Appendix 6 — Detailed Implementation Plans for Safety Enhancements

Each implementation plan will contain—

- Prioritized implementation strategies,
- Parties responsible for action,
- Major implementation milestones,
- Metrics to monitor progress in meeting these milestones, and
- Metrics for tracking success of the intervention.

Controlled Flight Into Terrain Working Group Safety Enhancement 12 (SE 12, R1) Expanded Weather Camera Network	
SE 12, R1	*Expanded Weather Camera Network*
Safety Enhancement Action:	To renew and strengthen efforts captured in LOC–I SE 12 (Weather Technology-Weather Cameras) with additional support from CFIT analysis in further expanding the network of weather cameras across the U.S. and to ensure greater awareness and accessibility of weather observation feeds by pilots and operators.
Implementers:	FAA, and aviation community/industry (NASAO, NATA, AAAE)
Statement of Work:	In order to reduce the risk of LOC–I and CFIT accidents due to weather-related factors, pilots should rely upon accurate real-time weather reporting. While ground-based weather reporting systems (Automated Weather Observing System, Automated Surface Observing Systems, etc.) have proliferated, remote installation of weather cameras can help provide additional and real-time weather information to pilots. Further, there are current weather reporting technologies available about which some pilots may not be aware. The CFIT working group assessed problems associated with the lack of current pictorial preflight weather information existing along the route of flight in isolated area/mountain passes as key to the following CFIT accidents: ANC09FA052 WPR11FA319 ANC17MA001 This Safety Enhancement is comprised of three related Intervention Strategies (IS), as described above in *Safety Enhancement Action*. These ISs are sequential, meaning; the two TECHNOLOGY interventions precede the third. These actions are covered in sequential order, although the second and third IS could be done concurrently. In order to reduce the risk of accidents related to LOC–I and CFIT due to weather-related factors in remote areas, safety to the flying public would be increased by incorporating real-time weather display reporting. FAA and Industry (NASAO, NATA, AAAE) in coordination with international partners (e.g., COPA, Transport Canada & Nav Canada) to continue pushing for expanded weather camera network, especially in areas lacking ATC surveillance (i.e., mountain passes, areas prone to obscuration). App developers to explore possibility of linking weather cameras to airport pages for easy access. Industry & FAASTeam to promote established WX camera systems among GA pilots encouraging their use.
Total Financial Resources:	To be developed.

SE 12, R1	*Expanded Weather Camera Network*
Relation to Current Aviation Community Initiatives:	**GAJSC–LOC, Safety Enhancement #12**: In a General Aviation Joint Steering Committee Loss of Control, Approach and Landing (GAJSC–LOC), Final Report, Safety Enhancement SE 12, identified needed improvements in weather technology to reduce the risk of accidents due to weather-related factors. The Safety Enhancement described that while ground-based weather reporting systems (Automated Weather Observing System, Automated Surface Observing Systems, etc.) have proliferated, they have identified that remote installation of weather cameras can help provide additional and real-time weather information to pilots. Further, there are current weather reporting technologies available about which some pilots may not be aware. For additional information see http://www.gajsc.org/loss-of-control/. **NTSB Safety Recommendation A–13–025 through –027**: A National Transportation Safety Board (NTSB) Safety Recommendation, A–13–025 through –027, dated August 15, 2013 states the need for weather cameras in Hawaii. The report states that, since 1997, the NTSB has investigated numerous accidents in Hawaii involving aircraft encountering instrument meteorological conditions (IMC) and/or other adverse weather phenomena while operating under daytime visual flight rules (VFR) under the provisions of Title 14, Code of Federal Regulations (14 CFR) part 135 or 14 CFR part 91. These accidents resulted in 48 fatalities, 4 minor injuries and substantial damage to the aircraft. Seven (7) of the accidents were sightseeing air tour flights. The NTSB recommends that the FAA initiate an aviation weather camera program in Hawaii to include the installation and maintenance of aviation weather cameras at critical locations in Hawaii as well as install and maintain aviation weather cameras in mountain passes in the continental United States identified as being high risk and to allow public access to these aviation weather cameras' real-time imagery. Additionally, to equip flight service station specialists, responsible for Hawaii and the continental United States, with the technical capabilities and training to provide verbal preflight and en route briefings using aviation weather camera imagery. For additional information see, https://www.ntsb.gov/safety/safety-recs/recletters/A-13-025-027.pdf. The FAA already operates a weather camera program in Alaska. The existing program (see, https://weathercams.faa.gov) uses government and industry cameras and links to cameras in Canada that are operated by NAV Canada and other entities. This FAA program has been embraced by the pilot community. Additionally, select state DOTs and other industry groups have deployed weather cameras in CONUS including Washington State (https://wsdot.wa.gov/aviation/WebCam/) and the Idaho Aviation Association (https://idahoaviation.com/idaho-airstrip-network#webcams_header) that provide this benefit to the aviation community.

SE 12, R1	*Expanded Weather Camera Network*
Performance Goal Indicators:	Goal: To expand the remote weather camera system and to increase the awareness and use of remote weather camera systems which display actual current conditions. Indicators: - Implementation of the camera systems - Identified electronic traffic from users including response/feedback from the flying public Output 1: — Total Months: 12 months after approval — Start Date: TBD — End Date: TBD Output 2: — Total Months: 12 months (concurrent) — Start Date: TBD — End Date: TBD Output 3: — Total Months: 12 months (concurrent) — Start Date: TBD — End Date: TBD **Completion: — Total Months: 24 months — Start Date: TBD — End Date: TBD**
Potential Obstacles:	- Lack of perceived value/interest by FAA and/or developers/programmers. - Lack of use by aviation community who is still unaware of technology.
Detailed Implementation Plan Notes:	
CICTT Code:	
Output 1:	
Description:	FAA and industry to continue to push for expanded weather camera network as outlined in SE 12, especially in areas lacking ATC surveillance (i.e., mountain passes, areas prone to obscuration and remote airports). This work should include exploration of leveraging additional channels for real-time weather observation (e.g., traffic cameras, national park cameras, etc.).
Lead Organization:	FAA, AJV–23 (currently oversees the Alaska Airport Camera Program)
Supporting Organizations:	ATO, NASAO, NATA, AAAE, COPA, Transport Canada & Nav Canada.
Implementers:	NASAO, NATA, AAAE, COPA, Transport Canada & Nav Canada.

SE 12, R1	*Expanded Weather Camera Network*
Actions:	1. FAA and industry to continue to push for expanded weather camera network as outlined in SE 12, especially in areas lacking ATC surveillance (i.e., mountain passes, areas prone to obscuration and remote airports). 2. Identify areas in need of real-time weather observation cameras. 3. Explore additional/alternate channels for real-time weather observation (e.g., traffic cameras, national parks) 4. Work with government and local areas willing to install weather camera systems at remote airports.
Output Notes:	Less than $50,000
Time Line:	12 months
Target Completion Date:	
Output 2:	
Description:	Encourage aviation app providers (e.g., ForeFlight) to incorporate live weather camera observation feeds into their platforms.
Lead Organization:	FAA AJV–23
Supporting Organizations:	GAMA
Implementers:	
Actions:	1. Encourage aviation app providers (e.g., ForeFlight) to incorporate live weather camera observation feeds into their platforms.
Output Notes:	Align efforts with SE 50, Output 2 (exploring additional development of CFIT awareness/avoidance tools with developers)
Time Line:	12 months
Target Completion Date:	
Output 3:	
Description:	FAASTeam and industry to establish a promotional campaign to pilots and operators that creates awareness of the benefits of weather cameras and encourage their use in pre-flight planning.
Lead Organization:	FAASTeam
Supporting Organizations:	AOPA, AAAE, NASAO and EAA

SE 12, R1	*Expanded Weather Camera Network*
Actions:	1. FAASTeam to issue a FAAST Blast. 2. FAASTeam and supporting organizations to incorporate articles and training materials into seminars and other promotional mechanisms to the flying public.
Output Notes:	
Time Line:	12 months
Target Completion Date:	

GAJSC – Controlled Flight Into Terrain (CFIT) Working Group Safety Enhancement 51 (SE 51) Augmented Visual Technology for GA	
SE 51	*Augmented Visual Technology for GA*
Safety Enhancement Action:	Encourage GA pilots and operators to equip and utilize Enhanced Vision System (EVS)/Synthetic Vision System (SVS) technology to enhance situational awareness with respect to surrounding terrain.
Implementers:	SAT and pilot associations
Statement of Work:	The GA JSC CFIT working group identified a number of the CFIT fatal aircraft accidents involving pilots flying under Visual Flight Rules (VFR) encountering Instrument Meteorological Conditions (IMC) resulting in the inability to visually identify surrounding terrain. The continued incorporation of new technology can play a significant role in mitigating these accidents. The following accidents prompted this safety enhancement: ANC09FA052 CEN14FA522 ERA10FA088 MIA08FA115 WPR12FA098 WPR14LA007 ANC13FA030 ERA09FA060 ERA11FA055 NYC08FA138 WPR12FA136 WPR15FA166 CEN10MA367 ERA09FA078 ERA11FA480 SEA08FA108 WPR12FA255 WPR15FA212 CEN11FA110 ERA09FA514 ERA11LA424 WPR10FA116 WPR12MA046 WPR15FA215 CEN12FA639 ERA09LA123 ERA15FA046 WPR11FA319 WPR14FA124
Total Financial Resources:	
Relation to Current Aviation Community Initiatives:	
Performance Goal Indicators:	1. Beginning one year after implementation, a yearly increase in the use of these technologies as identified in the GA and Part 135 Activity Survey. 2. Supporting organizations to demonstrate outreach exposure by providing web analytics to the GAJSC SAT.

SE 51	*Augmented Visual Technology for GA*
Key Milestones:	Total Months / Start Date / End Date Output 1: 12 **Completion: 12 months after GA JSC approval of SE**
Potential Obstacles:	FAA not effectively implementing the risk-based safety continuum concept in developing appropriate requirements for equipment targeting the retrofit market.
Detailed Implementation Plan Notes:	The Intervention Strategies and first iterations of the SE focused on the research and development of low cost technologies for the "light GA" segment. The goal of the proposed research was to provide an architecture for industry standards to ensure safety and functionality of pilot vision systems. Then government and industry would encourage manufacturers to develop a "low cost" version of the technology and then leverage specific FAA offices to allow for specialization with regards to small airplane fleet modernization. After reviewing the initial versions of the SE, the GA JSC CFIT working group decided that the technology already exists (installation means and low cost versions with relative functionality via Portable Electronic Devices (PEDs), with another alternative being a Head-Up-Display). It was determined that a successful path forward would be to encourage pilot and operator use of existing technology through targeted outreach. The majority of "light GA" aircraft are still equipped with 1960s to 1980s vintage instruments and avionics. Providing pilots with information like Global Positioning System (GPS) position on a moving map, real-time weather, terrain awareness, and traffic awareness has made a significant reduction in pilot workload. In addition, the proliferation of precision GPS approaches that replaced non-precision approaches has helped the pilot during IMC operations. The first wave of new technology incorporated simple, cost effective GPS-based systems. The next wave will be more sophisticated and costly, but safety enhancing sensor-based technology. Although not the direct intent of this SE, government and industry should continue to encourage developers/manufacturers to develop technology that provides more GA pilots with enhanced situational awareness by providing augmented visual cues referencing surrounding terrain (i.e., enhanced or synthetic vision for GA).
CICTT Code:	CFIT, UIMC

SE 51	*Augmented Visual Technology for GA*
Output 1:	
Description:	FAA/Industry to encourage pilots and operators to install enhanced vision systems (EVS) and/or synthetic vision (SVS) on GA aircraft.
Lead Organization:	SAT
Supporting Organizations:	FAASTeam, AOPA, NBAA, EAA, LOBO, NAFI, SAFE
Implementers:	SAT and supporting organizations with emphasis on external Communication Departments
Actions:	1. SAT to develop an outreach campaign highlighting the safety benefits of using EVS/SVS equipment for GA pilots. The SAT should consider: a. Using the accident analysis of the CFIT working group to exemplify the need for pilot vision systems; b. Promoting the direct operational benefits for equipping with such technology (lower DH, access to airports you otherwise couldn't get in to) c. Continued efforts to educate ATO on the benefits of having an on-board HUD—ability to receive landing clearance even in 0-0 conditions when the airport is closed. d. Addressing the limitations of both systems; and e. Providing options to equip (installed vs. PED) 2. GA JSC SAT to connect aviation publishers with the appropriate researchers or manufacturers who can help develop content for magazine articles that promote the safety benefits of EVS and SVS equipment that can reduce CFIT accidents. 3. Supporting organizations to conduct the SAT's outreach campaign, in addition to published magazine articles, targeting their respective audiences.
Output Notes:	
Time Line:	12 months after SE approval
Target Completion Date:	

Controlled Flight into Terrain (CFIT) Working Group Safety Enhancement 52 (SE 52) *WINGS* Program Overhaul	
SE 52	*WINGS Program Overhaul*
Safety Enhancement Action:	FAA to overhaul and develop a plan for continual improvement of the FAA Pilot Proficiency Program (WINGS) to make it more user-friendly and dynamic.
Implementers:	FAA AFS–850 (FAASTeam), AFS–630 and AFS–640, WINGS Industry Advisory Committee (WIAC), National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE, EAA-IMC/VMC Clubs, AOPA, training providers
Statement of Work: *Cont. next page.*	The CFIT Working Group identified a number of fatal CFIT accidents involving moderate to high-time and/or instrument-rated pilots who encounter instrument meteorological conditions while flying under Visual Flight Rules, day or night and were unable to handle the situation resulting in an accident. Participation in ongoing proficiency training has been proven to reduce all types of accidents including CFIT. Outside of flight reviews, general aviation pilots rarely seek additional opportunities to train with instructors or interact with the FAA. The FAA's Pilot Proficiency Award Program (WINGS) promotes safety and encourages general aviation pilots to continue training and maintain proficiency. Statistics show that 57,000 pilots have taken at least one knowledge credit towards a WINGS phase but, only 8600 pilots or 15% have actually earned a phase of WINGS. This is an indication that pilots find working with WINGS to be cumbersome and not available when and where they need it. While that statistic may not tell the whole story, considering WINGS' current participation, we still felt it was important enough to include it in this SE. Aspects of the current WINGS program's automation are not user-friendly, especially for tablet and smartphone users. To encourage greater use of the program and reach more pilots, the CFIT working group recommends refreshing the program's automation so that it is more user friendly and will work easily on all user devices. In addition, the working group recommends reviewing/updating the program's training content to ensure it is all up to date and includes CFIT-specific information from the CFIT Working Group's efforts. The FAA WINGS program is billed as one of the FAASTeam's flagship programs. It is intended to promote safety through incentives for continuous training.

SE 52	*WINGS Program Overhaul*
Statement of Work: Cont. and cont. on next page.	Unfortunately, WINGS is little used and is unpopular for several reasons. • It is not easily accessible—anything bound to a desktop is unlikely to be used in today's all-mobile app-driven environment. • Content is inscrutable—too many levels, outdated material, too many codes that are meaningless gibberish to the average user. • It is very hard to find what you need—even simple things like credit for flight reviews or IPCs require painfully slow scrolling through multiple screens and the search engine is terribly inadequate. • Current format and delivery (i.e., substance and technological interface) are hard to update and thus do not support rapid response to GAJSC or other targeted safety enhancements (e.g., CFIT, LOC, fuel exhaustion). Content and delivery are not optimized to appeal to or effectively educate new users (e.g., new manned aircraft pilots) or new entrants (e.g., remote pilots). The refresh should include: 1. Evaluate what the current online pilot proficiency training market has to offer, with particular emphasis on user experience (including mobile/tablet compatibility). 2. Assess the current WINGS Program automation/technology/format, and content. 3. Industry and FAA to collaborate to develop new user-friendly WINGS automation including a WINGS App compatible for all mobile devices. 4. FAA and industry to incorporate the revised WINGS program into the knowledge requirements of the ACS and require DPEs/CFIs to test/train on knowledge of the WINGS program and why it is important for GA pilots to establish a personal proficiency program (like WINGS). 5. FAA and industry to promote use of revised WINGS program including the mobile App. 6. Drone WINGS will also be included in the new WINGS APP. A review of all sUAS accidents/incidents in the United States over a 2-year period was conducted. This review resulted in a list of accident/incident causal factors which appeared most often in accident/incident reports. The activities and tasks required for completion of a phase of Drone WINGS would address these causal factors. Drone WINGS would be a means to comply with the 24-month currency requirement in 14 CFR Part 107.65 Aeronautical Knowledge Recency. 7. Updates will also be needed for the Sea WINGS and Balloon WINGS Programs. WINGS needs to be an APP that airmen and instructors can use on the spot. It needs to be mobile.

SE 52	*WINGS Program Overhaul*
Statement of Work: Cont.	1. The interface needs to be intuitive for users, in the Apple "it just works" vein. 2. The content MUST be updated to reflect ACS (vice PTS). 3. Courses and activities need to be streamlined. 4. It should be a simple exercise to find and log what you need to do to qualify for a phase of WINGS. 5. Phases (Basic, Advanced Master) should be rethought and restructured. 6. Consider creating "packages" on the app that allow airmen and instructors to quickly find, follow, and document common activities (e.g., flight review, IPC, aircraft checkout). 7. Remove utterly inscrutable codes used in the current WINGS program. Consider whether/how to use ACS codes to identify content in WINGS. Benefits include consistency with ACS (codes already known and widely used), ease of connecting and calibrating WINGS activities to certificate levels and ratings. 8. AOPA's weather 2019 survey showed a sharp surge of pilots use of Weather APPS for obtaining the most current weather information. We believe a mobile and generationally appealing WINGS APP would have the same increase of usage resulting in pilots more routinely becoming more proficient and more routinely and intuitively using risk based decision making. The following NTSB accident files involved flight under visual flight rules into instrument meteorological conditions: CEN12FA639 WPR15FA212 ANC15MA041 WPR10FA116 ERA09FA514 AMC17MA001
Total Financial Resources:	
Relation to Current Aviation Community Initiatives:	Numerous outreach efforts internal and external to the GAJSC.
Performance Goal Indicators:	Increase the number of phased WINGS pilots by 10% per year for each of the 5 years following completion of the WINGS revision.

