled Flight into Terrain
Joint Safety Implementation Team

Final Report

February 29, 2000

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Appendices

Executive Summary

In April 1999 the General Aviation (GA) Controlled Flight Into Terrain (CFIT) Joint Safety Analysis Team (JSAT) published its final report. That report provided the foundation upon which the CFIT Joint Safety Implementation Team (JSIT) built its detailed accident reduction strategies. The end result of the CFIT JSAT/JSIT process was a prioritized list of program initiatives, to be undertaken by both government and industry, to achieve the fatal accident reduction goal in the most cost-effective manner.

The GA CFIT JSAT was formed as part of the Federal Aviation Administration's (FAA) *Safer Skies* program, which was announced by Vice President Al Gore, along with Transportation Secretary Rodney E. Slater and Federal Aviation Administrator Jane F. Garvey, in April 1998. The stated goal of the *Safer Skies* initiative for general aviation was to significantly reduce fatal accidents over a 10-year period (1996 to 2007) through a comprehensive review of aviation accidents causes and implementation of safety intervention strategies. To accomplish that goal six focus areas were identified: CFIT, Weather, Aeronautical Decision-Making, Loss of Control, Survivability, and Runway Incursions. The CFIT and Weather JSATs, which were the first two focus areas, both performed detailed studies on mishaps within their respective causal areas and recommended intervention strategies to prevent those particular types of accidents.

As a follow-on to the JSAT process, JSITs were formed for the CFIT and Weather focus areas. The CFIT JSIT first met in August 1999 with the primary goal of developing detailed intervention strategies identified by the CFIT JSAT. This report provides a list of implementation strategies, identification of responsible parties and resources, a list of major milestones/completion dates, links to the original JSAT recommendations, and metrics for tracking success of the interventions. The JSIT team's prioritized detailed Implementation Plans (IPs) follow in order:

1. **Streamlining Equipment Installation**
2. **CFIT Education, Awareness, and Training**
3. **Standardization and Expansion of Requirements for Enhancing the Visibility and Detection of Wires, Support Structures and Towers**
4. **Routes for GPS Waypoints for Mountain Passes**
5. **Enhance DUATS to Provide Density Altitude Advisories**

The specifics of each plan are outlined in the detailed Implementation Plans included in Appendix G. This report also identifies the process whereby the JSIT team arrived at this final product.

One area of concern identified in both the CFIT JSAT and JSIT is the lack of thorough mishap investigating and reporting in the GA sector. One particular deficiency highlighted in the JSAT/JSIT process is the lack of human factor analysis and reporting.

This void of GA human factor data makes it very difficult to quantify the scope of human factors involvement in CFIT accidents.

Introduction

General aviation, from the *Safer Skies* perspective, includes a diverse range of aviation activities including pilot training, corporate travel, agricultural and external load operations, firefighting, airborne surveillance, air shows, aircraft maintenance return-to-service flights, and personal and recreational flying. GA aircraft range from single-place homebuilts to helicopters and business jets. GA also includes gliders, balloons and aerial application aircraft — basically everything except the military and scheduled air carriers. The teams used the following definition of CFIT to maintain consistency in accident data selection and analysis:

> *A CFIT accident occurs when an airworthy aircraft, under the control of a pilot, is flown into terrain (water or obstacles) with inadequate awareness on the part of the pilot of the impending disaster.*

The JSAT reviewed GA CFIT accidents occurring over a 2-year time period during 1993 and 1994. The team conducted a detailed analysis of 195 CFIT accidents based on the best data available from National Transportation Safety Board (NTSB) reports. See the JSAT report executive summary at Appendix C for details.

The CFIT JSAT developed 55 interventions to address accident causes identified for this data set. The team went on to narrow that list to the top 10 interventions considered to be the most effective and feasible for industry and FAA to implement to reduce CFIT accidents. These interventions formed the core of the CFIT JSIT's efforts. The intervention entitled "Improve the quality and substance of weather briefs" was transferred to the weather JSIT. The CFIT JSAT's top 10 recommended intervention strategies follow (in no particular order):

- Increase pilot awareness on accident causes.
- Improve safety culture within the aviation community.
- Promote development and use of low cost terrain clearance and/or look ahead device.
- Improve pilot training (i.e. weather briefing, equipment, decision-making, wire and tower avoidance, and human factors).
- Improve the quality and substance of weather briefs. (Transferred to Weather JSIT)
- Enhance the Biennial Flight Review (BFR) and /or instrument competency check.
- Develop and distribute mountain flying technique advisory material.