SE 52	*WINGS Program Overhaul*			
Key Milestones:		Total Months	Start Date	End Date
	Output 1:	6		
	Output 2:	12		
	Output 3:	12		
	Output 4:	15		
	Output 5:	23		
	Output 6:	29		
	Completion:			
Detailed Implementation Plan Notes:				
CICTT Code:				
Output 1:				
Description: *Cont. on next page.*	The scope of this FAA/Industry Workgroup is to evaluate the aviation safety training market products, and determine what is the most appropriate, generationally attractive and effective components of the WINGS APP. Output considerations for the newly designed WINGS APP should include: • Pilots understanding why proficiency training is important • Pilots understanding how the WINGS program can help them maintain proficiency • Pilots interact with the system on any of their devices • The system interactively suggests knowledge and flight activities based on evaluation of their profile, ratings, location and current accident causal factors. • Pilots can see their proficiency plan thru exciting graphical interfaces • Pilots can easily see their progress on the plan and what they need to do next. • Pilots are reminded by the system when they need to take action to stay on track • The system encourages pilots to expand their horizons beyond the plan based on trending accident causes. The system allows pilots to share their accomplishments via social media		

SE 52	*WINGS Program Overhaul*
Output 1 Description: Cont.	• CFIs can easily validate flight activities while they are still with the student Include value added links to the APP design such as the approved medications for pilots and Basic Med checklist for their doctors. It would be ideal to have a WINGS APP that has the most used and relevant links for pilots.
Lead Organization:	AFS–850 (FAASTeam)
Supporting Organizations:	AFS–630, AFS–640, WIAC, NAFI, SAFE, EAA-IMC/VMC Clubs, AOPA, training providers
Actions:	1. Establish a working group comprised of FAASTeam and industry members to support a redesign of the WINGS Program platform(s) content (course/flight activity offerings) and automation/usability. 2. Have the working group conduct an evaluation of existing training market offerings with particular emphasis on user experience and usability and compatibility across devices. 3. Produce a document detailing the group's findings that are applicable for adoption into the WINGS update in Output 2.
Output Notes:	Working group members for this SE may choose to work on the content portion in Output 2 or the automation portion in Output 3 or both.
Time Line:	Approximately six months from overall approval.
Target Completion Date:	
Output 2:	
Description:	Assess and develop a plan to update the WINGS program course/flight activity content in light of Output 1.
Lead Organization:	AFS–850 (FAASTeam),
Supporting Organizations:	AFS–630, WIAC, NAFI, SAFE, EAA–IMC/VMC Clubs, AOPA, training providers

SE 52	*WINGS Program Overhaul*
Actions:	1. Members of the working group from Output 1 will evaluate current WINGS course material for relevance and determine the desired offering of courses/flight activities after the WINGS redesign. 2. Industry members on the working group will solicit industry to place additional online courses in the FAASafety.gov learning center to correspond to the working group's recommendations in step 1. 3. AFS–850 will develop or update selected flight activities to correspond to the working group's recommendations in step 1. 4. AFS–630 to collaborate with PSI Contractor for ACS to ensure consistency in course development. This is to incorporate WINGS into the futures ACSs. 5. Develop recommendations to ensure process for continued review and updating of the course/flight activity content.
Output Notes:	Ensure content alignment with SE 21 (risk-based). Platform/format changes should ensure mobile/tablet compatibility. All ASIs, CFIs & student pilots should be in the new WINGS Program. This should also be encouraged in the DPEs and incorporated into revised ACS.
Time Line:	Approximately 6 months from the completion of Output 1. Output 2 runs concurrently with Output 3.
Target Completion Date:	
Output 3:	
Description:	Assess and develop a plan to update the WINGS program automation/usability in light of Output 1.
Lead Organization:	AFS–850 (FAASTeam),
Supporting Organizations:	WIAC, NAFI, SAFE, EAA–IMC/VMC Clubs, AOPA, training providers

SE 52	*WINGS Program Overhaul*
Actions:	1. Members of the working group from Output 1 will evaluate current WINGS automation for usability and compatibility on all user platforms and determine what actions are necessary to update/change the automation to meet the recommendations from Output 1. 2. AFS–850 (FAASTeam) will develop a formal requirements document for website developers and/or turnkey web hosting entities based on the information provided in step 1. Develop recommendations to ensure processes for continued review/updating and sustainment of up to date automation/usability.
Output Notes:	
Time Line:	Approximately 6 months from the completion of Output 1. Output 3 runs concurrently with Output 2.
Target Completion Date:	
Output 4:	
Description:	Establish human resources/funding and contract vehicle for updates/changes and sustainment of WINGS automation.
Lead Organization:	AFS–800
Supporting Organizations:	Industry-WIAC, NAFI, SAFE, EAA–IMC/VMC Clubs, AOPA, training providers
Actions:	1. Obtain adequate funding authorization for automation changes established in Output 3. 2. Insure adequate human resources are available to facilitate the update/changes and sustain WINGS automation. 3. Insure that there is a suitable contracting vehicle available to do the work and receive the funds.
Output Notes:	
Time Line:	Approximately 3 months from the completion of Output 2 & 3.
Target Completion Date:	

SE 52	*WINGS Program Overhaul*
Output 5:	
Description:	Complete WINGS automation/usability and content updates.
Lead Organization:	AFS–850 (FAASTeam)
Supporting Organizations:	
Actions:	1. Update WINGS automation/usability based on the requirements document for website developers developed in Output 3. 2. Update WINGS content based on info from Output 2. 3. Manage the contractor established in Output 4.
Output Notes:	
Time Line:	Approximately 8 months after the completion of Output 4.
Target Completion Date:	
Output 6:	
Description:	Promote the updated WINGS program
Lead Organization:	AFS–850 (FAASTeam)
Supporting Organizations:	WIAC, NAFI, SAFE, EAA–IMC/VMC Clubs, AOPA, training providers
Actions:	1. FAASTeam & Working group to conduct comprehensive outreach to promote the features and usability of the updated WINGS automation.
Output Notes:	
Time Line:	Approximately six months from overall approval.
Target Completion Date:	

GAJSC – Controlled Flight Into Terrain (CFIT) Working Group Safety Enhancement 53 (SE 53) Pressure to Complete a Mission	
SE 53	*Pressure to Complete a Mission*
Safety Enhancement Actions:	To identify opportunities for improving awareness of the need to mitigate mission completion pressure on piloting, including sources and types of pressures, and the impact on decision-making.
Implementers:	FAA, Academia, AOPA, EAA, NBAA
Statement of Work:	The GAJSC CFIT Working Group identified mission completion pressure on an individual or organization as a contributing factor in 18 of the 63 studied events. External pressures, while difficult to anticipate, can influence a pilot's aeronautical decision-making, causing distraction and potential deviation from SOPs. Accordingly, the Working Group recommends conducting a review of existing measures intended to address pressure to complete a flight, and identifying new opportunities for improved education and outreach to the flying community on the importance of managing pressure. The CFIT WG identified mission completion pressure in the following 18 CFIT accidents: CEN10MA367 WPR13FA073 ERA11FA078 ERA09FA078 ERA11FA219 WPR12FA098 ERA15FA326 SEA08FA108 CEN12FA639 ERA14FA359 ERA13FA064 ERA14FA044 ERA09FA039 WPR15FA212 ERA10FA088 WPR11FA319 WPR14LA007 ANC15MA041
Total Financial Resources:	COE/PEGASAS research: $25K

SE 53	*Pressure to Complete a Mission*
Relation to Current Aviation Community Initiatives:	This SE could be related to several Loss of Control (LOC) SEs: • LOC SE 03—ADM: emphasis was on preflight planning • LOC SE 09—Part 135 Safety Culture: ▪ safety benefits of SOPs ▪ CFR Part 91 positioning flights ▪ Benefits of FRAT, SMS • LOC SE 24—Single-Pilot CRM • LOC SE 33—Safety Culture The Working Group noted that fatigue was also assessed as a problem in five of these accidents. Therefore, it also relates to GAJSC CFIT SE 56 (fatigue). As FAA reviews and amends airmen knowledge tests to include scenario-based elements, results and recommendations from this research could inform such scenario-based elements, particularly in areas of ADM. Industry's scalable Parts 135 and 91 SMS and FRAT initiatives (NBAA, AOPA, etc.) could be informed by research on the effects of pressure on pilots to continue a flight or mission.
Performance Goal Indicators:	Review of existing education, outreach, and training completed. White paper developed, including existing and recommended new education, outreach, and training measures. Outreach conducted.
Key Milestones:	Total Months / Start Date / End Date Output 1: 18 **Completion: Approximately 18 months after overall approval of SE**
Potential Obstacles:	Management reluctance.
Detailed Implementation Plan Notes:	

SE 53	*Pressure to Complete a Mission*
CICTT Code:	CFIT
Output 1:	
Description:	Research existing education, outreach, and training intended to address mission completion pressure and develop recommendations for improving education and training.
Lead Organization:	FAA AFS–800
Supporting Organizations:	GAJSC
Actions:	1. FAA to direct research into mission completion pressure education, outreach, and training. Research should include mission pressures associated with: a. flying to aviation events, b. flying to family events, c. flying to business-related events, d. Part 135 organizational pressures, e. charity flights f. tour operations 2. Develop a white paper assessing gaps in existing materials and outlining recommendations for improving education and training, based on accident data. 3. Present white paper to the GAJSC. 4. GAJSC to review recommendations and develop plan of action for improving education and training.
Output Notes:	FAA may choose to task to COE/PEGASAS. Research should include a review of new general aviation accidents in addition to those already analyzed by the CFIT working group. Groups such as Citation Jet Pilots (CJP) have done work in this area.
Time Line:	16–18 mos.
Target Completion Date:	

GAJSC – Controlled Flight Into Terrain (CFIT) Working Group Safety Enhancement 54 (SE 54) TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance	
SE 54	*TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance*
Safety Enhancement Action:	Improve TAWS capabilities and algorithms to better protect pilots operating in areas with challenging terrain, and develop additional safety protections to prevent the permanent inhibition of nuisance TAWS alerts during a terrain-critical flight.
Implementers:	FAA AIR–600, AIR–700, AFS–400; AFS–250, NASA; Avionics Manufacturers
Statement of Work: *Cont. on next page.*	In certain situations, particularly Alaska part 135 operations, aircraft routinely operate at altitudes below the 700 ft. AGL Class B TAWS Minimum Terrain Clearance (MTC) floor, resulting in a continuous TAWS terrain alert. This negative overlap of TAWS MTC floor and operator minimum enroute altitude approval causes nuisance alerts which are silenced when the flight crew engages the TAWS inhibit switch, thereby negating the terrain awareness safety benefit should the aircraft subsequently encounter VFR into IMC conditions or other terrain critical operations. The GAJSC CFIT Working Group recommends the need to provide a means to avoid the negative overlap condition between TAWS Minimum Terrain Clearance (MTC) and operator minimum enroute altitude, feasibility of authorizing an alternate TAWS envelope for unique operations such as mountainous/low altitude ops. The GAJSC CFIT Working Group encourages developers/manufacturers to develop hardware/technology that will automatically prevent the TAWS inhibit function, based on appropriate variables, to preclude continued TAWS inhibit during terrain critical flight operations. The CFIT Working Group also encourages the development of new algorithms and new terrain database sources that provide better performance than TAWS, including accommodation of specific aircraft performance in the escape trajectories. During low level mountainous terrain operations, the forward looking terrain avoidance (FLTA) “predictive” mode continues to generate nuisance alerts because of the FLTA search volume (reference DO–367). Additional research is necessary to determine appropriate forward-looking algorithms to address operations with lateral proximate terrain. Consideration should be given to the use of NASA’s Auto GCAS algorithms, and terrain/trajectory modelling in that algorithm, to see how it might be leveraged to improve existing TAWS and ground collision avoidance strategies.

SE 54	*TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance*
Statement of Work Cont.	Additionally, as a next step, existing and future TAWS implementations would benefit from revisions to provide lateral alert guidance based on surrounding terrain and aircraft performance capability (Ground Collision Avoidance Systems, or GCAS), to include the potential for flight director/autopilot guidance. The following accidents prompted this Safety Enhancement: WPR10FA107 CEN10MA367 ERA11FA55 ERA09FA078 WPR13FA017 WPR14LA007 NYC08FA138 ANC09FA052 CEN12FA639 ERA09LA123 ANC15MA041 ANC17MA001 ANC18FA053
Total Financial Resources:	
Relation to Current Aviation Community Initiatives:	NTSB Safety Recommendation A–17–035 NTSB Safety Recommendation A–18–015 RTCA TAWS SC–231, Committee Review of NTSB Safety Recommendations for possible DO–367 update.
Key Milestones:	Total Months / Start Date / End Date Output 1: 6 Output 2: 6 Output 3: 18 Output 4: 48 **Completion:**
Potential Obstacles:	Availability of cost-effective hardware/software. Initiative on the part of affected Part 135 operators to install/deploy available technologies.
Detailed Implementation Plan Notes:	In the absence of rulemaking, could affected operators be required to install/deploy available technology as a prerequisite to being issued op-specs authorizing low altitude ops in the vicinity of proximate terrain? Same question for mandatory CFIT training. FAA needs to encourage compliance with alert driven escape maneuver, which could result in IMC through Part 135 annual training requirements.
CICTT Code:	

SE 54	*TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance*
Output 1:	
Description:	FAA to task RTCA, through SC–231, to review the GAJSC findings and determine if the TAWS MOPS should be updated to better serve operations in terrain challenged environments, such as Alaska.
Lead Organization:	FAA AIR–600
Supporting Organizations:	RTCA SC–231
Implementers:	
Actions:	1. RTCA to explore the use of existing Class C TAWS for unique operations such as mountainous/low altitude operations.
Output Notes:	We should avoid being too narrow in suggesting that a new TAWS box be created for Alaska only. This should also avoid saying that it should be an Alaska-specific TAWS box, but maybe features within the generic TAWS box. The RTCA TOR states that its work should be informed by the CFIT WG recommendations, so the language in this SE will specifically be considered. Reference: https://www.rtca.org/sites/default/files/sc-231_june_2019_tor.pdf RTCA to provide recommended solutions by May 2020. Identified in NTSB SR A–17–035. NTSB simulations show that while use of Class C envelope (i.e., lower minimum terrain clearance (MTC) eliminates negative overlap of MTC floor, forward looking modes still provide nuisance alerts based on current algorithms and FLTA search volume.
Time Line:	6 months
Target Completion Date:	May 2020
Output 2:	
Description:	The FAA should determine if Helicopter–TAWS (H–TAWS) lends itself to operation in certain environments for fixed wing airplanes with certain performance. If yes, the FAA should update regulations and policy, as needed, to allow for H–TAWS installation and use in these fixed-wing airplanes.
Lead Organization:	FAA AIR–600
Supporting Organizations:	RTCA SC–231
Implementers:	

SE 54	*TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance*
Actions:	1. RTCA to explore whether or not H–TAWS algorithms could be helpful in preventing CFIT accidents in certain environments for fixed wing aircraft. Incorporate analysis into final recommendation. 2. If the RTCA analysis indicates H–TAWS could benefit fixed-wing aircraft the FAA should update regulations and policies, as necessary, to allow for installation.
Output Notes:	
Time Line:	6 months
Target Completion Date:	May 2020
Output 3:	
Description:	The FAA should task RTCA, through SC–231, to explore an auto-uninhibit function for TAWS or TAWS-like equipment to ensure the ongoing integrity of the alerting system despite pilots' ability to silence "nuisance" alerts.
Lead Organization:	FAA AIR–600
Supporting Organizations:	RTCA SC–231
Implementers:	
Actions:	1. RTCA SC–231 to explore hardware/technology solutions that ensure protections against the permanent inhibiting of TAWS "nuisance" alerts, such as a time-limited *un*inhibit switch. 2. Issue recommendation.
Output Notes:	
Time Line:	6 months
Target Completion Date:	May 2020
Output 4:	
Description:	GAMA to encourage avionics manufacturers to review the results of SC–231. If the DO–367 MOPS are updated, GAMA should encourage manufacturers to update their equipment.
Lead Organization:	GAMA
Supporting Organizations:	RTCA SC–231; Avionics Manufacturers
Implementers:	

SE 54	*TAWS for GA, Addressing Time-Limited Inhibit, and Future Auto Ground Collision Avoidance*
Actions:	1. GAMA to review SC–231 recommendations and encourage equipment adoption/updates as necessary.
Output Notes:	
Time Line:	18 months
Target Completion Date:	
Output 5:	
Description:	GAMA to encourage avionics manufacturers to incorporate GCAS functions into Part 23 aircraft (installed equipment and/or PEDs)
Lead Organization:	GAMA
Supporting Organizations:	
Implementers:	
Actions:	1. FAA to provide approval path for incorporation of GCAS functions in Part 23 aircraft (PEDs and/or installed equipment). 2. Subsequent to completion of action #1, NASA/AIR–600 to collaborate with manufacturers on a deployable (e.g., EFB-based) and/or installable (TC, STC) system to provide lateral alert guidance based on surrounding terrain and aircraft performance capability as an enhancement to existing TAWS capabilities (GCAS). 3. Manufacturers to make available new and retrofit TAWS/GCAS equipment for installation in GA aircraft.
Output Notes:	As terrain changes the technology modifies its guidance. NASA simulations of Class B vs Class C TAWS using a one-accident scenario have also shown that elimination of the MTC negative overlap, while beneficial and a necessary step, is not sufficient to minimize nuisance terrain warnings, specifically during common mountainous terrain operations with lateral proximate terrain. During these types of operations, the forward-looking terrain avoidance (predictive) modes, because of their area of regard, continue to generate nuisance alerts.
Time Line:	36–48 months after SE approval.
Target Completion Date:	June 2022 – June 2023

GAJSC – Controlled Flight Into Terrain (CFIT) Working Group Safety Enhancement 56 (SE 56) UIMC Escape Response	
SE 56	*UIMC Escape Response*
Safety Enhancement Actions:	FAA and Industry to revise teaching and training the UIMC escape response maneuver to include an initial climb before any heading change.
Implementers:	FAA, GAJSC, new UIMC Task Force, FAASTeam, AOPA, EAA, NBAA, SAFE, NAFI
Statement of Work:	The CFIT WG found that pilots involved in fatal CFIT accidents related to a UIMC encounter lost situational awareness as a result of descending to stay below a lowering cloud deck and/or reduced visibility. In the accidents studied, the group found that the CFIT resulted from the commonly taught 180-degree turn UIMC response maneuver wherein the pilot impacted terrain and/or obstacles as a result of their low altitude. Additionally, in many LOC accident cases involving UIMC the loss of control itself occurred when the pilot attempted to turn. In short, pilots may put themselves at higher risk when they have unintentionally flown into IMC conditions by executing a turn and not initially climbing to a safe altitude to avoid terrain and obstacles. Therefore, it's the group's recommendation that FAA and industry to review data on UIMC escape to understand if better training on UIMC escape and situational awareness is needed to reduce CFIT and LOC accidents that results from UIMC. In an effort to further support this recommendation, we call for additional review and validation by a UIMC Escape Response Task Force which should look at past LOC analysis (LOC–1 and LOC–2 data) as well as ASRS reports involving UIMC. The Task Force's goal should be to evaluate pilots decision making after encountering IMC, and whether or not better training and/or decision making improved their chances for a safe escape from IMC. In parallel to the Task Force's efforts to substantiate and support this recommendation, we call for the development of enhanced scenario-based training (SBT) to include simulated IMC encounters through the use of view-limiting devices (e.g., AT Systems, ICARUS) or with a flight simulator/trainer (FTD/AATD). The following accidents involved UIMC: CEN12FA639 WPR15FA212 ANC15MA041 WPR10FA116 ERA09FA514 ANC18FA053

SE 56	*UIMC Escape Response*
Total Financial Resources:	
Relation to Current Aviation Community Initiatives:	Safety Enhancements from prior working groups (LOC–1, LOC–2, SCF–PP) have similar goals related to mitigating fatal accidents resulting from UIMC. Current industry training material and organizations are evaluating the benefits of an amended escape guidance from UIMC
Performance Goal Indicators:	• Task Force created • Task Force validation and white paper presented to GAJSC • FAA-approved training materials and guidance amended to reflect the new procedure • FAASTeam and Industry developed education and training materials for new UIMC escape philosophy produced. • Advanced technology view restricting device is available to flight instructors. • VFR into IMC training scenarios are developed to take advantage of advanced technology view restricting devices. • New VFR into IMC training scenarios that involve a climb-out escape are available to flight instructors.
Key Milestones:	Total Months / Start Date / End Date Output 1: 6 Output 2: 12 (upon completion of Output 1) Output 3: 6 (upon completion of Output 2) Output 4: 6 (in parallel with Output 1) **Completion: Approximately 24 months after overall approval for SE**
Potential Obstacles:	- Resistance to new escape philosophy

SE 56	*UIMC Escape Response*
Detailed Implementation Plan Notes:	The CFIT working group acknowledges that UIMC is a category of accidents that may be wholly studied by a future working group. However, CFIT accidents have been directly tied to the failure to safely escape entry into UIMC, and therefore we recommend changing how we teach and train the UIMC escape maneuver at this time. Output 4 calls for improved scenario-based training involving UIMC and is designed to expose pilots to UMIC scenarios in a simulated environment where pilots can safely practice and hone their skills to avoid UIMC and successfully escape an encounter. View-limiting devices can be set in real time to display different visibility profiles. An example of advanced view-limiting device technology, the ICARUS device, was demonstrated for the CFIT WG at one of its meetings. Another example of advanced view-limited device technology is AT Systems. Both devices include the glasses, similar in shape to Foggles, a power pack, and an App through which the instructor controls the visibility capability of the glasses. As with Foggles, the lower center area of glasses stays clear for viewing the instrument panel. The remainder of the glasses can be controlled by the instructor to simulate different levels of visibility outside the aircraft, from clear to most obscured with intermediate levels available. Although it is the working group's intent to avoid being prescriptive in terms of specific vendors, the point here is that the technology exists.
CICTT Code:	
Output 1:	
Description:	GAJSC to develop a UIMC Escape Response Task Force to review previous LOC findings (LOC–1 and LOC–2) as well as ASRS and NTSB reports involving UIMC scenarios to validate and further substantiate the recommendation that education and training on UIMC escape should be revised, amended, or modified to enhance pilot decision making and reduce fatal accidents.
Lead Organization:	GAJSC
Supporting Organizations:	SAT
Implementers:	

SE 56	*UIMC Escape Response*
Actions:	1. GAJSC to establish up a UIMC Escape Response Task Force. 2. Task Force to examine prior GAJSC LOC analysis (LOC–1 and LOC–2 findings), ASRS reports, NTSB reports, and other industry data involving the UIMC scenario to evaluate whether or not pilots considered differing strategies (e.g., an initial climb after encountering IMC), and whether or not other strategies would have improved the chances for a safe escape from IMC. 3. Task Force to provide analysis and/ supporting recommendation to the GAJSC via a white paper.
Output Notes:	
Time Line:	6 months
Target Completion Date:	
Output 2:	
Description:	Pending supporting validation from the UIMC Escape Response Task Force, FAA to update all relevant training materials and publications (ACS, PHAK, etc.)
Lead Organization:	FAA AFS–800
Supporting Organizations:	GAJSC
Implementers:	
Actions:	1. Pending the Task Force's final analysis, FAA to revise all education and training materials to include decision making and risk mitigation strategies to escape or prevent UIMC.
Output Notes:	If the Task Force in fact cannot make any recommendations that the education and training materials be revised, this SE can be closed.
Time Line:	12 months
Target Completion Date:	
Output 3:	
Description:	Pending supporting validation from the UIMC Escape Response Task Force, and FAA's update of training materials, FAA and Industry to develop an education campaign to inform certificated pilots and training institutions of the new recommended procedure for a UIMC escape.
Lead Organization:	FAASTeam
Supporting Organizations:	GAJSC, AOPA, EAA, NBAA, NATA, NAFI, SAFE, Type Clubs

SE 56	*UIMC Escape Response*
Implementers:	
Actions:	1. Develop and execute an education campaign to inform certificated pilots and training institutions of the new recommended procedure for a UIMC escape.
Output Notes:	If the Task Force in fact cannot recommend that education and training materials be revised to teach a climb-out escape as the safest initial maneuver, this SE can be closed.
Time Line:	6 months
Target Completion Date:	
Output 4:	
Description:	FAA and industry to improve scenario-based training through the use of advanced view-limiting device technology that simulates inadvertent IMC entry and/or through the use of flight simulators (FTD/AATD).
Lead Organization:	FAA, FAASTeam
Supporting Organizations:	Industry
Implementers:	
Actions:	1. Develop new scenario-based training (SBT) for UIMC that includes climbing as an initial escape maneuver.
Output Notes:	This Output should be implemented in parallel with (regardless of) the Task Force's analysis. The SBT should also take advantage of advanced view-limiting device technology which simulates inadvertent IMC entry (e.g., AT Systems, ICARUS). The industry will need to evaluate the availability of advanced view-limiting technology determined. GAJSC is aware of ongoing development of devices, such as AT Systems, ICARUS, and similar systems, designed for more realistic UIMC initial response training. New scenario-based courseware, involving latest approved techniques and advanced view-limiting technology, developed and made available to pilots and instructors.
Time Line:	6 months.
Target Completion Date:	

Controlled Flight Into Terrain (CFIT) Working Group Safety Enhancement 58 (SE 58) Approach Guidance in Night/Mountainous VFR	
SE 58	*Approach Guidance in Night/Mountainous VFR*
Safety Enhancement Action:	Education campaign to instrument rated pilots on the value of flying published instrument approaches, utilizing backup lateral and vertical navigation guidance, in night/mountainous VFR conditions.
Implementers:	FAA, Pilot Associations, Training Providers, Part 141 flight schools, and FIRC and e-FIRC Providers
Statement of Work:	To further prevent controlled flight into terrain (CFIT) accidents, the FAA along with pilot organizations, flight instructor refresher course (FIRC) providers, and training providers should conduct an education campaign and/or develop learning modules educating the instrument-current pilot community of the safety benefits of backing up a nighttime VFR approach with lateral and vertical navigation guidance, particularly in mountainous terrain. Three accidents from the CFIT dataset highlight the importance of this education campaign where experienced IFR pilots elected to fly VFR approaches at night, and often in challenging terrain environments. These accidents may have been avoided if the pilots chose to instead fly instrument approach procedures or back up their VFR approach with vertical and lateral guidance, such as an ILS and end up in a CFIT accident. In order to be effective focus should be on media and in-person opportunities (as opposed to flyers & email blasts). The use of University InfoShare along with FIRC providers and 141 training programs to include this education in their courses, training, and material, would help efficiently distribute the material. Relevant Accident Numbers: ERA11FA055 WPR13FA073 DEN08FA162
Total Financial Resources:	$XX
Relation to Current Aviation Community Initiatives:	Focus should be on media and in-person opportunities (as opposed to flyers & email blasts). Incorporate into scenario-based training opportunities. Include Output to have AOPA, Gleim, Sporty's, King, American Flyers & other FIRC-providers to include content on this topic in their courses. Work with AFS–810 (complete list of providers). Include Output to encourage University InfoShare to help disseminate information. Include Output to encourage 141 programs to include this in CFI training/recurrent training. Include Output to commercial training providers, user groups.

SE 58	*Approach Guidance in Night/Mountainous VFR*
Performance Goal Indicators:	
Key Milestones:	Total Months / Start Date / End Date Output 1: 12 Output 2: 18 **Completion:**
Potential Obstacles:	Recommendation only applies to instrument rated/current pilots who have the knowledge and familiarity of an instrument approach.
Detailed Implementation Plan Notes:	
CICTT Code:	
Output 1:	
Description:	EDUCATION - FAA and industry (including training providers) to further educate the instrument-rated pilot community of the enhancement to safety that flying a published instrument approach (or backing up a visual approach with lateral and vertical guidance) provides for nighttime VFR arrivals, particularly in mountainous terrain.
Lead Organization:	FAASTeam
Supporting Organizations:	AOPA, NAFI, SAFE, LOBO, NBAA, EAA (including IMC Clubs), Type Clubs
Implementers:	
Actions:	1. FAASTeam and supporting organizations to add materials to existing and future programming for instrument pilots on night VMC approaches; ensure that mountain flying education contains this guidance. 2. IMC Clubs to develop scenario discussing the relative merits of using published IFR approaches or backup guidance in VMC with emphasis on night VFR arrivals, particularly in mountainous terrain.
Output Notes:	In general, this education effort is best integrated into existing materials for instrument pilots.
Time Line:	12 months
Target Completion Date:	

SE 58	*Approach Guidance in Night/Mountainous VFR*
Output 2:	
Description:	EDUCATION - Pilot associations to encourage CFIs to emphasize the enhancement to safety that flying a published instrument approach or utilizing backup lateral and vertical guidance provides for a night VFR arrival, particularly in mountainous terrain.
Lead Organization:	FAA AFS–600/800
Supporting Organizations:	EAA, SAFE, NAFI, UAA-GAJSC members, LOBO, AOPA ASI, FAASTeam, FIRC providers
Implementers:	
Actions:	1. FAA to evaluate recommending FIRC providers and part 141 flight schools to amend training material to include CFIs emphasizing to instrument rated pilots the safety benefits of using a published instrument procedure or backup guidance during night operations 2. Supporting organizations to encourage its members and/or CFI to promote the safety benefits of flying published instrument procedures or using backup guidance during night VFR operations 3. FAA to present material at Flight Training InfoShare
Output Notes:	
Time Line:	18 months
Target Completion Date:	

Appendix 7 — Standard Problem Statements

Standard Problem Statements

1	PILOT - Low time in make and model (A5)
2	PILOT - Recency of experience/proficiency (A4)
3	PILOT - Distraction/Divided attention (A3)
4	PILOT - Aerodynamic stall - failure to recognize and execute corrective action (A5)
5	PILOT - Aerodynamic Stall/Spin (A4)
6	AIR TRAFFIC SYSTEM - Failure of air traffic control to provide instructions/information/clearances using standard and unambiguous phraseology in accordance with appropriate regulatory directives (A3)
7	PILOT - Aeronautical Decision Making - Poor Judgement (A4)
8	AIR TRAFFIC SYSTEM - Air traffic system procedures that may compromise safety or increase flight crew workload (e.g., noise abatement procedures, slam dunk approaches, inappropriate taxi routes during low visibility operations, etc.) (A2)
9	PILOT - Lack of knowledge of aircraft systems and limitations (A3)
10	PILOT - Lateral imbalance (A1)
11	PILOT - Failure to acknowledge traffic and maintain separation (A3)
12	PILOT - Different types of operations in close proximity (A2)
13	PILOT - Failure of third party to voice concerns (A3)
14	PILOT - Evasive maneuver when low and/or slow (A4)
15	PILOT - Wake turbulence (A2)
16	PILOT - Flight testing at low altitude (A3)
17	AIRCRAFT - Loss of engine power (A2)
18	PILOT - Failure to maintain airspeed (A3)

19	**PILOT - Operated aircraft while under influence of illegal drugs (A1)**
20	**PILOT - Improper traffic pattern procedures (A4)**
21	**PILOT - Not feeling well (A1)**
22	**PILOT - Improper preflight planning (A3)**
23	**PILOT - Recency of night experience (A5)**
24	**PILOT - Lack of aeronautical knowledge (A2)**
25	**PILOT - Aircraft improperly configured for specific operation (A2)**
26	**PILOT - Inadequate/missing transition training (A4)**
27	**WEATHER SERVICE - Inaccurate forecast (A3)**
28	**ENVIRONMENTAL - Weather deterioration (A4)**
29	**PILOT - Overload (A4)**
30	**PILOT - Lack of assertiveness/command with ATC (A2)**
31	**PILOT - Use of over-the-counter drugs and/or their effects on pilot performance (A3)**
32	**PILOT - Lack of piloting ability (A4)**
33	**PILOT - Loss of situational awareness (A4)**
34	**PILOT - Failure to verify information (A2)**
35	**PILOT - Inadequate/improper training (A4)**
36	**PILOT - Failure to follow procedure (A3)**
37	**AIRCRAFT - Powerplant control malfunction (A2)**
38	**PILOT - Fatigue (A2)**
39	**PILOT - Poor safety culture (A3)**
40	**PILOT - Failure of instructor to intervene (A1)**
41	**AIRCRAFT - System/component failure - non-powerplant (A3)**
42	**PILOT - Failure to test/inspect aircraft after maintenance (A3)**
43	**AIRCRAFT - Improperly maintained/repaired (A2)**

44	**PILOT - Lack of CRM (A1)**
45	**WEATHER - Significant weather (SIGMET) (A3)**
46	**INFRASTRUCTURE/NAVAID - Out of service and/or malfunctioning (A3)**
47	**PILOT - Operated aircraft while under influence of unauthorized prescription drugs (A3)**
48	**PILOT - Low pilot time in complex/high performance (A5)**
49	**PILOT - Improper Go-Around (A5)**
50	**PILOT - Failure fly a stabilized approach (A5)**
51	**PILOT - Runway incursion (A5)**
52	**PILOT - Intentional non-compliance (A4)**
53	**PILOT - Unstabilized approach (A4)**
54	**AIRCAFT - Unsafe flying characteristics (A3)**
55	**PILOT - Attention Allocation (A3)**
56	**AIRCRAFT - No Stall Warning System installed (A3)**
57	**ORGANIZATION - No or poor safety culture (A3)**
58	**FAA - ASI lack of knowledge of type of aircraft and certification requirements (A2)**
59	**BUILDER- Lack of knowledge of aircraft systems and limitations (A2)**
60	**Pilot - Spatial disorientation (A4)**
61	**PILOT - Failed to monitor fuel level (A4)**
62	**AIR TRAFFIC SERVICE - High workload in congested airspace (A4)**
63	**PILOT - Operating aircraft while under the influence of alcohol (A1.5)**
64	**PILOT - Medical incapacitation (A1)**
65	**PILOT - Pressure to reach destination/complete the mission (A2)**
66	**AIRCRAFT - No shoulder harness installed (A1.5)**
67	**AIRCRAFT - Unstable aircraft (A1)**
68	**PILOT - Improper stall recovery (A3.5)**

69	**PILOT - Inadvertent VFR into IMC (A2.5)**
70	**PILOT - Not completing a familiarization flight prior to operating new aircraft (A1)**
71	**PILOT - Departure from controlled flight, not stall/spin (A1.5)**
72	**PILOT - Degraded medical/psychological condition (A3.5)**
73	**PILOT - G-Induced Loss of Consciousness (G–LOC) (A1)**
74	**PILOT - Use of beta blockers during aerobatic flight/high G maneuvers (A0.75)**
75	**PILOT - Reckless behavior (A2.5)**
76	**ENVIRONMENTAL - Conditions exceeded pilot skills (A2.5)**
77	**TRAINING - Incorrect spin recovery technique (A5)**
78	**PILOT - Maintaining flight currency but not proficiency (A5)**
79	**TRAINING - Lack of refresher training and/or limitations of known mission specific hazards (A2)**
80	**PILOT - CFI or DPE failed to ensure that required training was completed prior to check ride (A1)**
81	**AIRCRAFT - Pilot injured by fire/smoke (A1) - Add to report**
82	**PILOT - Aerodynamic Stall, unable to correct (A1.5)**
83	**PILOT - Inability to manage sudden control force changes associated with a configuration change (A1.5)**
84	**AIRCRAFT - Powerplant malfunction (A1)**
85	**PILOT - Continued flight after aircraft sustained substantial damage (A1)**
86	**AIRCRAFT - Required maintenance inspections not performed (A2.5)**
87	**PILOT - Pilot lack of experience for flight conditions (A2)**
88	**AIRCRAFT - Aircraft structure failed to protect occupant in a crash (A5) - Add to report**
89	**REPORT - Lack of crash survivability data contained in accident report (A5) - Add to report**
90	**RESERVED -**
91	**RESERVED -**

92	**RESERVED -**
93	**PILOT - Failure to determine airworthiness of aircraft (A2.75)**
94	**PILOT - Aircraft operated outside CG envelope (A1.5)**
95	**RESERVED -**
96	**RESERVED -**
97	**PILOT - Improper response to unexpected event - "Surprise/Startle" (A-2)**
98	**PILOT - Inadequate preflight inspection (A3)**
99	**RESERVED -**
100	**MAINTENANCE - Improper maintenance (A1.5)**
101	**RESERVED -**
102	**RESERVED -**
103	**WEATHER- Locality of weather information, i.e., nearest TAF may be 25 miles away (A1.5)**
104	**PILOT - Lack of experience outside of a structured training environment (A2)**
105	**PILOT - Failure to follow regulations (A5)**
106	**RESERVED -**
107	**CFI - Low time/experience in aircraft (A2.5)**
108	**Aircraft - Not Certificated (A1)**
109	**PILOT - Passenger unrestrained (A1) - Add to Report**
110	**ATC - Ambiguous guidance/language (A2)**
111	**PILOT - Failure to conduct proper medical self-assessment (A3)**
112	**PILOT - Hypoxia (A1)**
114	**PILOT - Demonstrates hazardous attitudes (macho, invulnerability, etc.) (A2)**
115	**AIRCRAFT - System/component failure - powerplant (A2)**
116	**POWERPLANT - Compressor turbine blade fatigue failure**

117	**POWERPLANT - Increased risk of failure of CT and/or Hot section due to increased thermal cycling**
118	**MAINTENANCE - Failure to inspect/maintain restraint system**
119	**PILOT - Failure to consider operating environment effects on restraint system**
120	**MAINTENANCE - No mechanism in place to designate an aircraft is undergoing maintenance**
121	**MAINTENANCE - Incomplete maintenance**
122	**MAINTENANCE - Incomplete record of engine maintenance & inspection history. Lack of documentation.**
123	**AIRCRAFT - Inactivity greater than one year**
124	**PILOT - Failure to recognize point of takeoff abort, aircraft orientation with remaining useable runway, discontinued operation (V1)**
126	**MANUFACTURER - Failure to require testing of TSO seatbelt and seat parts in aircraft**
127	**MAINTENANCE - Failure to follow manufacturer's recommended guidelines on TBO**
128	**POWERPLANT - Exhaust valve/seat failure resulting in loss of compression and a reduction in power**
129	**MAINTENANCE - Fuel contamination not discovered during inspection for ferry permit**
130	**POWERPLANT - Failure of the V band clamp**
131	**MAINTENANCE - Failure to use correct part**
132	**PILOT - Impaired vision during emergency landing**
133	**OWNER/OPERATOR - Required maintenance not performed**
134	**LACK OF DATA - POWERPLANT - Not enough data to determine failure mode of the powerplant**
135	**MAINTENANCE - Improper engine maintenance by experimental owner**
136	**POWERPLANT - Critical part not installed**
137	**POWERPLANT - Altered the replacement engine design by removing components**
138	**POWERPLANT - Engine lost power due to incorrect maintenance and/or substandard inspections performed.**

139	**PILOT - Failed to compensate for crosswinds on emergency descent/landing**
140	**MAINTENANCE - Improper engine maintenance by EAB repairman/owner**
141	**MAINTENANCE - Improper engine installation by EAB repairman**
142	**INFORMATION - Not enough information to support an SPS**
143	**INFORMATION - Not enough investigative detail and/or data**
144	**PILOT - Most suitable emergency landing sight not selected**
145	**PILOT - TWIN-ENGINE OPS - Encountered Vmc stall/spin**
146	**PILOT – TWIN-ENGINE OPS - Failure to recognize an impending Vmc stall and to take corrective actions**
147	**PILOT - Decision to fly with unresolved mechanical problems**
148	**AIRCRAFT - Shoulder harness did not restrain pilot**
149	**OWNER/OPERATOR - Should ensure use of TSO-compliant restraint systems**
150	**MANUFACTURER - Materials selected by supplier do not meet specifications**
151	**ENGINE - Premature failure of the component**
152	**AIRCRAFT - Aircraft not properly equipped with required TAWS**
153	**AIRCRAFT - Unequipped with terrain awareness system**
154	**ATC - Controller cleared pilot for instrument approach not authorized at night**
155	**ATC - Failure to contact pilot when aircraft well below published altitudes**
156	**ATC - Failure to issue a Safety Alert**
157	**ATC - Lack of tools to maintain awareness as to pilot being unintentionally in IMC**
158	**ATC did not advise pilot of deviation below MEA**
159	**Attempted VFR arrival at airport in IMC**
160	**ENVIRONMENTAL - Dark night in mountainous terrain**
161	**ENVIRONMENTAL - Dark night, unlit terrain**
162	**ENVIRONMENTAL - Few outside visual references (dark night)**