- Standardize and expand use of markings for towers and wires.
- Use high visibility paint and other visibility enhancing features on obstructions.
- Eliminate the pressure to complete the flight where continuing may compromise safety.

As stated earlier, one problem identified by both the CFIT JSAT and JSIT is that GA accident investigation reports typically lack the detail to precisely determine accident causes. The reports were challenging for the JSAT to analyze and the team often had to utilize their experience to generate possible accident causes. There is no doubt that better and more complete data would help the industry and government more accurately focus safety efforts and better measure results. For this reason, one major recommendation from both the CFIT JSAT and JSIT is to improve the quality of the collection and analysis of general aviation accident data; particularly with regard to elements of human factors.

Background

The interventions recommended in this report were prepared by FAA and aviation industry professionals primarily using a data-driven approach. Through this approach, the JSAT first analyzed the mishaps to identify causes and develop recommendations to reduce the number of fatal accidents. The JSIT then developed and evaluated detailed implementation plans from those recommendations. The end result was a prioritized list of program initiatives, to be undertaken by both government and industry, to achieve the fatal accident reduction goal in the most cost-effective manner.

In early 1998, the GA industry and the FAA formed a committee that identified the leading causes of fatal GA accidents. Six categories, including CFIT, were identified as the major causes of fatal accidents. These categories make up the *Safer Skies* focus areas. Weather and CFIT mishaps were the first to be targeted by this effort.
The GA Joint Steering Committee (JSC), comprised of the members of the GA Coalition, chartered the CFIT JSAT to analyze the root causes of fatal GA CFIT accidents and recommend interventions that could be accomplished in a collaborative effort by the FAA and industry. The CFIT JSAT issued its final report in April 1999. The JSAT Charter is contained in Appendix B, and the Executive Summary of the JSAT report Executive Summary is contained in Appendix C.

Following the issuance of CFIT JSAT report, the JSC chartered the CFIT JSIT. The JSIT Charter is contained in Appendix D. The JSC appointed one industry and one FAA to co-chair the JSIT. The rest of the implementation team was comprised of members from both government and industry. A list of participating JSIT members and their organizational affiliation can be found in Appendix E.

The scope of JSIT activity was based on the interventions recommended by the GA CFIT JSAT. Some of the CFIT and Weather JSAT interventions were similar so responsibility for these interventions was assigned to either the GA CFIT or Weather JSIT. The Weather JSIT transferred interventions 1-1(b); 5-1(a),(b),and (c); and 7-1, 7-2, and 7-3 to the CFIT JSIT for action. The CFIT JSIT transferred interventions TRN 11 bullet 1; TRN8 bullet 5; TRN 3 bullets 1, 2, 4, and 5; MISC 1 entirely to the Weather JSIT.

Methodology

The recommendations from the CFIT JSAT report were analyzed by the JSIT and consolidated into 5 detailed Implementation Plans (IPs). The IPs were drafted by working groups, and reviewed by all JSIT members. Each IP was validated by the entire JSIT, which considered the effectiveness and feasibility (including cost and technical risk) towards reducing fatal GA CFIT accidents. A final "reality check" was accomplished by reviewing each intervention against the original accidents. This effort, in effect, closed the loop on the accident review / intervention process. The IPs identified products, completion dates or milestones, and resource requirements for both government and industry. The IPs also detail program risks, metrics, and other elements. See Implementation Plans, Appendix G.

Metrics

Metrics are offered to measure the success of certain elements of each implementation plan. However, it is not possible to match a specific implementation plan to a numerical reduction in fatal CFIT accidents. There are numerous reasons why it is not possible to show a direct relationship between the individual IP's and the mishap rate. These reasons include:

- Lack of detail in accident reporting such that specific accident causes were hard to pinpoint.
- Lack of pilot profiles in the accident reports to evaluate pilot training strategies and whether or not the accident pilot would have participated in or benefited from the training.
- Aircraft owners are installing new safety enhancing equipment such as moving maps, but it is hard to predict how many new safety-enhancing pieces of equipment will be installed in the future.
- Many of the recommended interventions are indirect because the only direct way to prevent certain CFIT accidents would be to effectively ground the fleet – and that was considered unacceptable.