163	**ENVIRONMENTAL - Insufficient visual cues in night VMC**
164	**ENVIRONMENTAL - Visual cues may be difficult to see in the desert**
165	**FAA - Insufficient oversight of 135 operation by assigned POI**
166	**Failure to establish and follow altitude minimums**
167	**Failure to establish/utilize contingency plans**
168	**Failure to maintain clearance with terrain**
169	**ORGANIZATION - Economic pressure to complete flight**
170	**ORGANIZATION - Lack of apparent operational risk assessment mechanism with risk mitigation strategies**
171	**ORGANIZATION - Non-existent or poor fatigue management policy, training or awareness**
172	**PILOT - Attempting to fly VFR into IMC**
173	**PILOT - Attempting VFR landing in IMC**
174	**PILOT - Continued flight into IMC conditions when not IFR rated**
175	**PILOT - Cruise flight below 700 AGL**
176	**PILOT - Descended below minimum altitude**
177	**PILOT - External Stressors**
178	**PILOT - Failed to respond properly to ground proximity warnings**
179	**PILOT - Failed to utilize or disabled available safety equipment**
180	**PILOT - Failed to utilize or disabled available terrain avoidance safety equipment**
181	**PILOT - Failure to adhere to published approach altitudes**
182	**PILOT - Failure to communicate entering IMC**
183	**PILOT - Failure to complete the missed approach procedure**
184	**PILOT - Failure to get any pre-flight weather briefing**
185	**PILOT - Failure to obtain updated (abbreviated) weather briefing prior to departure**
186	**PILOT - Failure to obtain updated weather briefing en route**

187	**PILOT - Failure to properly execute mountainous approach**
188	**PILOT - Failure to recognize and respond to weather deterioration**
189	**PILOT - Failure to use available resources, including ATC assistance**
190	**PILOT - Flight below approach minimum altitude without having the runway environment in sight and/or being in a position to safely descend to land**
191	**PILOT - Inadvertent IMC while on a visual approach at night**
192	**PILOT - Inappropriate descent below MDA**
193	**PILOT - Intentional noncompliance with FAA medical restrictions**
194	**PILOT - Intentional use non-IFR certified equipment to fly an instrument approach**
195	**PILOT - Lack of experience in mountainous terrain**
196	**PILOT - Lack of knowledge of available navigation equipment or tools, or failure to use same.**
197	**PILOT - Loss of situational and positional awareness with respect to terrain/runway**
198	**PILOT - Low pilot time and/or recency in make and model**
199	**PILOT - Maintaining flight instrument currency but not proficiency**
200	**PILOT - Noncompliance with ATC instructions**
201	**PILOT - Noncompliance with published altitude restrictions**
202	**PILOT - Not fit for duty**
203	**PILOT - Pilot did not use available in-flight navigation equipment or tools appropriately**
204	**PILOT - Pilot did not use relevant on-board equipment**
205	**PILOT - Pilot flew in mountainous terrain and poor weather with limited or no terrain awareness systems**
206	**PILOT - Pilot's failure to adequately assess fitness for flight or duty**
207	**PILOT - Scud running**
208	**PILOT - Selection of visual approach in mountainous terrain on a dark night**
209	**PILOT - Terrain warning systems designed for cruise flight often disabled or ignored in low altitude operations**

210	**PILOT - Use of Rx drugs and/or their effects on pilot performance**
211	**POLICY - FAA to incentivize self-reporting on medical questionnaire**
212	**SAFETY PILOT - Safety pilot did not identify altitude deviation below MDA**
213	**SURVIVABILITY - Failure of passengers to secure seatbelts**
214	**VFR departure into known deteriorating weather conditions**
215	**VFR into known IMC without valid IFR rating**
216	**WEATHER SERVICE - Failure of briefer to provide accurate and complete weather briefing**

Appendix 8 — CFIT Prioritized Interventions

CFIT PRIORITIZED INTERVENTIONS

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
3.0	2.9	8.7	421	TECHNOLOGY - Industry (app developers, EFB manufacturers, etc.) to further develop and make widely available “virtual co-pilot”-like technology including terrain awareness and warnings.
2.5	3.0	7.6	334	EDUCATION - FAA/Industry to emphasize scenario-based training that simulates self-induced pressure to complete flight.
2.8	2.7	7.5	368	POLICY - FAA to establish a universal scorecard database for DPEs and ASIs that evaluates CFIs in an effort to encourage greater adherence to instructor best practices.
2.8	2.6	7.1	372	POLICY - FAA to maintain greater connection with Part 61 flight schools; inspectors to have higher visibility at local airports.
2.5	2.9	7.1	447	TRAINING - Industry to improve scenario-based training through the use of advanced view-limiting device technology that simulates inadvertent IMC entry.
2.5	2.9	7.1	267	OUTREACH - FAA/Industry to encourage pilots and operators to install enhanced vision systems (EVS) and/or synthetic vision (SVS) on GA aircraft (e.g., GCAS).
2.5	2.9	7.1	422	TECHNOLOGY - Industry to develop digital copilot technology to provide alerts when pilot deviates from published approach procedures.
2.3	2.9	6.5	408	TECHNOLOGY - Avionics manufacturers to develop cost-effective terrain awareness using ADSB or other sufficiently accurate position source.
2.3	2.9	6.5	413	TECHNOLOGY - Encourage manufacturers to develop and incorporate technology that alerts to intervening terrain hazards when GPS-direct is selected.
2.3	2.6	5.9	450	TECHNOLOGY - Avionics manufacturers to adopt and deploy an equivalent TAWS-like option for terrain avoidance (e.g., GCAS).
2.1	2.9	5.9	6	EDUCATION - FAA, industry, and academia develop educational campaign on the dangers fatigue on flying in order to reduce the likelihood of accidents due to pilot fatigue.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.9	3.0	5.7	374	POLICY - FAA to overhaul and continually improve the WINGS Program to make it more user-friendly, dynamic, and valuable (i.e., Smartphone app).
2.0	2.9	5.6	419	TECHNOLOGY - FAA to establish expanded weather camera network in mountainous/underserved areas (i.e., mountain passes, areas prone to obscuration).
2.2	2.6	5.6	318	ATO to consider amending 7110.65 concerning approach clearances at airports with mountainous terrain to include altitude restrictions during non-precision approaches (example: "Cessna 123AB maintain 14000 until established, cleared for the approach").
1.9	2.9	5.6	449	TRAINING - SAFE/NAFI/FAASTeam to emphasize teaching pilots proper techniques for managing unexpected events (how to recognize and manage startle response, including response to TAWS alerts).
1.9	2.9	5.5	328	EDUCATION - FAA/Aviation event sponsors to jointly conduct "arrive alive" campaign to mitigate enroute accidents.
1.9	2.9	5.5	398	RESEARCH - Industry/Academia to study ATC controller culture with regards to the issuance of approach clearances in "anticipation of separation" (based on expected aircraft performance, etc.) versus the application of strict separation standards.
2.2	2.4	5.4	388	RESEARCH - FAA/COEs to research feasibility of authorizing Class C TAWS (or alternate Class B envelope) for unique operations such as mountainous/low altitude.
1.8	2.9	5.3	276	OUTREACH - FAA/Industry to educate pilots on already available benefits of low-cost terrain awareness technology such as terrain-enabled EFBs, VSI alerters, and "Digital Copilot" type systems (e.g., GCAS).
1.8	2.9	5.3	406	TECHNOLOGY - Avionics manufacturers to develop a time-limited inhibit switch for TAWS or TAWS-like equipment.
1.7	3.0	5.2	387	RESEARCH - FAA to review latest fire suppression/survival technology from aviation and other vehicle-related fields.
1.8	2.9	5.2	237	OUTREACH - FAASTeam/Industry to encourage greater use of accurate position source technology among GA pilots.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.8	2.9	5.2	409	TECHNOLOGY - Encourage developers/manufacturers to develop cost-effective technology that enhances situational awareness by providing augmented visual cues referencing surrounding terrain (i.e., HUD/synthetic vision, FLIR for GA).
2.0	2.6	5.1	369	POLICY - FAA to focus surveillance activities on operators during marginal/dangerous operating conditions.
1.9	2.7	5.0	327	EDUCATION - FAA to partner with industry (NAFI/SAFE/ASI, etc.) to develop auditable instructor network for standardizing recurrent training.
1.7	3.0	5.0	272	OUTREACH - FAA/GA Associations to develop information and advise pilots that special procedures exist for 121/135 operators at certain high-altitude/mountainous airports that Part 91 pilots may find helpful.
1.7	3.0	5.0	338	EDUCATION - FAA/Industry to encourage greater participation in government and industry proficiency programs (i.e., proficiency centers, type clubs).
1.8	2.7	5.0	392	RESEARCH - FAA/PEGASAS to research methods to identify and change behavior of pilots who display intentional disregard for advice, practices for safe operation, and noncompliance with regulation.
1.7	2.9	4.8	221	OUTREACH - FAA/Industry to promote use of third-party “dispatch”/SMS evaluation services (including mentorships) to assist pilots in go/no-go decision.
1.7	2.9	4.8	322	EDUCATION - FAA and industry (including training providers) to educate the pilot community of the enhancement to safety that flying an instrument approach provides in night VFR, particularly in mountainous terrain.
1.7	2.9	4.8	350	EDUCATION - Pilot associations (e.g., SAFE, NAFI, ASI, UAA, LOBO) to encourage CFIs to emphasize the safety benefits of utilizing published instrument procedures during night operations.
1.7	2.9	4.8	396	RESEARCH - Industry or academia to research cost-effective technology that enhances situational awareness by providing augmented visual cues referencing surrounding terrain (i.e., HUD/synthetic vision for GA).
1.7	2.9	4.8	424	TECHNOLOGY - Manufacturers and industry to develop cost-effective terrain awareness using sufficiently accurate position source.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.6	3.0	4.7	90	TRAINING - Training industry develop consensus on standard pattern procedures (altitude/power setting/airspeed/glidepath/configuration); emphasize the importance of flying a standard traffic pattern to facilitate the stabilized approach appropriate to the type of operation, aircraft type, environment and to emphasize the importance of proper and timely go-around decisions and procedures when the landing approach is not stabilized by X.
1.6	2.9	4.7	391	RESEARCH - FAA/Industry to sanction a work group to study and develop effective “tactical” weather training (practical application of WX products w.r.t. decision-making).
1.6	2.9	4.5	28	PROCEDURES - Type Clubs, aircraft manufacturers, and operator groups develop simplified miss approach, go-around, and other procedures/checklists to reduce the likelihood of accidents due to high pilot workload during critical phase of flights.
1.5	3.0	4.4	330	EDUCATION - FAA/Industry to develop an educational campaign on use of Personal Minimums.
1.5	3.0	4.4	341	EDUCATION - FAA/SAFE/NAFI to emphasize with CFIs the importance of teaching proper PIC decision-making skills with reference to go-arounds (at the application and correlation levels). Focus on the decision to go around when not on speed, not on course or incorrectly aligned for landing.
1.5	3.0	4.4	347	EDUCATION - Government and industry emphasize importance of terrain familiarization/terrain mental model for pre-flight (FSF’s CFIT Checklist).
1.5	3.0	4.4	426	TRAINING - AOPA/EAA PPC/FAASTeam to develop MVFR/VFR into IMC scenarios for simulator-based training.
1.5	2.9	4.4	233	OUTREACH - FAASTeam to promote use of AC 90–109 in guiding transition training and the importance of transition training, even when transitioning between model subtypes.
1.5	3.0	4.4	336	EDUCATION - FAA/Industry to emphasize to CFIs the importance of training pilots to be comfortable communicating concerns to ATC.
1.7	2.6	4.4	364	POLICY - FAA to continue efforts to provide policy for easier/streamlined installation of safety enhancing equipment including scalability of TSOs and software and hardware certification.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.6	2.7	4.3	365	POLICY - FAA to enroll pilots in FAASafety.gov to encourage their continuing education (automatic enrollment at medical application and subsequent certificate application).
1.4	3.0	4.2	436	TRAINING - FAA/Industry to emphasize the importance of configuration settings for go-around procedures in training and flight reviews.
1.4	3.0	4.2	382	RESEARCH - Academia/PEGASAS to develop pilot profile risk assessment tool (pprat). This tool would consider a pilot's personality, experience, and aptitude, and predict the accident types the pilot is most likely to experience.
1.5	2.9	4.2	381	PROCEDURE - When ATC provides both heading and altitude instructions to VFR aircraft, require ATC to ensure that track does not conflict with terrain/obstructions.
1.5	2.7	4.2	359	POLICY - Electronic chart/EFB providers to incorporate hyperlinks depicting special procedures on approach charts that highlight important safety considerations/nuances.
1.5	2.7	4.1	292	OUTREACH - FAA/Industry to encourage tour/Pt. 135 Operators to establish mentorship programs for new pilots to promote safe operation of aircraft and familiarity with company procedures.
1.5	2.7	4.1	441	TRAINING - FAA/Industry to promote use of SMS/risk matrix by pilots of tour/135 operations; employ safety culture that honors pilot judgement (include cruise industry).
1.7	2.4	4.0	407	TECHNOLOGY - Avionics manufacturers to develop and deploy a cost-effective terrain avoidance systems that provide escape guidance and/or flight control input for common GA aircraft types.
1.4	2.9	4.0	186	TRAINING - FAA and associations work to re-emphasize the need for training and currency when flying in mountainous areas.
1.4	2.9	3.9	362	POLICY - FAA to change ACS to require testing of pilot-initiated decision to go around.
1.4	2.9	3.9	411	TECHNOLOGY - Encourage greater incorporation of profile-view approach depiction by avionics and EFB manufacturers for vertical situational awareness.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.4	2.9	3.9	311	OUTREACH FAA/Industry - Educate pilots on benefits of already available low-cost terrain awareness technology such as terrain-enabled EFBs, VSI alerters, and “Digital Copilot” type systems, etc.
1.4	2.9	3.9	232	OUTREACH - FAASTeam to promote consistent use of established WX camera systems.
1.3	2.9	3.8	258	POLICY/OUTREACH - FAA to incorporate greater emphasis on PIC authority to deviate from ATC instructions in the private pilot ACS.
1.4	2.6	3.7	29A	RESEARCH - FAA/Government to sponsor research cost-effective technologies that can provide real-time weather information at remote airports. #29B TRAINING - FAA and industry to promote and educate the GA community on available weather technologies such as the NOAA ADDS icing tool.
1.2	3.0	3.7	332	EDUCATION - FAA/Industry to emphasize case studies involving inappropriate use of tablet apps and similar technology.
1.4	2.7	3.7	417	TECHNOLOGY - Encourage MITRE and other EFB companies to include altitude and track warnings for instrument approaches in “digital co-pilot”-like technology.
1.6	2.3	3.7	326	EDUCATION - FAA to develop guidance to emphasize teaching situational awareness to primary student pilots. (ACS, PHAK, etc.)
1.2	3.0	3.6	268	OUTREACH - FAA and industry emphasize the importance of ADM concerning pressures to complete a mission.
1.2	3.0	3.6	320	EDUCATION - FAA/industry to promote and encourage the use of existing flight risk assessment tools (FRAT).
1.3	2.7	3.6	433	TRAINING - FAA and Industry to emphasize importance of SRM (single-pilot resource management) in initial pilot training.
1.2	3.0	3.6	333	EDUCATION - FAA/Industry to emphasize dangers of potentially flying into IMC without IFR flightplan, even when IFR rated; special emphasis on mountainous areas (i.e., “not even once” campaign).
1.5	2.4	3.6	321	EDUCATION - Add a section to the PHAK and Flight Instructor handbooks on developing PIC decision-making skills relative to go-arounds.
1.3	2.9	3.6	200	OUTREACH - MITRE to make virtual co-pilot technology ensuring terrain avoidance widely available to flying public.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.6	2.3	3.6	399	RESEARCH - PEGASAS/Industry to research feasibility of changing ATC vectoring procedure to issue tracks rather than headings and FAA to implement findings.
1.2	2.9	3.6	261	TRAINING - FAA/industry promote the use of the flight risk analysis tools (FRAT).
1.2	3.0	3.5	349	EDUCATION - Industry/local flying organizations to publish guidance/advice on the hazards of long-distance low(er) altitude XC routing.
1.1	3.0	3.4	54	Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.
1.5	2.3	3.4	275	OUTREACH - FAA/Industry to develop guidance on designing and maintaining private airports.
1.5	2.3	3.4	377	POLICY - Mandate CFIT avoidance training for operators approved for low-altitude and/or mountainous operations.
1.4	2.4	3.4	384	RESEARCH - Avionics industry and FAA to research development of automatic MSAW alerting via ADS–B.
1.3	2.6	3.3	259	RESEARCH/EDUCATION - PEGASAS and NTSB to conduct research on pilot reluctance to self-report or request assistance when inadvertently entering IMC. Industry to develop outreach campaign to pilots highlighting protections against enforcement actions when pilots report unintended flight into IMC.
1.2	2.9	3.3	444	TRAINING - FAASTeam to host training on different weather products and their application to pre-flight planning; this should be a scenario-based training.
1.1	3.0	3.3	319	Avionics manufacturers to develop cost-effective terrain awareness using ADSB or other sufficiently accurate position source.
1.1	2.9	3.3	294	OUTREACH - FAA/Industry to promote and educate on the utilization of existing circadian-based fatigue management software/app to pilots and dispatchers (e.g., Netjets' FRAT system).
1.1	2.9	3.3	434	TRAINING - FAA to train weather briefers to recognize biases and cues from pilots that may indicate or lead to poor decision-making; train for intervention when such behavior is observed.
1.1	3.0	3.2	215	OUTREACH - FAA/Industry to encourage installation of enhanced restraint systems.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.1	3.0	3.2	453	TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture.
1.2	2.7	3.2	270	OUTREACH - FAA to promote “Circle of Safety” or similar program that educates tour/Part 135 clients on aviation safety issues.
1.1	2.9	3.2	219	OUTREACH - FAA/Industry to encourage pilots to use in-cockpit weather services (ADS–B, satellite).
1.1	2.9	3.2	240	OUTREACH - Industry and FAA to educate and encourage pilots re: proper utilization of available weather information, including ground-based and in-cockpit resources.
1.1	2.9	3.2	244	OUTREACH - Industry to encourage greater adoption of scalable Fatigue Management Systems and practices.
1.1	2.9	3.2	412	TECHNOLOGY - Encourage industry and operators to adopt synthetic vision technology for GA aircraft.
1.1	2.9	3.2	420	TECHNOLOGY - FAA/Industry to encourage greater incorporation of profile-view approach depiction by avionics and EFB manufacturers for vertical situational awareness.
1.2	2.7	3.1	416	TECHNOLOGY - Encourage MITRE and other developers to enhance “virtual co-pilot”-like technology to assist in maintaining altitude (obstacle) clearance.
1.0	3.0	3.1	339	EDUCATION - FAA/Industry to encourage home/desktop simulator-based training for familiarization with cockpit technology.
1.1	2.9	3.0	302	OUTREACH - Industry and FAASTeam to develop enhanced training resources aimed at pilots using technology for terrain avoidance.
1.1	2.9	3.0	317	TRAINING - FAA/industry to conduct outreach campaign on ADM.
1.1	2.7	3.0	395	RESEARCH - Industry and academia to research possibilities of incorporating sleep assessment technology (e.g., smart phones, wearable devices) with fatigue awareness capabilities.
1.1	2.9	3.0	228	OUTREACH - FAASTeam outreach on alternate routes for mountain flying, special emphasis on timely diversion decisions. Reference ASI “178 Seconds to Live” video.
1.0	3.0	3.0	196	EDUCATION - FAA and Industry outreach campaign on when to declare an emergency; emphasize compliance philosophy.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.0	3.0	3.0	206	OUTREACH - ATO to incorporate into controller training and recurrent training review of case studies that highlight accidents where ATC instructions contributed to accidents (particularly with respect to LOC, CFIT and midair collisions).
1.0	3.0	3.0	297	OUTREACH - FAASTeam encourage pilots to be assertive with ATC, especially when verifying/clarifying clearances.
1.0	3.0	3.0	404	RESEARCH - FAA/Industry to study what constitutes an effective safety culture and try to identify how to reach pilots who do not have/participate in an effective safety culture (SE 33 link).
1.1	2.7	3.0	295	OUTREACH - FAA/Industry to recommend that mercy flight recipients be referred to mercy flight organizations, and prospective mercy flight pilots do the same.
1.1	2.6	3.0	360	POLICY - FAA inspectors to increase surveillance of annual company training for Pt 135 operators, with emphasis on operational control.
1.0	2.9	2.9	427	TRAINING - ATO to emphasize MSAW alerting procedures with controllers.
1.1	2.7	2.9	290	OUTREACH - FAA/Industry to encourage pilots and operators to install TAWS and equivalent systems equipped with descent after takeoff warning.
1.1	2.6	2.9	218	OUTREACH - FAA/Industry to encourage operators, especially 135 certificate holders, to adopt formalized risk assessment mechanisms.
1.1	2.6	2.9	291	OUTREACH - FAA/Industry to encourage tour operators to establish criteria around changing tour routes based on weather (similar to criteria for airshow routines).
1.1	2.6	2.9	363	POLICY - FAA to conduct comprehensive risk assessment for GA operators, including using DOT Value of Statistical Life methodology prior to changing airspace.
1.1	2.6	2.9	380	POLICY/TECHNOLOGY - FAA to expeditiously establish expanded ADSB ground station network in mountainous/underserved areas.
1.1	2.6	2.9	425	TECHNOLOGY - Manufacturers to incorporate terrain warning sensitivity adjustments into existing and future terrain avoidance systems for visual and aural warnings.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
1.0	2.9	2.8	235	OUTREACH - FAASTeam/Industry to develop and distribute video to demonstrate the difference between vertical and slant range visibility in fog.
1.0	2.9	2.8	440	TRAINING - FAA/Industry to incorporate risk-management and scenario-based training in IPCs.
1.0	2.9	2.7	298	OUTREACH - FAASTeam to educate pilots in detail on factors that lead to a “VFR not recommended” advisory.
0.9	3.0	2.7	431	TRAINING - FAA and Industry to develop additional training regarding proper make/model go-around decision-making, including commitment decision point and procedures.
1.0	2.9	2.7	435	TRAINING - FAA/Industry to emphasize importance of pilots requesting track vectors (vs. heading vectors) from ATC.
1.0	2.7	2.7	361	POLICY - FAA to amend approach plates to include contour lines where appropriate.
1.0	2.7	2.7	366	POLICY - FAA to ensure adequate staffing so that POIs are available and providing appropriate oversight consistent with safe operations.
1.0	2.7	2.7	415	TECHNOLOGY - Encourage MITRE and industry to explore capabilities of warning pilots when a selected approach and weather ceiling/visibility don't align in “digital co-pilot”-like technology.
0.9	2.9	2.7	452	TECHNOLOGY - MITRE to make virtual co-pilot technology ensuring terrain avoidance widely available to flying public.
1.0	2.6	2.7	378	POLICY - POIs to promote commercial operators’ adoption of best SMS practices in area of risk management.
0.9	3.0	2.7	262	TRAINING/OUTREACH - FAASTeam/Industry to emphasize PIC authority, particularly as it pertains to ATC instructions and pilot responsibilities.
0.9	3.0	2.7	268	TRAINING - FAA and industry emphasize the importance of ADM concerning pressures to complete a mission.
1.0	2.6	2.6	357	POLICY - After major accident, FAA Certificate Management Team to re-evaluate operational control within commercial operators and work with company management on improved operational control.
0.9	2.9	2.6	247	OUTREACH - Industry to promote creation/use of user comments on popular online airport directory platforms (AOPA Airports, Foreflight, AirNav, etc.).