Expanding on the lack of human factors information for example, the JSAT was not able to identify a percentage of mishaps caused by inadequate knowledge of CFIT awareness/avoidance. However, the JSAT did conclude that "pilots may not have been aware of the risk associated with flying into a given situation. It was assumed that had

the pilot been more aware of the accident causes, they may have avoided these situations or taken the appropriate corrective action to avert an accident." The team went on to rate the intervention concerning increasing pilot awareness as highly effective. Because of the lack of clear human factors data it is impossible to provide a precise measurement of how much human factors related interventions will lower the CFIT mishap rate. However what can be measured is how many pilots receive a recommended form of training, or how effective they believe the training is at helping them to avoid CFIT accidents.

Overall, the team did believe that each of these plans would provide a reduction in the CFIT mishap rate. The final accident review evaluating these interventions allowed the team to make some conservative estimates as to how many of the 195 accidents might have been prevented. Our conservative estimate was approximately 10 to 15%. Additionally, if implemented in concert with the other focus area efforts, these plans should make achieving the accident reduction goal for GA in 2007 very realistic.

Plan Summaries

1. Streamlining Equipment Installation

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.

This plan's 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. Specific projects are:

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.

2. CFIT Education, Awareness, and Training

This plan is designed to contribute to the reduction of the CFIT accident rate by improving pilot education, awareness, and training. It is a conglomeration of four initiatives developed by the JSIT which target increased understanding of CFIT accident awareness and avoidance.

- *CFIT Awareness and Prevention:* The first project in this plan is to review and revise as necessary the Practical Test Standards, Knowledge Tests, and associated training materials to train and test knowledge of CFIT awareness/avoidance. Also, a new Advisory Circular will be introduced to provide guidance and instructional material for flight instructors and Safety Program Managers to specifically train CFIT awareness/avoidance at safety seminars and related forums. In addition, Advisory Circular AC 61-98A will be reviewed and revised as necessary to provide an enhanced focus on CFIT awareness/avoidance during the Biennial Flight Review.

- *General Aviation Safety Council:* The second project of this plan addresses the formation of a General Aviation Safety Council (GASC). 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. *This project has broader applications than just CFIT.*

- *Increased Pilot Awareness on CFIT Accident Causes:* The third project will create a 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 that will identify pilot ratings, flight time, locale, and seasonal anomalies where CFIT accidents are most likely to occur. It will also provide periodic 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. *This project has broader applications than just CFIT.*

Pilot Risk Analysis and Mitigation Training: The final project of this plan 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 product 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.

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

The goal of this plan is to enhance delectability of wires, towers and structures that support wires, and other types of towers not necessarily associated with electrical power transmission. There currently are no standardized 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.

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.

4. Routes for GPS Waypoints for Mountain Passes

This intervention involves depicting mountain pass routes via GPS waypoints. This intervention may be somewhat 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. These instructors indicate that it conveys a 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.

5. **Enhance DUATS to Provide Density Altitude Advisories**

   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 and the higher elevations along the proposed flight path. An advisory would then be provided to the pilot if necessary.

Conclusions and Comments

The CFIT JSAT produced 10 interventions that reflect the most effective and feasible strategies of the over 50 recommendations the group developed. The follow-on CFIT JSIT carried the JSAT's work to the next level by honing the top interventions into 5 detailed, implementation plans. The details outlined in the plans were developed using team member expertise and by consulting additional resources when warranted. Once implemented these plans will contribute to the *Safer Skies* goal of reducing the number of GA mishaps. In order for this to happen, the FAA and industry must continue to jointly carry on with efforts to field these plans. These plans will have no effect unless implemented. Part of the CFIT JSIT charter was to develop a communications strategy aimed at gaining "stakeholder" buy-in. The proposed General Aviation Safety Council will provide the impetus to keep these plans "alive" and foster their development.

These plans represent the JSIT's best efforts to precisely target the CFIT problem. However, inadequacies in the investigation and reporting of GA mishaps often make the determination of root-causes elusive. This lack of clear mishap data has forced the JSAT/JSIT teams to have to fill in the gaps with opinions and intuition, thereby making the process less than fully data driven. In many cases these interventions target what the teams *believe* is the root cause (s). Because of this, it is not possible to precisely predict the effectiveness of any of these interventions. Yet, the JSIT offer these implementation plans with a high degree of confidence that they will provide the largest safety return for the investment. The team also recommends improving the investigation and reporting of GA mishaps; especially the human factors aspects. Accurate determination of the root-causes of GA mishaps will provide a rich source of information for future data-driven processes.