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.9	2.9	2.5	226	OUTREACH - FAASTeam and Industry to develop education material that encourages pilots to ask controllers for help.
0.9	2.9	2.5	279	OUTREACH - FAA/Industry to educate pilots on the risks associated with lack of recent flight experience.
0.9	2.9	2.5	300	OUTREACH - FAASTeam/Industry to develop dedicated outreach to high-risk groups, including high time and older pilots, about the risks of complacency.
0.9	2.9	2.5	308	OUTREACH - Pilot volunteer organizations and FAAST to conduct "blood on the runway" messaging campaign (with real-life examples) to counterbalance mission pressures and promote organization-specific pro-safety ops standards (e.g., checklists, FRAT, training and fatigue guidelines).
0.9	2.7	2.5	208	OUTREACH - FAA to encourage commercial operators to ensure ops manuals contain instructions for pilots to utilize all available tools to ensure safe outcome of a given flight; manuals should give guidance for when systems should or should not be inhibited.
0.9	2.7	2.5	310	OUTREACH - Promote use of seat/restraint systems above minimum standards with commercial operators.
0.8	3.0	2.5	331	EDUCATION - FAA/Industry to educate pilots on importance of planning for contingencies and activating those plans at the appropriate time.
0.8	3.0	2.5	346	EDUCATION - FAASTeam to emphasize importance of smart preflight planning.
0.8	3.0	2.5	352	EDUCATION/TRAINING — FAA and Industry to emphasize the importance of climbing as a viable initial response to unintentional flight into IMC. (Current training seems to be primarily focused on pilots initiating a 180 turn as primary response. Not always best.)
1.1	2.3	2.5	309	OUTREACH - POI to encourage 135 operators engaged in medical transport flights to conduct annual scenario-based training on best practices for such flights or other unusual circumstances.
.0.9	2.7	2.5	210	OUTREACH - FAA/Industry to develop a conference/educational event aimed at air tour operators in an effort to encourage the sharing of safety best practices.
0.9	2.7	2.4	353	EDUCATION - FAA to include concepts of intra-cockpit authority gradient for students in the PHAK.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.8	2.9	2.4	397	RESEARCH - Industry or academia to research existing/develop pre-flight tool for intended mountain flying route providing vertical planning guidance in consideration of weather, expected aircraft performance, terrain, and distribute/promote resources to pilot community.
0.8	2.9	2.4	454	TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on preflight planning.
1.0	2.4	2.4	358	POLICY - AJV–8 to amend 7110.65 to require controllers to issue altitudes with hold clearances.
0.8	2.9	2.3	423	TECHNOLOGY - Industry to develop digital copilot technology to provide alerts when pilot is descending, but apparently not to runway.
0.8	3.0	2.3	442	TRAINING -- FAA/Industry to provide enhanced scenario-based and risk-based decision-making training to GA pilots.
1.0	2.3	2.3	356	OVERSIGHT - FAA to audit industry standard organizations receiving federal funding (e.g., Medallion Foundation).
0.8	3.0	2.3	203	OUTREACH - ATO and Industry to encourage informal meetings between pilots and controllers to facilitate better communication.
0.8	2.7	2.3	254	OUTREACH - FAA/Industry (SAFE & NAFI) to promote the importance of CFIs preparing a plan of action prior to every flight and sharing with learners/students.
0.8	2.7	2.3	269	OUTREACH - FAA to develop and publish guidance for the use of equipment-specific electronic avionics display simulators and procedural trainers that do not meet the definition of flight simulation training devices prescribed in Title 14, Code of Federal Regulations (14 CFR) part 60 to support equipment-specific pilot training requirements (NTSB Rec. A–10–40).
0.8	2.9	2.2	312	OUTREACH - FAA/SAFE team to create CFI decision-making courses (i.e., accident case study).
0.7	3.0	2.2	231	OUTREACH - FAASTeam to develop an outreach campaign highlighting dangers of fixation and tunnel vision during critical phases of flight.
0.7	3.0	2.2	242	OUTREACH - Industry to develop outreach campaign encouraging pilots to always have secondary source of navigation available and ready (including visual sources).

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.7	3.0	2.2	342	EDUCATION - FAA/SAFE/NAFI to emphasize to pilots the importance of proper decision-making with reference to executing go-arounds. Focus on the decision to go around whenever a safe landing is not assured.
0.7	3.0	2.2	348	EDUCATION - Industry and FAA to educate pilots on the practical implications of extreme fatigue on physical/mental condition, including relating to other experiences (e.g., xx hours awake = xx beers).
0.7	3.0	2.2	393	RESEARCH - Industry and academia to explore feasibility and impact of insurance discounts for best safety practices.
0.7	3.0	2.2	329	EDUCATION - FAA/Industry (SAFE/NAFI/AOPA/ASI/EAA) to develop and promote methods/techniques to acquire, identify, and safely enter traffic patterns in night VFR.
0.8	2.9	2.2	229	OUTREACH - FAASTeam to actively recruit additional safety representatives to be assigned to remote locations.
0.7	3.0	2.2	376	POLICY - FAA/AFS to review enforcement policy and new compliance philosophy with respect to pilots who self-report inadvertent flight into IMC and address as appropriate.
0.8	2.9	2.2	265	OUTREACH - Encourage FAA and Industry to explore new methods for communicating the risks of pilots flying while taking OTC medications (e.g., research, simulations, direct messaging, accident scenarios, consequences of non-compliance).
0.8	2.9	2.2	307	OUTREACH - Industry/FAASTeam to make use of existing communication channels to emphasize importance of proper preflight planning.
0.8	2.9	2.2	314	OUTREACH/EDUCATION - FAA and industry to educate (initial and recurrent) pilots on the enhanced dangers of flying in mountainous terrain in combination with low ceilings.
0.8	2.9	2.2	340	EDUCATION - FAA/Industry to provide enhanced training to both pilots and controllers highlighting complexities of programming modern aircraft and managing IFR clearances/"void times."
0.9	2.4	2.2	214	OUTREACH - FAA/Industry to encourage greater adoption and implementation of SMS standards.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.7	2.9	2.1	224	OUTREACH - FAASTeam and Industry to develop data-driven education campaign to alert pilots to the real hazards of non-compliance and safety implications.
0.7	2.9	2.1	236	OUTREACH - FAASTeam/Industry to develop outreach campaign encouraging pilots to always have secondary source of navigation available and ready (including visual sources).
0.7	2.9	2.1	285	OUTREACH - FAA/Industry to encourage greater emphasis on missed approach proficiency during training and recurrent training exercises.
0.7	2.9	2.1	432	TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture aimed at high-time pilots.
0.7	2.9	2.1	445	TRAINING - FAASTeam/Industry to emphasize to pilots the importance of reading approach plate notes as part of pre-flight planning.
0.8	2.7	2.1	390	RESEARCH - FAA/Industry to encourage quick adoption of voice-to-text technology that transcribes radio calls and alert controllers to readback discrepancies.
0.7	2.9	2.1	199	EDUCATION/OUTREACH - FAASTeam/SAFE/NAFI to add night VFR arrival planning as flight review emphasis item.
0.7	2.9	2.1	305	OUTREACH - Industry to encourage informal meetings between pilots and controllers.
0.7	2.9	2.1	335	EDUCATION - FAA/Industry to emphasize that IPC should be completed annually in same/similar aircraft to one typically flown.
0.8	2.7	2.1	211	OUTREACH - FAA/Industry to develop educational campaign to address unique risks associated with special mission operations.
0.8	2.7	2.1	256	OUTREACH - FAA/Industry to promote CRM concepts adapted for students.
0.8	2.6	2.1	220	OUTREACH - FAA/Industry to promote HIMS and other substance abuse support programs to GA pilots, family, and friends.
0.8	2.4	2.0	367	POLICY - FAA to ensure greater emphasis on FAA/Designee/CFI intervention in the case of known unsafe behavior.
0.7	2.7	2.0	255	OUTREACH - FAA/Industry (SAFE & NAFI) to strongly encourage mentorship of low time CFIs (e.g., CFICare Campaign).
0.7	2.7	2.0	257	OUTREACH - SAFE/NAFI and FAA to promote CFI professionalism.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.7	2.7	2.0	414	TECHNOLOGY - Encourage MITRE and EFB/avionics OEMs to create digital co-pilot-like tech providing pilots with altitude and track warnings.
0.7	2.9	2.0	227	OUTREACH - FAASTeam and Industry to encourage GA pilots to seek greater mission-specific training when planning to fly in unfamiliar environment (e.g., mountain flying).
0.7	3.0	2.0	325	EDUCATION - FAA and industry to stress the importance of obtaining updated weather information while airborne.
0.7	3.0	2.0	351	TRAINING/EDUCATION - FAA and industry to emphasize the importance of checklist usage.
0.7	2.7	1.9	281	OUTREACH - FAA/Industry to emphasize dangers of flying into known icing with inoperative FIKI equipment.
0.7	2.9	1.9	448	TRAINING - Industry to train pilots/companies to establish procedures on briefing minimum sector altitudes when preparing for approach (e.g., MVAs don't apply on published route segments).
0.7	2.6	1.9	217	OUTREACH - FAA/Industry to encourage operators to implement fatigue awareness training and establish fatigue risk management policies.
0.7	2.6	1.9	222	OUTREACH - FAASTeam and Industry to develop an education program that promotes pilot discipline and strengthening safety culture.
0.7	2.9	1.9	223	OUTREACH - FAASTeam and Industry to develop an education program that reminds pilots of the importance of being physically, mentally, and emotionally fit to fly.
0.7	2.9	1.9	239	Outreach - FAASTeam to Encourage flight training providers to offer more scenario-based go-around training.
0.7	2.9	1.9	280	OUTREACH - FAA/Industry to emphasize dangers of flying GPS-direct without proper preflight planning.
0.7	2.9	1.9	284	OUTREACH - FAA/Industry to encourage greater emphasis on automation management and hand flying skills in IMC during training and recurrent training exercises.
0.7	2.9	1.9	355	INSURANCE - Insurance industry to incentivize monthly instrument proficiency exercises (i.e., desktop/sim sessions, computer-based training, workshop attendance, etc.).

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.7	2.9	1.9	429	TRAINING - ATO to review training for controller-issued Safety Alerts to ensure controllers are comfortable and proficient at issuing appropriate Safety Alerts.
0.6	3.0	1.9	207	OUTREACH - Encourage the FAA and airport owners/operators to facilitate, liaise, and improve coordination with state and local law enforcement to help identify and/or intervene in potential non-compliance activity, particularly in the case of substance abuse.
0.6	3.0	1.9	337	EDUCATION - FAA/Industry to encourage flight training providers to include fatigue risk management training into initial and recurrent training (including Part 91 pilots obtaining make/model specific training or type rating).
0.6	3.0	1.9	343	EDUCATION - FAASTeam to educate pilots on the consequences of failing to adhere to published altitudes, including with accident examples and approaches with obstacles.
0.6	3.0	1.8	286	OUTREACH - FAA/Industry to encourage membership/participation in ASI courses, IMC Clubs, etc., that promote “personal proficiency standards.”
0.7	2.7	1.8	289	OUTREACH - FAA/Industry to encourage pilots and operators to install enhanced vision systems (EVS) and synthetic vision (SVS) on GA aircraft.
0.7	2.7	1.8	428	TRAINING - ATO to review procedures to prevent controllers from clearing pilots for unauthorized procedures.
0.6	2.9	1.8	260	TRAINING - Industry and FAASTeam to develop enhanced training resources aimed at pilots using technology for terrain avoidance.
0.6	2.9	1.8	306	OUTREACH - Industry to encourage manufacturers to facilitate greater adoption of synthetic vision technology for GA aircraft.
0.8	2.3	1.8	375	POLICY - FAA to require commercial operators to incorporate operational controls that guard against financial incentives to complete unsafe assignments.
0.6	2.9	1.7	315	OUTREACH - FAA/Industry to encourage pilots to access as much weather information as possible, including electronic, briefer, etc.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.6	3.0	1.7	1	MEDICAL - Industry groups, academia, FAA (CAMI, FAAST, ATC), insurance providers and the medical community should develop educational tools, surveys (both pre- and post-implementation), educational materials and research in order to reduce the risk of pilots inadvertently flying under the influence of over-the-counter or prescription medications that might adversely affect their ability to safety operate aircraft.
0.6	3.0	1.7	204	OUTREACH - ATO to continue to emphasize importance of proper "hearback, readback" procedures.
0.6	3.0	1.7	344	EDUCATION - FAASTeam and Industry to emphasize the importance of the use of FRATs with respect to available navigation equipment and resources.
0.6	3.0	1.7	373	POLICY - FAA to more regularly check airmen against driver registry regarding DUI history.
0.6	3.0	1.7	48	TRAINING - FAA and industry develop training and educational materials concerning the impact of aircraft gross weight on take-off performance safety margins and the importance of monitoring AOA (if aircraft so equipped).
0.6	2.9	1.6	385	RESEARCH - COEs to conduct research on the extent to which lack of amnesty acts as an economic barrier to safe operations.
0.6	2.9	1.6	394	RESEARCH - Industry and academia to research additional mechanisms to better convey IMC conditions to controllers.
0.7	2.4	1.6	216	OUTREACH - FAA/Industry to encourage operators flying high-risk missions to include in their risk assessment mitigation strategies the option for requiring a safety pilot.
0.5	3.0	1.6	271	OUTREACH - FAA/FAASTeam to educate pilots to better understand the dangers of flight in IMC when not IFR rated/proficient.
0.6	2.7	1.6	451	TECHNOLOGY - Encourage MITRE and industry to explore capabilities of in-cockpit technology to detect and alert pilots of deteriorating weather.
0.5	2.9	1.5	238	OUTREACH - FAASTeam/Industry to encourage membership/participation in ASI courses, IMC Clubs, etc., that promote "personal proficiency standards."
0.5	2.9	1.5	243	OUTREACH - Industry to develop programs to help infrequent IFR pilots continue their education "dusty rating."

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.7	2.3	1.5	248	OUTREACH - Medical community (e.g., AMA) to help educate physicians on unique aspects of treating and prescribing medications to pilots.
0.5	3.0	1.5	324	EDUCATION - FAA and industry to encourage pilots flying into untowered airports to frequently monitor (in contrast to checking once) available weather sources to assist in identifying changing conditions.
0.5	2.9	1.5	225	OUTREACH - FAASTeam and Industry to develop dedicated outreach to high-risk groups, including high time and older pilots, about the risks of complacency.
0.5	3.0	1.5	439	TRAINING - FAA/Industry to incorporate risk-management and scenario-based training in flight reviews.
0.5	3.0	1.5	446	TRAINING - Industry (particularly SAFE and NAFI) to encourage CFIs to give initial and recurrent training in real IMC even to pilots without an instrument rating.
0.6	2.6	1.4	386	RESEARCH - FAA to develop more intuitive, user-friendly weather products that track utilization.
0.5	2.9	1.4	249	OUTREACH - NBAA to encourage commercial operators to emphasize importance of fundamental pilot skills.
0.5	2.9	1.4	198	EDUCATION/OUTREACH - FAA/Industry to stress the importance of communicating safety-pilot duties and responsibilities, appropriate to phase of flight and commensurate with the safety-pilot's experience (e.g., during approaches safety-pilot should be aware of altitude minimums and lateral guidance).
0.5	3.0	1.4	345	EDUCATION - FAASTeam to develop education programs, including basicmed course materials, to raise pilot awareness of the effects of illegal and/or legal substances on flying, emphasizing time between use and take-off.
0.4	3.0	1.3	418	TECHNOLOGY - Encourage publishers of electronic logbooks to include personal proficiency standards to metrics, FAA/Industry to encourage utilization.
0.4	3.0	1.3	201	OUTREACH - AOPA/EAA/SAFE/NAFI/FAASTeam to develop 2-minute "CFI Care Tips" videos.
0.4	3.0	1.3	266	OUTREACH - Encourage insurance companies to provide incentives for pilot participation in "loss of situational awareness" seminars.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.5	2.7	1.3	437	TRAINING - FAA/Industry to encourage CFIs to incorporate more realistic IMC scenario-based training activities during student pilot training.
0.4	3.0	1.3	230	OUTREACH - FAASTeam to conduct outreach stressing the need for and importance of obtaining updated weather briefings whenever an hour or more lapses between briefing and departure.
0.4	3.0	1.3	430	TRAINING - Encourage increased understanding of the hazards of IMC and night flight.
0.4	3.0	1.3	405	TECHNOLOGY - App for pilots willing to assist other pilots who have to divert with rides, lodging, etc.
0.4	2.7	1.2	323	EDUCATION - FAA and industry to educate pilots on the limitations of non-certified equipment and emphasize the risks associated with flying instrument approaches with non-certified equipment.
0.4	2.7	1.2	402	RESEARCH - FPAW/Academia to research potential development of IMC detection systems (IDS) and IMC reporting systems; systems should be made available to mobile devices, EFBs, etc.
0.4	2.7	1.2	410	TECHNOLOGY - Encourage FAA to install additional weather reporting systems (AWOS, ASOS) at airports based on risk assessment, including instrument approaches, terrain, nearest weather reporting station.
0.4	3.0	1.2	205	OUTREACH - ATO to educate controllers on “bystander effect” and necessity to intervene in safety-critical situations.
0.4	2.9	1.2	234	OUTREACH - FAASTeam to reinforce visual approach techniques, particularly for night operations in mountainous terrain.
0.4	2.9	1.2	245	OUTREACH - Industry to encourage member organizations to make available travel discounts (taxi, hotel) to pilots who make pro-safety diversion decisions.
0.4	2.7	1.1	264	OUTREACH - EAA/AOPA to coordinate with FAA/Industry to develop content targeting challenges for low-time CFIs (type club collation finishing a transition training guide for transition training).
0.4	2.9	1.1	253	OUTREACH/EDUCATION - FAASTeam/Industry to emphasize the need for training and currency when flying in mountainous areas.
0.4	2.9	1.1	400	RESEARCH - PEGASAS/Industry to research motivating factors and potential interventions that will lead to greater pilot compliance with safety of flight rules, and industry to then implement recommendations.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.4	2.7	1.0	209	OUTREACH - FAA to encourage Part 135 operators to implement mandatory stand-down period for pilots following accidents/incidents.
0.4	2.7	1.0	252	OUTREACH - UAA/NAFI/SAFE to encourage flight schools to develop guidance for instructors on “duty times” and fatigue, in particular with respect to nighttime instruction.
0.4	2.9	1.0	250	OUTREACH - Promote use of AC 90–109 in guiding transition training and the importance of transition training, even when transitioning between model subtypes.
0.3	2.9	1.0	277	OUTREACH - FAA/Industry to educate pilots on how to smartly interpret text-based weather briefings.
0.3	2.9	1.0	212	OUTREACH - FAA/Industry to emphasize dangers of overreliance on technology.
0.3	2.9	1.0	251	OUTREACH - Training industry to emphasize emergency situation task management.
0.3	3.0	0.9	343	EDUCATION - FAAST to educate pilots on the consequences of failing to adhere to published altitudes, including with accident examples and approaches with obstacles.
0.4	2.6	0.9	383	RESEARCH - ATO to study merits of increasing changeover period between shifts.
0.3	2.7	0.9	202	OUTREACH - ASIs to encourage commercial operators to utilize risk-management tools (such as Flight Safety Foundation CFIT Checklist) to address pilot stress.
0.4	2.4	0.9	401	RESEARCH - Research factors of aging in pilots. How do age, disease, cognitive and psychomotor skills affect flying/decision-making ability relate to accidents?
0.3	2.9	0.9	213	OUTREACH - FAA/Industry to emphasize unique risks of low-altitude flying.
0.3	2.9	0.9	299	OUTREACH - FAASTeam to reemphasize dangers of low-altitude operations.
0.3	3.0	0.8	371	POLICY - FAA to incentivize self-reporting on medical questionnaire.

Overall Effectiveness	*Average Feasibility*	*OE x F*	*Intervention No.*	*Intervention*
0.2	2.9	0.7	103	EDUCATION - Organizations/Associations/FAASTeam to develop an outreach program to GA stakeholders (inc. pilots, family, etc.) to encourage a "see something, say something" mentality; including, but not limited to, hotline to appropriate party and presentations to stakeholders highlighting risks of flying with a poor personal safety culture.
0.2	2.7	0.5	283	OUTREACH - FAA/Industry to emphasize unique challenges of proper ADM with pilot aging.
0.2	3.0	0.5	197	EDUCATION - FAAST Team to conduct outreach stressing the need for vigilance when flying outside normal circadian; in particular, summer night flying.
0.2	2.9	0.5	3	#3- MEDICAL - CAMI, CGAR, and other aero-medical associations as identified, perform a study to determine barriers to open an honest communication between AME/docs and the pilot community and recommend enhancements to pilot medical program in order to improve open communication.
0.2	2.9	0.4	296	OUTREACH - FAASTeam and AAM to educate pilots on signs and symptoms of medical emergencies in the cockpit.
0.1	2.9	0.4	282	OUTREACH - FAA/Industry to emphasize the negative effects of aging on pilot vision.
0.1	3.0	0.4	370	POLICY - FAA to improve medical questionnaire clarity, particularly with respect to DUI history.
0.1	2.7	0.4	278	OUTREACH - FAA/Industry to educate pilots on the potential benefits of a flightplan for ensuring timely activation of SAR services.
0.1	3.0	0.4	443	TRAINING - FAASTeam and industry to develop training materials focusing on proper configuration for phase of flight.
0.1	2.9	0.2	241	OUTREACH - Industry to develop an outreach campaign highlighting the importance of the use of seatbelt restraints.
0.0	2.7	0.0	354	GUIDANCE - STC manufacturers to include flight manual entry on dangers of accumulating ice on floats.

Appendix 9 — Intervention Feasibility

CFIT INTERVENTION FEASIBILITY

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
1	MEDICAL - Industry groups, academia, FAA (CAMI, FAAST, ATC), insurance providers, and the medical community should develop educational tools, surveys (both pre- and post-implementation), educational materials and research in order to reduce the risk of pilots inadvertently flying under the influence of over-the-counter or prescription medications that might adversely affect their ability to safely operate aircraft.	4	2	3.43	0.57	3	3	3	3	3	3	3	3.00
3	#3- MEDICAL - CAMI, CGAR, and other aero-medical associations as identified, perform a study to determine barriers to open an honest communication between AME/docs and the pilot community, and recommend enhancements to pilot medical program in order to improve open communication.	2	1	2.00	0.17	3	3	3	2	3	3	3	2.86
6	EDUCATION - FAA, industry, and academia develop educational campaign on the dangers fatigue on flying in order to reduce the likelihood of accidents due to pilot fatigue.	4.5	3.5	4.24	2.06	3	3	3	3	3	3	2	2.86

CFIT
CONTROLLED FLIGHT INTO TERRAIN

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
28	PROCEDURES - Type Clubs, aircraft manufacturers, and operator groups develop simplified miss approach, go-around, and other procedures/checklists to reduce the likelihood of accidents due to high pilot workload during critical phase of flights.	4.5	3	4.74	1.58	3	3	3	2	3	3	3	2.86
48	TRAINING - FAA and industry develop training and educational materials concerning the impact of aircraft gross weight on take-off performance safety margins and the importance of monitoring AOA (if aircraft so equipped).	3	1.5	3.43	0.57	3	3	3	3	3	3	3	3.00
54	Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.	3.5	2.5	4.12	1.14	3	3	3	3	3	3	3	3.00
90	TRAINING - Training industry develop consensus on standard pattern procedures (altitude/power setting/airspeed/glidepath/configuration); emphasize the importance of flying a standard traffic pattern to facilitate the stabilized approach appropriate to the type of operation, aircraft type, environment, and to emphasize the importance of proper and timely go around decisions and procedures when the landing approach is not stabilized by X.	4.5	3	4.74	1.58	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
103	EDUCATION- Organizations/Associations/FAASTeam to develop an outreach program to GA stakeholders (inc. pilots, family, etc.) to encourage a "see something, say something" mentality; including, but not limited to, hotline to appropriate party and presentations to stakeholders highlighting risks of flying with a poor personal safety culture.	2	1	2.86	0.24	3	3	3	3	3	3	2	2.86
186	TRAINING - FAA and associations work to re-emphasize the need for training and currency when flying in mountainous areas.	4	2.5	4.44	1.39	3	3	3	3	3	3	2	2.86
196	EDUCATION - FAA and Industry outreach campaign on when to declare an emergency; emphasize compliance philosophy.	4	3	4.00	1.00	3	3	3	3	3	3	3	3.00
197	EDUCATION - FAASTeam to conduct outreach stressing the need for vigilance when flying outside normal circadian; in particular, summer night flying.	3	1	3.00	0.17	3	3	3	3	3	3	3	3.00
198	EDUCATION/OUTREACH - FAA/Industry to stress the importance of communicating safety-pilot duties and responsibilities, appropriate to phase of flight and commensurate with the safety-pilot's experience (e.g., during approaches safety-pilot should be aware of altitude minimums and lateral guidance).	4	2	4.44	0.49	3	3	3	3	3	3	2	2.86
199	EDUCATION/OUTREACH - FAASTeam/SAFE/NAFI to add night VFR arrival planning as flight review emphasis item.	4	2.5	4.24	0.74	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
200	OUTREACH - MITRE to make virtual co-pilot technology ensuring terrain avoidance widely available to flying public.	5	3	5.00	1.25	3	3	3	3	3	3	2	2.86
201	OUTREACH - AOPA/EAA/SAFE/NAFI/FAASTeam to develop 2-minute “CFI Care Tips” videos	3.5	2.5	3.23	0.45	3	3	3	3	3	3	3	3.00
202	OUTREACH - ASIs to encourage commercial operators to utilize risk-management tools (such as Flight Safety Foundation CFIT Checklist) to address pilot stress.	3	2	3.00	0.33	3	3	3	3	3	3	1	2.71
203	OUTREACH - ATO and Industry to encourage informal meetings between pilots and controllers to facilitate better communication.	3	2	3.43	0.76	3	3	3	3	3	3	3	3.00
204	OUTREACH - ATO to continue to emphasize importance of proper “hearback, readback” procedures.	3	2	3.43	0.57	3	3	3	3	3	3	3	3.00
205	OUTREACH - ATO to educate controllers on “bystander effect” and necessity to intervene in safety-critical situations.	3	2	3.60	0.40	3	3	3	3	3	3	3	3.00
206	OUTREACH - ATO to incorporate into controller training and recurrent training review of case studies that highlight accidents where ATC instructions contributed to accidents (particularly with respect to LOC, CFIT and midair collisions).	4	3	4.00	1.00	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
207	OUTREACH - Encourage the FAA and airport owners/operators to facilitate, liaise, and improve coordination with state and local law enforcement to help identify and/or intervene in potential non-compliance activity, particularly in the case of substance abuse.	3	2	3.75	0.63	3	3	3	3	3	3	3	3.00
208	OUTREACH - FAA to encourage commercial operators to ensure ops manuals contain instructions for pilots to utilize all available tools to ensure safe outcome of a given flight; manuals should give guidance for when systems should or should not be inhibited.	3.5	3	3.73	0.93	3	3	3	3	3	3	1	2.71
209	OUTREACH - FAA to encourage Part 135 operators to implement mandatory stand-down period for pilots following accidents/incidents.	3	2	3.43	0.38	3	3	3	3	3	3	1	2.71
210	OUTREACH - FAA/Industry to develop a conference/educational event aimed at air tour operators in an effort to encourage the sharing of safety best practices.	3	2.5	3.75	0.91	3	3	3	3	3	3	1	2.71
211	OUTREACH - FAA/Industry to develop educational campaign to address unique risks associated with special mission operations.	3	2	3.43	0.76	3	3	3	3	3	3	1	2.71
212	OUTREACH - FAA/Industry to emphasize dangers of overreliance on technology.	4	1	4.00	0.33	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
213	OUTREACH - FAA/Industry to emphasize unique risks of low altitude flying	3	1	3.75	0.31	3	3	3	3	3	3	2	2.86
214	OUTREACH - FAA/Industry to encourage greater adoption and implementation of SMS standards.	4	2	4.00	0.89	3	3	2	3	3	2	1	2.43
215	OUTREACH - FAA/Industry to encourage installation of enhanced restraint systems.	5	2.5	4.44	1.08	3	3	3	3	3	3	3	3.00
216	OUTREACH - FAA/Industry to encourage operators flying high-risk missions to include in their risk-assessment mitigation strategies the option for requiring a safety pilot.	4	2	4.00	0.67	3	3	3	3	3	1	1	2.43
217	OUTREACH - FAA/Industry to encourage operators to implement fatigue awareness training and establish fatigue risk-management policies.	4	2	4.44	0.74	3	3	3	3	3	2	1	2.57
218	OUTREACH - FAA/Industry to encourage operators, especially 135 certificate holders, to adopt formalized risk-assessment mechanisms.	5	3	4.44	1.11	3	3	3	3	3	2	1	2.57
219	OUTREACH - FAA/Industry to encourage pilots to use in-cockpit weather services (ADS–B, satellite).	4	3	4.44	1.11	3	3	3	3	3	3	2	2.86
220	OUTREACH - FAA/Industry to promote HIMS and other substance abuse support programs to GA pilots, family, and friends.	4	2	4.80	0.80	3	3	3	3	3	2	1	2.57
221	OUTREACH - FAA/Industry to promote use of third-party “dispatch”/SMS evaluation services (including mentorships) to assist pilots in go/no-go decision.	5	3	5.00	1.67	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
222	OUTREACH - FAASTeam and Industry to develop an education program that promotes pilot discipline and strengthening safety culture.	4	2	4.44	0.74	2	3	3	3	3	2	2	2.57
223	OUTREACH - FAASTeam and Industry to develop an education program that reminds pilots of the importance of being physically, mentally, and emotionally fit to fly.	4	2	4.00	0.67	3	3	3	3	3	3	2	2.86
224	OUTREACH - FAASTeam and Industry to develop data-driven education campaign to alert pilots to the real hazards of non-compliance and safety implications.	4	2	4.44	0.74	3	3	3	3	3	3	2	2.86
225	OUTREACH - FAASTeam and Industry to develop dedicated outreach to high-risk groups, including high time and older pilots, about the risks of complacency.	3	1	3.75	0.52	3	3	3	3	3	3	2	2.86
226	OUTREACH - FAASTeam and Industry to develop education material that encourages pilots to ask controllers for help.	4	2	4.00	0.89	3	3	3	3	3	3	2	2.86
227	OUTREACH - FAASTeam and Industry to encourage GA pilots to seek greater mission-specific training when planning to fly in unfamiliar environment (e.g., mountain flying).	4	2	4.00	0.70	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
228	OUTREACH - FAASTeam outreach on alternate routes for mountain flying, special emphasis on timely diversion decisions. Reference ASI “178 Seconds to Live” video.	3	3	3.60	1.05	3	3	3	3	3	3	2	2.86
229	OUTREACH - FAASTeam to actively recruit additional safety representatives to be assigned to remote locations.	4	2	4.63	0.77	3	3	3	3	3	3	2	2.86
230	OUTREACH - FAASTeam to conduct outreach stressing the need for and importance of obtaining updated weather briefings whenever an hour or more lapses between briefing and departure.	4	2	4.00	0.44	3	3	3	3	3	3	3	3.00
231	OUTREACH - FAASTeam to develop an outreach campaign highlighting dangers of fixation and tunnel vision during critical phases of flight.	4	2	4.44	0.74	3	3	3	3	3	3	3	3.00
232	OUTREACH - FAASTeam to promote consistent use of established WX camera systems.	4	3	4.63	1.35	3	3	3	3	3	3	2	2.86
233	OUTREACH - FAASTeam to promote use of AC 90–109 in guiding transition training and the importance of transition training, even when transitioning between model subtypes.	3.5	3	4.12	1.54	3	3	3	3	3	3	2	2.86
234	OUTREACH - FAASTeam to reinforce visual approach techniques, particularly for night operations in mountainous terrain.	3	1	3.75	0.42	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
235	OUTREACH - FAASTeam/Industry to develop and distribute video to demonstrate the difference between vertical and slant range visibility in fog.	4	2	4.44	0.99	3	3	3	3	3	3	2	2.86
236	OUTREACH - FAASTeam/Industry to develop outreach campaign encouraging pilots to always have secondary source of navigation available and ready (including visual sources).	4	2	4.44	0.74	3	3	3	3	3	3	2	2.86
237	OUTREACH - FAASTeam/Industry to encourage greater use of accurate position source technology among GA pilots.	5	3	5.45	1.82	3	3	3	3	3	3	2	2.86
238	OUTREACH - FAASTeam/Industry to encourage membership/participation in ASI courses, IMC Clubs, etc., that promote “personal proficiency standards.”	3.5	3	3.23	0.54	3	3	3	3	3	3	2	2.86
239	Outreach - FAASTeam to Encourage flight training providers to offer more scenario-based go-around training.	4	2	4.00	0.67	3	3	3	3	3	3	2	2.86
240	OUTREACH - Industry and FAA to educate and encourage pilots re: proper utilization of available weather information, including ground-based and in-cockpit resources.	5	3	4.44	1.11	3	3	3	3	3	3	2	2.86
241	OUTREACH - Industry to develop an outreach campaign highlighting the importance of the use of seatbelt restraints.	3	1	1.50	0.08	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
242	OUTREACH - Industry to develop outreach campaign encouraging pilots to always have secondary source of navigation available and ready (including visual sources).	4	2	4.44	0.74	3	3	3	3	3	3	3	3.00
243	OUTREACH - Industry to develop programs to help infrequent IFR pilots continue their education "dusty rating."	3.5	3	3.23	0.54	3	3	3	3	3	3	2	2.86
244	OUTREACH - Industry to encourage greater adoption of scalable Fatigue Management Systems and practices.	5	2	5.00	1.11	3	3	3	3	3	3	2	2.86
245	OUTREACH - Industry to encourage member organizations to make available travel discounts (taxi, hotel) to pilots who make pro-safety diversion decisions.	3	1	3.75	0.42	3	3	3	3	3	3	2	2.86
247	OUTREACH - Industry to promote creation/use of user comments on popular online airport directory platforms (AOPA Airports, Foreflight, AirNav, etc.).	3.5	2	4.12	0.92	3	3	3	3	3	3	2	2.86
248	OUTREACH - Medical community (e.g., AMA) to help educate physicians on unique aspects of treating and prescribing medications to pilots.	4	2	4.00	0.67	2	3	3	1	3	2	2	2.29
249	OUTREACH - NBAA to encourage commercial operators to emphasize importance of fundamental pilot skills.	3	2	3.00	0.50	3	3	3	3	3	3	2	2.86
250	OUTREACH - Promote use of AC 90–109 in guiding transition training and the importance of transition training, even when transitioning between model subtypes.	3.5	2.5	2.55	0.35	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
251	OUTREACH - Training industry to emphasize emergency situation task management.	3	2	3.00	0.33	3	3	3	3	3	3	2	2.86
252	OUTREACH - UAA/NAFI/SAFE to encourage flight schools to develop guidance for instructors on “duty times” and fatigue, in particular with respect to nighttime instruction.	4	2	3.43	0.38	3	3	3	3	3	3	1	2.71
253	OUTREACH/EDUCATION - FAASTeam/Industry to emphasize the need for training and currency when flying in mountainous areas.	3	2	3.43	0.38	3	3	3	3	3	3	2	2.86
254	OUTREACH - FAA/Industry (SAFE & NAFI) to promote the importance of CFIs preparing a plan of action prior to every flight and sharing with learners/students.	5	2	5.00	0.83	3	3	3	3	3	3	1	2.71
255	OUTREACH - FAA/Industry (SAFE & NAFI) to strongly encourage mentorship of low time CFIs (e.g., CFICare Campaign).	4	2	4.44	0.74	3	3	3	3	3	3	1	2.71
256	OUTREACH - FAA/Industry to promote CRM concepts adapted for students.	3	2	3.43	0.76	3	3	3	3	3	3	1	2.71
257	OUTREACH - SAFE/NAFI and FAA to promote CFI professionalism.	4	2	4.44	0.74	3	3	3	3	3	3	1	2.71
258	POLICY/OUTREACH - FAA to incorporate greater emphasis on PIC authority to deviate from ATC instructions in the private pilot ACS.	4	3	4.00	1.33	3	3	3	3	2	3	3	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
259	RESEARCH/EDUCATION - PEGASAS and NTSB to conduct research on pilot reluctance to self-report or request assistance when inadvertently entering IMC. Industry to develop outreach campaign to pilots highlighting protections against enforcement actions when pilots report unintended flight into IMC.	4	3	4.44	1.30	3	3	3	1	3	3	2	2.57
260	TRAINING - OUTREACH - Industry and FAASTeam to develop enhanced training resources aimed at pilots using technology for terrain avoidance.	3	2	3.00	0.50	3	3	3	3	3	3	3	3.00
261	TRAINING - FAA/industry promote the use of the flight risk analysis tools (FRAT).	3.5	3	4.28	1.25	3	3	3	3	3	3	2	2.86
262	TRAINING/OUTREACH - FAASTeam/Industry to emphasize PIC authority, particularly as it pertains to ATC instructions and pilot responsibilities.	4	2	4.00	0.89	3	3	3	3	3	3	3	3.00
264	OUTREACH - EAA/AOPA to coordinate with FAA/Industry to develop content targeting challenges for low-time CFIs (type club collation finishing a transition training guide for transition training).	3	2.5	3.00	0.42	3	3	3	3	3	3	1	2.71
265	OUTREACH - Encourage FAA and Industry to explore new methods for communicating the risks of pilots flying while taking OTC medications (e.g., research, simulations, direct messaging, accident scenarios, consequences of non-compliance).	3	2	3.43	0.76	3	3	3	2	3	3	3	2.86