Appendix A – Acronym Glossary

AC	Advisory Circular
AGL	Above Ground Level
BFR	Biennial Flight Review
CFIT	Controlled Flight Into Terrain
DA	Density Altitude
DTED	Digital Terrain Elevation And Obstacles Database
DUATS	Direct User Access Terminals
FAA	Federal Aviation Administration
GA	General Aviation
GASC	General Aviation Safety Council
GPS	Global Positioning System
IP	Implementation Plan
JSAT	Joint Safety Analysis Team
JSIT	Joint Safety Implementation Team
KT	Knowledge Test
NTSB	National Transportation Safety Board
PTS	Practical Test Standard
TSO	Technical Standard Order

Appendix B – CFIT JSAT Charter

Purpose: Complete an in-depth review and analysis of data focusing on general aviation Controlled Flight Into Terrain (CFIT) accidents and make implementation recommendations for reducing these accidents.

Background: Industry (GAAPC), NASA, and FAA have agreed to work together to identify and implement a data driven, cost/benefit focused, safety enhancement program designed to reduce fatal general aviation accidents. The FAA, NASA, and GAAPC have further agreed that cooperatively targeting a few critical and highly leveraged safety intervention strategies will maximize the safety benefit to the aviation community. To achieve this goal, the three organizations have chartered the CFIT working group as one of six Joint Safety Analysis Teams (JSATs).

Structure: The team will be co-chaired by an Industry and FAA representative who will recruit qualified representatives from industry, NASA, and the FAA to serve as team members. The co-chairs will facilitate team meetings as necessary and will serve as the points-of-contact to the JSC. The team co-chairs will also maintain contact with the other JSAT co-chairs to take advantage of all the teams' collective experience.

Tasks:

- The team will review a representative population of publicly available accident studies.
- The team will analyze an appropriate number of individual accidents to validate the completed studies.
- The team will develop a list of "causal factors" or problem statements.
- The team will recommend intervention strategies based on their analysis.

Product: The team will provide the Joint Steering Committee (JSC) with a final report by April 1, 1999, containing our recommended safety intervention strategies. The final report will include discussion of the process and assumptions used in the analysis. The team will also provide periodic status reports of work in progress as may be requested from the JSC.

Resources: The JSC members who approve this JSAT charter agree to provide the people, money, and organizational support to carry out this charter.

Appendix C – JSAT Report Executive Summary

In October 1998, a Joint Safety Analysis Team (JSAT) was formed to review General Aviation (GA) Controlled Flight Into Terrain (CFIT) accidents. GA includes a diverse range of aviation activities including student pilot training, business and corporate travel, agricultural and external load operations, firefighting, powerline and pipeline surveillance, air shows, aircraft maintenance return-to-service flights, personal and recreational flying. General aviation aircraft range from single-place homebuilts to helicopters and business jets. GA also includes gliders, balloons and aerial application aircraft – basically everything except military and scheduled air carriers. The team did not include ultralight vehicles.
The team used the following definition of CFIT to maintain consistency in accident data selection and analysis:

> *A CFIT accident occurs when an airworthy aircraft, under the control of a pilot, is flown into terrain (water or obstacles) with inadequate awareness on the part of the pilot of the impending disaster.*

For example, GA CFIT accidents occurred in all phases of flight from takeoff through landing and encompassed many different types of impacts with terrain, water, and obstacles. The data set included high-density altitude accidents, water impacts, and wire or tower strikes.

The team reviewed GA CFIT accidents occurring over a 2-year time period during 1993 and 1994. The team conducted a detailed analysis of 195 CFIT accidents based on the best data available from National Transportation Safety Board (NTSB) reports. CFIT accidents that occurred while conducting operations under Federal Aviation Regulations (FAR) Parts 91 (primarily personal and business flying), 125 (privately operated transport aircraft), 133 (external load operations), and 135 (air taxi) were included in the study. Additionally, the team looked at 79 CFIT accidents from FAR Part 137 (aerial application) operations. The intervention strategies identified by the team reflect the diversity in GA CFIT accidents.

The team developed 55 interventions to address accident causes identified for this data set. It is impossible to choose only one or two interventions that would prevent most accidents in the study. Accident prevention is a combination of many intervention strategies. The following intervention strategies reflect the top 20% of the team's 55 interventions and are considered the most effective and feasible for industry and FAA to implement to reduce CFIT accidents. Some of the intervention strategies were identified in earlier accident prevention studies and revalidated by the CFIT team. The team realizes that there have been regulatory, technological, and GA community education improvements since 1994 that may already have reduced CFIT accidents. The top recommended intervention strategies based upon feasibility and effectiveness are the following (in no particular order):

- ☞ Increase pilot awareness on accident causes.