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266	OUTREACH - Encourage insurance companies to provide incentives for pilot participation in “loss of situational awareness” seminars.	3	2.5	3.23	0.45	3	3	3	3	3	3	3	3.00
267	OUTREACH - FAA/Industry to encourage pilots and operators to install enhanced vision systems (EVS) and/or synthetic vision (SVS) on GA aircraft (e.g., GCAS).	4.5	4	4.95	2.48	3	3	3	3	3	3	2	2.86
268	OUTREACH - FAA and industry emphasize the importance of ADM concerning pressures to complete a mission.	5	2	5.45	1.21	3	3	3	3	3	3	3	3.00
269	OUTREACH - FAA to develop and publish guidance for the use of equipment-specific electronic avionics display simulators and procedural trainers that do not meet the definition of flight simulation training devices prescribed in Title 14, Code of Federal Regulations (14 CFR) part 60 to support equipment-specific pilot training requirements (NTSB Rec. A–10–40).	4	2.5	4.00	0.83	3	3	3	3	2	2	3	2.71
270	OUTREACH - FAA to promote “Circle of Safety” or similar program that educates tour/Part 135 clients on aviation safety issues.	4	2.5	4.24	1.18	3	3	3	3	3	3	1	2.71
271	OUTREACH - FAA/FAASTeam to educate pilots to better understand the dangers of flight in IMC when not IFR rated/proficient.	4	1	4.80	0.53	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
272	OUTREACH - FAA/GA Associations to develop information and advise pilots that special procedures exist for 121/135 operators at certain high-altitude/mountainous airports that Part 91 pilots may find helpful.	4	3	4.44	1.67	3	3	3	3	3	3	3	3.00
275	OUTREACH - FAA/Industry to develop guidance on designing and maintaining private airports.	4	3	4.44	1.48	3	3	2	2	3	2	1	2.29
276	OUTREACH - FAA/Industry to educate pilots on already available benefits of low-cost terrain awareness technology such as terrain-enabled EFBs, VSI alerters, and “Digital Copilot” type systems (e.g., GCAS).	4.5	3.5	4.74	1.84	3	3	3	3	3	3	2	2.86
277	OUTREACH - FAA/Industry to educate pilots on how to smartly interpret text-based weather briefings.	3	1.5	3.23	0.34	3	3	3	3	3	3	2	2.86
278	OUTREACH - FAA/Industry to educate pilots on the potential benefits of a flightplan for ensuring timely activation of SAR services.	2	2	1.71	0.14	3	3	3	3	3	2	2	2.71
279	OUTREACH - FAA/Industry to educate pilots on the risks associated with lack of recent flight experience.	4	2	4.00	0.89	3	3	3	3	3	3	2	2.86
280	OUTREACH - FAA/Industry to emphasize dangers of flying GPS-direct without proper preflight planning.	4	1	4.80	0.67	3	3	3	3	3	3	2	2.86
281	OUTREACH - FAA/Industry to emphasize dangers of flying into known icing with inoperative FIKI equipment.	3	2	3.23	0.72	3	3	3	3	3	3	1	2.71
282	OUTREACH - FAA/Industry to emphasize the negative effects of aging on pilot vision.	4	2	2.67	0.15	3	3	3	3	3	2	3	2.86

Intervention No.	Intervention	P2	C	Power	Overall Effectiveness	Technical	Financial	Operational	Schedule	Regulatory	Sociological	Pilot Population	Overall Feasibility
283	OUTREACH - FAA/Industry to emphasize unique challenges of proper ADM with pilot aging.	2	1	2.40	0.20	3	3	3	3	3	2	2	2.71
284	OUTREACH - FAA/Industry to encourage greater emphasis on automation management and hand flying skills in IMC during training and recurrent training exercises.	4	2	4.00	0.67	3	3	3	3	3	3	2	2.86
285	OUTREACH - FAA/Industry to encourage greater emphasis on missed approach proficiency during training and recurrent training exercises.	4	2	4.44	0.74	3	3	3	3	3	3	2	2.86
286	OUTREACH - FAA/Industry to encourage membership/participation in ASI courses, IMC Clubs, etc., that promote “personal proficiency standards.”	3.5	2.5	3.50	0.61	3	3	3	3	3	3	3	3.00
289	OUTREACH - Encourage pilots and operators to install enhanced vision systems (EVS) and synthetic vision (SVS) on GA aircraft (e.g., GCAS).	5	4	5.00	2.22	3	3	3	3	3	3	3	3.00
290	OUTREACH - FAA/Industry to encourage pilots and operators to install TAWS and equivalent systems equipped with descent after takeoff warning.	4	2.5	4.44	1.08	3	3	3	3	3	3	1	2.71
291	OUTREACH - FAA/Industry to encourage tour operators to establish criteria around changing tour routes based on weather (similar to criteria for airshow routines).	5	3	4.44	1.11	3	3	3	3	3	2	1	2.57

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292	OUTREACH - FAA/Industry to encourage tour/Pt. 135 Operators to establish mentorship programs for new pilots to promote safe operation of aircraft and familiarity with company procedures.	5	3.5	4.44	1.51	3	3	3	3	3	3	1	2.71
294	OUTREACH - FAA/Industry to promote and educate on the utilization of existing circadian-based fatigue management software/app to pilots and dispatchers (e.g., Netjets' FRAT system).	3.5	3	3.94	1.15	3	3	3	3	3	3	2	2.86
295	OUTREACH - FAA/Industry to recommend that mercy flight recipients be referred to mercy flight organizations, and prospective mercy flight pilots do the same.	3.5	3	3.73	1.09	3	3	3	3	3	3	1	2.71
296	OUTREACH - FAASTeam and AAM to educate pilots on signs and symptoms of medical emergencies in the cockpit.	3	1.5	2.40	0.15	3	3	3	3	3	3	2	2.86
297	OUTREACH - FAASTeam encourage pilots to be assertive with ATC, especially when verifying/clarifying clearances.	4	3	4.00	1.00	3	3	3	3	3	3	3	3.00
298	OUTREACH - FAASTeam to educate pilots in detail on factors that lead to a "VFR not recommended" advisory.	3.5	2.5	3.94	0.96	3	3	3	3	3	3	2	2.86
299	OUTREACH - FAASTeam to reemphasize dangers of low altitude operations.	3	1	3.75	0.31	3	3	3	3	3	3	2	2.86

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300	OUTREACH - FAASTeam/Industry to develop dedicated outreach to high-risk groups, including high time pilots, about the risks of complacency.	3	2	3.43	0.57	3	3	3	3	3	3	3	3.00
302	OUTREACH - Industry and FAASTeam to develop enhanced training resources aimed at pilots using technology for terrain avoidance.	4	2	4.80	1.07	3	3	3	3	3	3	2	2.86
305	OUTREACH - Industry to encourage informal meetings between pilots and controllers.	3	2	3.75	0.73	3	3	3	3	3	3	2	2.86
306	OUTREACH - Industry to encourage manufacturers to facilitate greater adoption of synthetic vision technology for GA aircraft.	3	2	3.75	0.63	3	3	3	3	3	3	2	2.86
307	OUTREACH - Industry/FAASTeam to make use of existing communication channels to emphasize importance of proper preflight planning.	3	2	3.43	0.76	3	3	3	3	3	3	2	2.86
308	OUTREACH - Pilot volunteer organizations and FAAST to conduct “blood on the runway” messaging campaign (with real-life examples) to counterbalance mission pressures and promote organization-specific pro-safety ops standards (e.g., checklists, FRAT, training and fatigue guidelines).	4	2	4.00	0.89	3	3	3	3	3	3	2	2.86
309	OUTREACH - POI to encourage 135 operators engaged in medical transport flights to conduct annual scenario-based training on best practices for such flights or other unusual circumstances.	3.5	3	3.73	1.09	3	3	2	2	3	2	1	2.29

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310	OUTREACH - Promote use of seat/restraint systems above minimum standards with commercial operators.	4	3	3.73	0.93	3	3	3	3	3	2	2	2.71
311	OUTREACH FAA/Industry - Educate pilots on benefits of already available low-cost terrain awareness technology such as terrain-enabled EFBs, VSI alerters, and “Digital Copilot”-type systems, etc.	4	3.5	4.00	1.36	3	3	3	3	3	3	2	2.86
312	OUTREACH- FAA/SAFE team to create CFI decision-making courses (i.e., accident case study).	3.5	2.5	3.73	0.78	3	3	3	3	3	3	2	2.86
314	OUTREACH/EDUCATION - FAA and industry to educate (initial and recurrent) pilots on the enhanced dangers of flying in mountainous terrain in combination with low ceilings.	3	2	3.43	0.76	3	3	3	3	3	3	2	2.86
315	OUTREACH - FAA/Industry to encourage pilots to access as much weather information as possible, including electronic, briefer, etc.	3	2	3.60	0.60	3	3	3	3	3	3	2	2.86
317	TRAINING - FAA and industry emphasize the importance of ADM.	3	2	3.43	0.38	3	3	3	3	3	3	3	3.00
318	ATO to consider amending 7110.65 concerning approach clearances at airports with mountainous terrain to include altitude restrictions during non-precision approaches (example: “Cessna 123AB maintain 14000 until established, cleared for the approach.”).	4	3.5	4.44	2.16	3	3	3	3	2	2	2	2.57

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319	Avionics manufacturers to develop cost-effective terrain awareness using ADSB or other sufficiently accurate position source.	4	3	4.44	1.11	3	3	3	3	3	3	3	3.00
320	EDUCATION - FAA/industry to promote and encourage the use of existing flight risk assessment tools (FRAT).	5	2	5.45	1.21	3	3	3	3	3	3	3	3.00
321	EDUCATION - Add a section to the PHAK and Flight Instructor handbooks on developing PIC decision-making skills relative to go arounds.	4	3	4.44	1.48	3	3	3	1	2	2	3	2.43
322	EDUCATION - FAA and industry (including training providers) to educate the pilot community of the enhancement to safety that flying an instrument approach provides in night VFR, particularly in mountainous terrain.	5	3	5.00	1.67	3	3	3	3	3	3	2	2.86
323	EDUCATION - FAA and industry to educate pilots on the limitations of non-certified equipment and emphasize the risks associated with flying instrument approaches with non-certified equipment.	4	2	4.00	0.44	3	3	3	3	3	2	2	2.71
324	EDUCATION - FAA and industry to encourage pilots flying into untowered airports to frequently monitor (in contrast to checking once) available weather sources to assist in identifying changing conditions.	3	2	3.00	0.50	3	3	3	3	3	3	3	3.00
325	EDUCATION - FAA and industry to stress the importance of obtaining updated weather information while airborne.	4	3	4.00	0.67	3	3	3	3	3	3	3	3.00

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326	EDUCATION - FAA to develop guidance to emphasize teaching situational awareness to primary student pilots (ACS, PHAK, etc.).	4	3	4.80	1.60	3	3	3	1	2	2	2	2.29
327	EDUCATION - FAA to partner with industry (NAFI/SAFE/ASI, etc.) to develop auditable instructor network for standardizing recurrent training.	4	3	4.44	1.85	3	3	2	3	3	2	3	2.71
328	EDUCATION - FAA/Aviation event sponsors to jointly conduct “arrive alive” campaign to mitigate enroute accidents.	4.5	3.5	4.95	1.93	3	3	3	3	3	3	2	2.86
329	EDUCATION - FAA/Industry (SAFE/NAFI/AOPA/ASI/EAA) to develop and promote methods/techniques to acquire, identify, and safely enter traffic patterns in night VFR.	4	2.5	4.24	0.74	3	3	3	3	3	3	3	3.00
330	EDUCATION - FAA/Industry to develop an educational campaign on use of Personal Minimums.	4	3	4.44	1.48	3	3	3	3	3	3	3	3.00
331	EDUCATION - FAA/Industry to educate pilots on importance of planning for contingencies and activating those plans at the appropriate time.	4	2.5	4.00	0.83	3	3	3	3	3	3	3	3.00
332	EDUCATION - FAA/Industry to emphasize case studies involving inappropriate use of tablet apps and similar technology.	4	3	4.24	1.24	3	3	3	3	3	3	3	3.00

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333	EDUCATION - FAA/Industry to emphasize dangers of potentially flying into IMC without IFR flightplan, even when IFR rated; special emphasis on mountainous areas (i.e., “not even once” campaign).	4	2	4.80	1.20	3	3	3	3	3	3	3	3.00
334	EDUCATION - FAA/Industry to emphasize scenario-based training that simulates self-induced pressure to complete flight.	5	3.5	5.24	2.55	3	3	3	3	3	3	3	3.00
335	EDUCATION - FAA/Industry to emphasize that IPC should be completed annually in same/similar aircraft to one typically flown.	3.5	2.5	3.50	0.73	3	3	3	3	3	2	3	2.86
336	EDUCATION - FAA/Industry to emphasize to CFIs the importance of training pilots to be comfortable communicating concerns to ATC.	5	3	5.00	1.46	3	3	3	3	3	3	3	3.00
337	EDUCATION - FAA/Industry to encourage flight training providers to include fatigue risk management training into initial and recurrent training (including Part 91 pilots obtaining make/model specific training or type rating).	3	2	3.75	0.63	3	3	3	3	3	3	3	3.00
338	EDUCATION - FAA/Industry to encourage greater participation in government and industry proficiency programs (i.e., proficiency centers, type clubs).	4	3	4.44	1.67	3	3	3	3	3	3	3	3.00
339	EDUCATION - FAA/Industry to encourage home/desktop simulator-based training for familiarization with cockpit technology.	4	2.5	4.24	1.03	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
340	EDUCATION - FAA/Industry to provide enhanced training to both pilots and controllers highlighting complexities of programming modern aircraft and managing IFR clearances/"void times."	3	2	3.43	0.76	3	3	3	3	3	3	2	2.86
341	EDUCATION - FAA/SAFE/NAFI to emphasize with CFIs the importance of teaching proper PIC decision-making skills with reference to go-arounds (at the application and correlation levels). Focus on the decision to go around when not on speed, not on course or incorrectly aligned for landing.	4	3	4.44	1.48	3	3	3	3	3	3	3	3.00
342	EDUCATION - FAA/SAFE/NAFI to emphasize to pilots the importance of proper decision-making with reference to executing go-arounds. Focus on the decision to go around whenever a safe landing is not assured.	4	2	4.44	0.74	3	3	3	3	3	3	3	3.00
343	EDUCATION - FAASTeam to educate pilots on the consequences of failing to adhere to published altitudes, including with accident examples and approaches with obstacles.	3	2	3.75	0.63	3	3	3	3	3	3	3	3.00
344	EDUCATION - FAASTeam and Industry to emphasize the importance of the use of FRATs with respect to available navigation equipment and resources.	4	2	3.43	0.57	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
345	EDUCATION - FAASTeam to develop education programs, including basicmed course materials, to raise pilot awareness of the effects of illegal and/or legal substances on flying; emphasizing time between use and take-off.	3	1.5	3.60	0.45	3	3	3	3	3	3	3	3.00
346	EDUCATION - FAASTeam to emphasize importance of smart preflight planning.	3	2	3.75	0.83	3	3	3	3	3	3	3	3.00
347	EDUCATION - Government and industry emphasize importance of terrain familiarization/terrain mental model for pre-flight (FSF's CFIT Checklist).	4	3	4.44	1.48	3	3	3	3	3	3	3	3.00
348	EDUCATION - Industry and FAA to educate pilots on the practical implications of extreme fatigue on physical/mental condition, including relating to other experiences (e.g., xx hours awake = xx beers).	4	2	4.44	0.74	3	3	3	3	3	3	3	3.00
349	EDUCATION - Industry/local flying organizations to publish guidance/advice on the hazards of long-distance low(er) altitude XC routing.	4	2.5	4.24	1.18	3	3	3	3	3	3	3	3.00
350	EDUCATION - Pilot associations (e.g., SAFE, NAFI, ASI, UAA, LOBO) to encourage CFIs to emphasize the safety benefits of utilizing published instrument procedures during night operations.	5	3	5.00	1.67	3	3	3	3	3	3	2	2.86
351	TRAINING/EDUCATION - FAA and industry to emphasize the importance of checklist usage.	4	2	4.00	0.67	3	3	3	3	3	3	3	3.00

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
352	EDUCATION/TRAINING - FAA and Industry to emphasize the importance of climbing as a viable initial response to unintentional flight into IMC. (Current training seems to be primarily focused on pilots initiating a 180 turn as primary response. Not always best.)	5	3	5.00	0.83	3	3	3	3	3	3	3	3.00
353	EDUCATION: FAA to include concepts of intra-cockpit authority gradient for students in the PHAK.	4	2	4.00	0.89	3	3	3	2	3	2	3	2.71
354	GUIDANCE - STC manufacturers to include flight manual entry on dangers of accumulating ice on floats.	2	0	2.67	0.00	3	3	3	3	3	2	2	2.71
355	INSURANCE - Insurance industry to incentivize monthly instrument proficiency exercises (i.e., desktop/sim sessions, computer-based training, workshop attendance, etc.).	4	2	4.00	0.67	3	3	3	3	3	3	2	2.86
356	OVERSIGHT - FAA to audit industry standard organizations receiving federal funding (e.g., Medallion Foundation).	4	3	4.00	1.00	3	3	3	2	2	2	1	2.29
357	POLICY - After major accident, FAA Certificate Management Team to re-evaluate operational control within commercial operators and work with company management on improved operational control.	4	3.5	4.24	1.03	3	3	3	3	3	2	1	2.57
358	POLICY - AJV–8 to amend 7110.65 to require controllers to issue altitudes with hold clearances.	4	3.5	4.00	0.97	3	3	2	3	2	2	2	2.43