- ☞ Improve safety culture within the aviation community.
- ☞ Promote development and use of low cost terrain clearance and/or look ahead device.
- ☞ Improve pilot training (i.e. weather briefing, equipment, decision-making, wire and tower avoidance, and human factors).
- ☞ Improve the quality and substance of weather briefs.
- ☞ Enhance the Biennial Flight Review (BFR) and /or instrument competency check.
- ☞ Develop and distribute mountain flying technique advisory material.
- ☞ Standardize and expand use of markings for towers and wires.
- ☞ Use high visibility paint and other visibility enhancing features on obstructions.
- ☞ Eliminate the pressure to complete the flight where continuing may compromise safety.

GA accident investigation reports typically lack the detail to precisely determine accident causes. The reports were challenging to analyze and the team elected to use their experience to generate possible accident causes. There is no doubt that better and more complete data would help the industry and government more accurately focus their safety efforts and better measure the results of these efforts. For this reason, one major recommendation from this study must be to improve the quality of the collection and analysis of general aviation accident data. In addition, the quantity of data within the accident report, particularly with regard to elements of human factors associated with most of the pilot-error category of accident causes must be improved.

Appendix D – JSIT Charter

Charter for Joint Safety Implementation Team (JSIT)

Purpose. To develop prioritized implementation strategies and action plans and after approval by the Joint Steering Committee (JSC), coordinate the implementation of the strategies and plans.

Background. Industry and government, through the JSC, have jointly agreed to pursue a data driven approach to reducing the general aviation (GA) fatal accident rate while maintaining or improving GA utility and affordability. Industry and government have further agreed that cooperatively and selectively pursuing implementation of the high leveraged safety intervention strategies will maximize safety benefit. The WEATHER and CFIT JSATS have identified a number of intervention strategies to reduce the fatal accident rate. The next step is for a team to develop prioritized implementation strategies and action plans for those interventions.

Tasks. The JSIT will use the process developed by the Commercial CFIT JSIT wherever possible to complete the tasks. Adjustment to the process is allowed if necessary because of differences in General Aviation. It is the JSIT member responsibility to coordinate their implementation strategies and get input within their organization.

Intervention strategies identified by the CFIT or WEATHER JSATs will be analyzed by the JSIT for the purposes of determining implementation feasibility and identifying prospective strategies for implementation.

The implementation plan will contain:

- Prioritized implementation strategies;
- Identification of responsible parties;
- Resources required for each intervention implementation;
- A list of major implementation milestones;
- Metrics for tracking success of the interventions; and
- A communications strategy aimed at gaining “stakeholder” buy-in.

Within six months from its formation the JSIT will present the prospective interventions identified for implementation to the JSC for review and approval. Rationale for how all the CFIT or WEATHER JSAT intervention strategies were addressed will be included in the plan report

As directed by JSC, the JSIT will make periodic progress reports on implementation status JSC.

Membership. Team members are responsible for communicating issues within their lines of business or organizations and for representing the technical and programmatic positions of their respective entities. Conclusions from the JSIT are brought to the JSC for review and approval.

Resources. JSC participating organizations agree to provide appropriate financial, logistical and personnel resources necessary to carry out this charter and approved implementation strategies.

Appendix E – Participating JSIT Members

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Appendix F – Projects and Working Group Leaders

1. **Streamlining Equipment Installation**
   Plan Lead: Lowell Foster/Barry Breen

2. **CFIT Education, Awareness, and Training**
   CFIT Awareness and Prevention Project Lead: Mike Schanck/John Wensel
   General Aviation Safety Council Project Lead: Andrew Moore/Doug Smith
   Increased Pilot Awareness on CFIT Accident Causes Project Lead: Mike Lenz
   Pilot Risk Analysis and Mitigation Training Project Lead: Roger Baker

3. **Standardization and Expansion of Requirements for Enhancing the Visibility and Detection of Wires, Support Structures and Towers**
   Plan Lead: Dick Wright

4. **Routes for GPS Waypoints for Mountain Passes**
   Plan Lead: Mike Lenz

5. **Enhance DUATS to Provide Density Altitude Advisories**
   Plan Lead: Tony Aiken

Appendix G – Implementation Plans