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
359	POLICY - Electronic chart/EFB providers to incorporate hyperlinks depicting special procedures on approach charts that highlight important safety considerations/nuances.	3.5	3	4.12	1.54	3	3	3	3	3	3	1	2.71
360	POLICY - FAA inspectors to increase surveillance of annual company training for Pt 135 operators, with emphasis on operational control.	4.5	3.5	3.94	1.15	3	3	3	3	3	2	1	2.57
361	POLICY - FAA to amend approach plates to include contour lines where appropriate.	4	3	4.00	1.00	3	3	3	2	3	3	2	2.71
362	POLICY - FAA to change ACS to require testing of pilot-initiated decision to go around.	3.5	3	4.12	1.37	3	3	3	3	2	3	3	2.86
363	POLICY - FAA to conduct comprehensive risk assessment for GA operators, including using DOT Value of Statistical Life methodology prior to changing airspace.	5	3	4.44	1.11	3	3	3	3	2	3	1	2.57
364	POLICY - FAA to continue efforts to provide policy for easier/streamlined installation of safety enhancing equipment including scalability of TSOs and software and hardware certification.	5	4	5.00	1.70	3	3	2	2	2	3	3	2.57
365	POLICY - FAA to enroll pilots in FAASafety.gov to encourage their continuing education (automatic enrollment at medical application and subsequent certificate application).	4	3	4.80	1.60	3	3	3	3	2	2	3	2.71

Intervention No.	Intervention	P2	C	Power	Overall Effectiveness	Technical	Financial	Operational	Schedule	Regulatory	Sociological	Pilot Population	Overall Feasibility
366	POLICY - FAA to ensure adequate staffing so that POIs are available and providing appropriate oversight consistent with safe operations.	4	3	4.00	1.00	3	3	2	2	3	3	3	2.71
367	POLICY - FAA to ensure greater emphasis on FAA/Designee/CFI intervention in the case of known unsafe behavior.	3.5	2	3.73	0.83	3	3	3	3	2	2	1	2.43
368	POLICY - FAA to establish a universal scorecard database for DPEs and ASIs that evaluates CFIs in an effort to encourage greater adherence to instructor best practices.	5	4	5.00	2.78	3	3	3	3	3	3	1	2.71
369	POLICY - FAA to focus surveillance activities on operators during marginal/dangerous operating conditions.	4.5	4	4.50	2.00	3	3	3	3	3	2	1	2.57
370	POLICY - FAA to improve medical questionnaire clarity, particularly with respect to DUI history.	3	1	2.40	0.13	3	3	3	3	3	3	3	3.00
371	POLICY - FAA to incentivize self-reporting on medical questionnaire.	3	1	3.00	0.25	3	3	3	3	3	3	3	3.00
372	POLICY - FAA to maintain greater connection with Part 61 flight schools; inspectors to have higher visibility at local airports.	5	4	5.00	2.78	3	3	3	3	3	2	1	2.57
373	POLICY - FAA to more regularly check airmen against driver registry regarding DUI history.	4	2	3.43	0.57	3	3	3	3	3	3	3	3.00

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374	POLICY - FAA to overhaul and continually improve the WINGS Program to make it more user-friendly, dynamic and valuable (i.e., Smartphone app).	4	3	4.40	1.90	3	3	3	3	3	3	3	3.00
375	POLICY - FAA to require commercial operators to incorporate operational controls that guard against financial incentives to complete unsafe assignments.	3.5	2.5	3.73	0.78	3	3	3	2	2	2	1	2.29
376	POLICY - FAA/AFS to review enforcement policy and new compliance philosophy with respect to pilots who self-report inadvertent flight into IMC and address as appropriate.	3	2	3.75	0.73	3	3	3	3	3	3	3	3.00
377	POLICY - Mandate CFIT avoidance training for operators approved for low-altitude and/or mountainous operations.	4	3	4.44	1.48	3	3	2	3	2	2	1	2.29
378	POLICY - POIs to promote commercial operators' adoption of best SMS practices in the area of risk management.	3.5	2.5	3.73	1.04	3	3	3	3	2	3	1	2.57
380	POLICY/TECHNOLOGY - FAA to expeditiously establish expanded ADSB ground station network in mountainous/underserved areas	5	3	4.44	1.11	3	2	2	2	3	3	3	2.57
381	PROCEDURE - When ATC provides both heading and altitude instructions to VFR aircraft, require ATC to ensure that track does not conflict with terrain/obstructions	5	4	4.44	1.48	3	3	3	3	3	3	2	2.86

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382	RESEARCH - Academia/PEGASAS to develop pilot profile risk assessment tool (pprat). This tool would consider a pilot's personality, experience, and aptitude, and predict the accident types the pilot is most likely to experience	4.5	4	4.24	1.41	3	3	3	3	3	3	3	3.00
383	RESEARCH - ATO to study merits of increasing changeover period between shifts.	3.5	2	3.23	0.36	3	3	3	2	2	3	2	2.57
384	RESEARCH - Avionics industry and FAA to research development of automatic MSAW alerting via ADS–B.	4.5	3.5	4.74	1.38	3	3	3	1	3	3	1	2.43
385	RESEARCH - COEs to conduct research on the extent to which lack of amnesty acts as an economic barrier to safe operations.	3	2	3.43	0.57	3	3	3	2	3	3	3	2.86
386	RESEARCH - FAA/Industry to develop more intuitive, user-friendly weather products that track utilization.	3.5	3	3.73	0.93	2	3	3	1	3	3	3	2.57
387	RESEARCH - FAA to review latest fire suppression/survival technology from aviation and other vehicle-related fields.	4	3	4.63	1.74	3	3	3	3	3	3	3	3.00
388	RESEARCH - FAA/COEs to research feasibility of authorizing Class C TAWS (or alternate Class B envelope) for unique operations such as mountainous/low altitude.	5	4	5.00	2.22	3	3	3	2	1	3	2	2.43
390	RESEARCH - FAA/Industry to encourage quick adoption of voice-to-text technology that transcribes radio calls and alert controllers to readback discrepancies.	3.5	2.5	3.73	0.78	2	3	3	2	3	3	3	2.71

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391	RESEARCH - FAA/Industry to sanction a work group to study and develop effective “tactical” weather training (practical application of weather products on decision-making).	4.5	3	3.94	0.82	3	3	3	2	3	3	3	2.86
392	RESEARCH - FAA/PEGASAS to research methods to identify and change behavior of pilots who display intentional disregard for advice, practices for safe operation, and noncompliance with regulation.	4.5	3.5	4.74	1.84	3	3	3	2	3	3	2	2.71
393	RESEARCH - Industry and academia to explore feasibility and impact of insurance discounts for best safety practices.	4	2	4.44	0.74	3	3	3	3	3	3	3	3.00
394	RESEARCH - Industry and academia to research additional mechanisms to better convey IMC conditions to controllers.	4	2	3.43	0.57	2	3	3	3	3	3	3	2.86
395	RESEARCH - Industry and academia to research possibilities of incorporating sleep assessment technology (e.g., smart phones, wearable devices) with fatigue awareness capabilities.	5	2	5.00	1.11	2	3	3	2	3	3	3	2.71
396	RESEARCH - Industry or academia to research cost-effective technology that enhances situational awareness by providing augmented visual cues referencing surrounding terrain (i.e., HUD/synthetic vision for GA).	5	3	5.00	1.67	2	3	3	3	3	3	3	2.86

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397	RESEARCH - Industry or academia to research existing/develop pre-flight tool for intended mountain flying route providing vertical planning guidance in consideration of weather, expected aircraft performance, terrain, and distribute/promote resources to pilot community.	5	3	5.00	0.83	3	3	3	2	3	3	3	2.86
398	RESEARCH - Industry/Academia to study ATC controller culture with regards to the issuance of approach clearances in “anticipation of separation” (based on expected aircraft performance, etc.) versus the application of strict separation standards.	4.5	3.5	4.95	1.93	3	3	3	2	3	3	3	2.86
399	RESEARCH - PEGASAS/Industry to research feasibility of changing ATC vectoring procedure to issue tracks rather than headings and FAA to implement findings.	5	3	3.75	1.56	3	3	2	1	2	2	3	2.29
400	RESEARCH - PEGASAS/Industry to research motivating factors and potential interventions that will lead to greater pilot compliance with safety of flight rules, and industry to then implement recommendations.	4	1	4.44	0.37	3	3	3	2	3	3	3	2.86
401	RESEARCH - Research factors of aging in pilots. How do age, disease, cognitive and psychomotor skills affect flying/decision-making ability relate to accidents?	4	1	4.44	0.37	3	3	3	2	3	2	1	2.43
402	RESEARCH - FPAW/Academia to research potential development of IMC detection systems (IDS) and IMC reporting systems; systems should be made available to mobile devices, EFBs, etc.	3	2	4.00	0.44	3	3	3	2	3	3	2	2.71

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404	RESEARCH - FAA/Industry to study what constitutes an effective safety culture and try to identify how to reach pilots who do not have/participate in an effective safety culture (SE 33 link).	4	2	4.44	0.99	3	3	3	3	3	3	3	3.00
405	TECHNOLOGY - App for pilots willing to assist other pilots who have to divert with rides, lodging, etc.	3	1	3.75	0.42	3	3	3	3	3	3	3	3.00
406	TECHNOLOGY - Avionics manufacturers to develop a time-limited inhibit switch for TAWS or TAWS-like equipment.	4.5	3.5	4.74	1.84	3	3	3	3	3	3	2	2.86
407	TECHNOLOGY - Avionics manufacturers to develop and deploy a cost-effective terrain avoidance system that provide escape guidance and/or flight control input for common GA aircraft types.	5	3	5.00	1.67	2	3	3	2	2	3	2	2.43
408	TECHNOLOGY - Avionics manufacturers to develop cost-effective terrain awareness using ADSB or other sufficiently accurate position source.	5	3	5.45	2.27	3	3	3	2	3	3	3	2.86
409	TECHNOLOGY - Encourage developers/manufacturers to develop cost-effective technology that enhances situational awareness by providing augmented visual cues referencing surrounding terrain (i.e., HUD/synthetic vision, FLIR for GA).	5	3	5.45	1.82	3	3	3	3	3	3	2	2.86

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410	TECHNOLOGY - Encourage FAA to install additional weather reporting systems (AWOS, ASOS) at airports based on risk assessment, including instrument approaches, terrain, nearest weather reporting station.	4	3	2.67	0.44	3	2	3	2	3	3	3	2.71
411	TECHNOLOGY - Encourage greater incorporation of profile-view depiction by avionics and EFB manufacturers for vertical situational awareness.	5	3	5.45	1.82	3	3	3	3	3	3	2	2.86
412	TECHNOLOGY - Encourage industry and operators to adopt synthetic vision technology for GA aircraft.	5	2	5.00	1.11	3	3	3	3	3	3	2	2.86
413	TECHNOLOGY - Encourage manufacturers to develop and incorporate technology that alerts to intervening terrain hazards when GPS-direct is selected.	5	3	5.45	2.27	3	3	3	3	3	3	2	2.86
414	TECHNOLOGY - Encourage MITRE and EFB/avionics OEMs to create digital co-pilot-like tech providing pilots with altitude and track warnings.	4	3	4.44	0.74	2	3	3	3	3	3	2	2.71
416	TECHNOLOGY - Encourage MITRE and industry to explore capabilities of warning pilots when a selected approach and weather ceiling/visibility don't align in "digital co-pilot"-like technology.	4	2	4.44	0.99	2	3	3	3	3	3	2	2.71
417	TECHNOLOGY - Encourage MITRE and other EFB companies to include aural altitude and track warnings for instrument approaches in "digital co-pilot"-like technology.	5	3	5.45	1.36	2	3	3	3	3	3	2	2.71

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418	TECHNOLOGY - Encourage MITRE and other EFB companies to include altitude and track warnings for instrument approaches in “digital co-pilot”-like technology.	5	3	5.45	1.36	2	3	3	3	3	3	2	2.71
419	TECHNOLOGY - FAA to establish expanded weather camera network in mountainous/underserved areas (i.e., mountain passes, areas prone to obscuration).	4	4	4.44	1.98	3	3	3	2	3	3	3	2.86
420	TECHNOLOGY - FAA/Industry to encourage greater incorporation of profile-view approach depiction by avionics and EFB manufacturers for vertical situational awareness.	4	3	4.44	1.11	3	3	3	3	3	3	2	2.86
421	TECHNOLOGY - Industry (app developers, EFB manufacturers, etc.) to further develop and make widely available “virtual co-pilot”-like technology including terrain awareness and warnings.	5	4	5.45	3.03	3	3	3	3	3	3	2	2.86
422	TECHNOLOGY - Industry to develop digital copilot technology to provide alerts when pilot deviates from published approach procedures.	4.5	4	4.95	2.48	3	3	3	3	3	3	2	2.86
423	TECHNOLOGY - Industry to develop digital copilot technology to provide alerts when pilot is descending, but apparently not to runway.	4.5	2.5	4.74	0.82	3	3	3	3	3	3	2	2.86
424	TECHNOLOGY - Manufacturers and industry to develop cost-effective terrain awareness using sufficiently accurate position source.	5	3	5.00	1.67	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
425	TECHNOLOGY - Manufacturers to incorporate terrain warning sensitivity adjustments into existing and future terrain avoidance systems for visual and aural warnings.	5	3	4.44	1.11	3	3	3	2	2	3	2	2.57
426	TRAINING - AOPA/EAA PPC/FAASTeam to develop MVFR/VFR into IMC scenarios for simulator-based training.	4	3	4.44	1.48	3	3	3	3	3	3	3	3.00
427	TRAINING - ATO to emphasize MSAW alerting procedures with controllers.	3.5	3	4.12	1.03	3	3	3	3	3	3	2	2.86
428	TRAINING - ATO to review procedures to prevent controllers from clearing pilots for unauthorized procedures.	4	3	4.00	0.67	3	3	3	3	3	3	1	2.71
429	TRAINING - ATO to review training for controller-issued Safety Alerts to ensure controllers are comfortable and proficient at issuing appropriate Safety Alerts.	4	3	4.00	0.67	3	3	3	3	3	3	2	2.86
430	TRAINING - Encourage increased understanding of the hazards of IMC and night flight.	3	2	4.00	0.44	3	3	3	3	3	3	3	3.00
431	TRAINING - FAA and Industry to develop additional training regarding proper make/model go-around decision-making, including commitment decision point and procedures.	5	2	5.45	0.91	3	3	3	3	3	3	3	3.00
432	TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture aimed at high-time pilots.	4	2	4.44	0.74	3	3	3	3	3	3	2	2.86

Intervention No.	Intervention	P2	C	Power	Overall Effectiveness	Technical	Financial	Operational	Schedule	Regulatory	Sociological	Pilot Population	Overall Feasibility
433	TRAINING - FAA and Industry to emphasize importance of SRM (single-pilot resource management) in initial pilot training.	4	3	4.00	1.33	3	3	3	3	3	3	1	2.71
434	TRAINING - FAA to train weather briefers to recognize biases and cues from pilots that may indicate or lead to poor decision-making; train for intervention when such behavior is observed.	3.5	2.5	4.12	1.14	3	3	3	3	3	3	2	2.86
435	TRAINING - FAA/Industry to emphasize importance of pilots requesting track vectors (vs heading vectors) from ATC.	4	2	3.43	0.95	3	3	3	3	3	3	2	2.86
436	TRAINING - FAA/Industry to emphasize the importance of configuration settings for go-around procedures in training and flight reviews.	4	3	4.24	1.41	3	3	3	3	3	3	3	3.00
437	TRAINING - FAA/Industry to encourage CFIs to incorporate more realistic IMC scenario-based training activities during student pilot training.	4	2	4.44	0.49	3	3	3	3	3	3	1	2.71
439	TRAINING - FAA/Industry to incorporate risk-management and scenario-based training in flight reviews.	4	2	4.44	0.49	3	3	3	3	3	3	3	3.00
440	TRAINING - FAA/Industry to incorporate risk-management and scenario-based training in IPCs.	4	2	4.44	0.99	3	3	3	3	3	3	2	2.86

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
441	TRAINING - FAA/Industry to promote use of SMS/risk matrix by pilots of tour/135 operations; employ safety culture that honors pilot judgement (include cruise industry).	4.5	3	4.50	1.50	3	3	3	3	3	3	1	2.71
442	TRAINING - FAA/Industry to provide enhanced scenario-based and risk-based decision-making training to GA pilots.	4	2.5	3.73	0.78	3	3	3	3	3	3	3	3.00
443	TRAINING - FAASTeam and industry to develop training materials focusing on proper configuration for phase of flight.	3	1	1.50	0.13	3	3	3	3	3	3	3	3.00
444	TRAINING - FAASTeam to host training on different weather products and their application to pre-flight planning; this should be a scenario-based training.	4	3	4.00	1.17	3	3	3	3	3	3	2	2.86
445	TRAINING - FAASTeam/Industry to emphasize to pilots the importance of reading approach plate notes as part of pre-flight planning.	4	2	4.44	0.74	3	3	3	3	3	3	2	2.86
446	TRAINING - Industry (particularly SAFE and NAFI) to encourage CFIs to give initial and recurrent training in real IMC even to pilots without an instrument rating.	4	2	4.44	0.49	3	3	3	3	3	3	3	3.00
447	TRAINING - Industry to improve scenario-based training through the use of advanced view-limiting device technology that simulates inadvertent IMC entry goggles.	4.5	3.5	5.14	2.50	3	3	3	3	3	3	2	2.86

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448	TRAINING - Industry to train pilots/companies to establish procedures on briefing minimum sector altitudes when preparing for approach (e.g., MVAs don't apply on published route segments).	3.5	2.5	3.23	0.67	3	3	3	3	3	3	2	2.86
449	TRAINING - SAFE/NAFI/FAASTeam to emphasize teaching pilots proper techniques for managing unexpected events (how to recognize and manage startle response, including response to TAWS alerts).	5	3.5	5.00	1.94	3	3	3	3	3	3	2	2.86
450	TECHNOLOGY - Avionics manufacturers to adopt and deploy an equivalent TAWS-like option for terrain avoidance (e.g., GCAS).	5	3.5	5.24	2.29	2	3	3	2	3	3	2	2.57
451	TECHNOLOGY - Encourage MITRE and industry to explore capabilities of in-cockpit technology to detect and alert pilots of deteriorating weather.	3	2	3.43	0.57	2	3	3	3	3	3	2	2.71
452	TECHNOLOGY - MITRE to make virtual co-pilot technology ensuring terrain avoidance widely available to flying public.	5	3	3.75	0.94	3	3	3	3	3	3	2	2.86
453	TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture.	4	2	4.80	1.07	3	3	3	3	3	3	3	3.00
454	TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on preflight planning.	5	2	5.00	0.83	3	3	3	3	3	3	2	2.86
455	POLICY - POIs to observe Part 135 annual training sessions to ensure compliance with flight and duty time limitations.	3	2	3.43	0.67	3	3	3	3	2	2	1	2.43

Intervention No.	*Intervention*	*P2*	*C*	*Power*	*Overall Effectiveness*	*Technical*	*Financial*	*Operational*	*Schedule*	*Regulatory*	*Sociological*	*Pilot Population*	*Overall Feasibility*
456	RESEARCH - CFIT WG to determine the distance of CFIT accidents in our dataset from home base.												0
29A	RESEARCH - FAA/Government to sponsor research cost-effective technologies that can provide real-time weather information at remote airports. #29B TRAINING - FAA and industry to promote and educate the GA community on available weather technologies such as the NOAA ADDS icing tool.	4	3.5	4.24	1.44	3	3	2	2	3	3	2	2.57