



General Aviation Joint Steering Committee (GAJSC)

Loss of Control Work Group

Approach and Landing

September 1, 2012

This report provides an overview of the work of the General Aviation Joint Steering Committee (GAJSC) since the FAA-Industry program was re-established in January 2011 with specific focus on its pilot project on loss-of-control on approach and landing.

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I. GAJSC Loss of Control Work Group.

Background

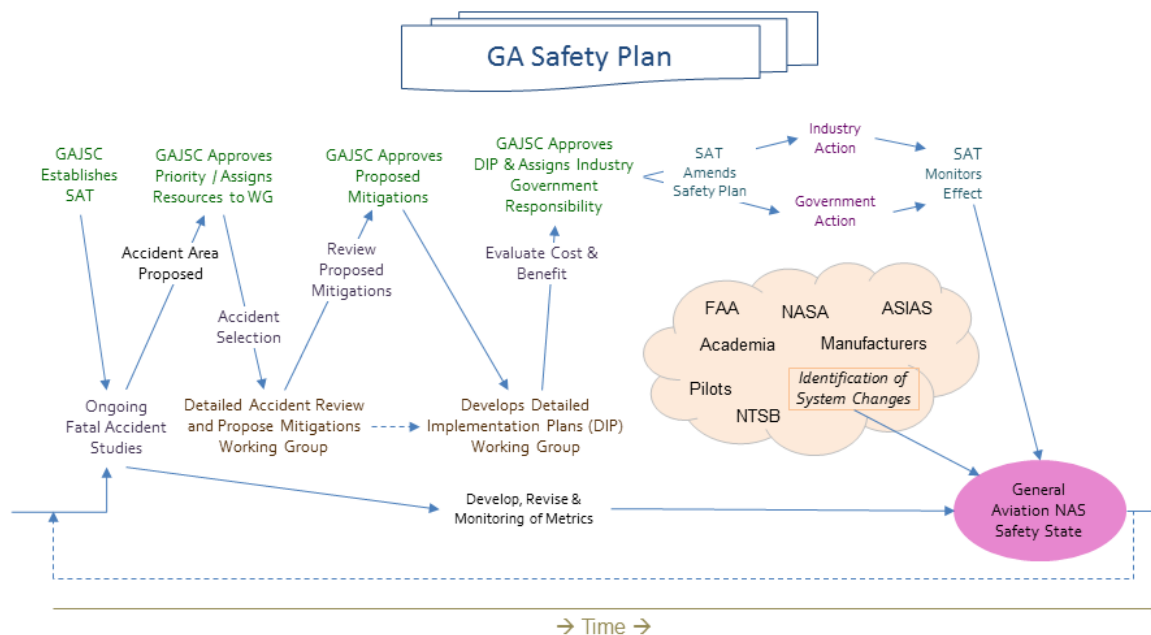
The General Aviation Joint Steering Committee (GAJSC) was reestablished in January 2011 after several years of being dormant. It originally was created in the mid 1990s to parallel the Commercial Aviation Safety Team (CAST) under the Safer Skies initiative. The GAJSC had many successes through the mid 2000s, including the Federal Aviation Administration's (FAA) annual General Aviation and Air Taxi Activity Survey, which provided the FAA and industry with credible data on flight hours, from which meaningful accident rates could be computed. However, industry and FAA involvement subsided and the committee was inactive by 2010.

The impetus for reforming the GAJSC came from the Secretary of Transportation and the Future of Aviation Advisory Committee (FAAC). In its final report, the FAAC Safety Subcommittee identified the need to refocus joint FAA/industry work¹ on proactive and cooperative safety analysis to reduce the fatal accident rate in general aviation. The FAAC Safety Subcommittee also determined it was necessary to emphasize the FAA's strategic plan, also referred to as the "Flight Plan".

The GAJSC sought to avoid previous problems by adopting a structured, strategic process and making its work data driven (see figure 1.1 for the revised GAJSC process). This ensures analytical credibility and would allow the FAA and industry to plan for implementation activities. The GAJSC noted it was essential to keep any ongoing projects from the previous incarnations of the committee and therefore directed the Safety Analysis Team (SAT) to inventory ongoing activities. In the spring of 2011, the GAJSC also tasked the SAT to conduct a review of GA accidents and determine the priorities for joint FAA/Industry analysis of risks leading to fatal GA accidents.

¹ FAAC, Safety Recommendation, #3 "Voluntary Safety Data" and #5 "Identification of Safety Priorities."

Figure I.1 – GAJSC Process Overview following 2011 Revisions



The GA fatal accident rate is one of the metrics the FAA’s Aviation Safety organization monitors. While the FAA established a GA safety metric under the Safer Skies initiative based on the number of annual fatal accidents that occurred², industry and the FAA jointly transitioned to a rate based metric in 2007. The FAA and industry agreed to base the new metric on the 3 safest years in GA (2006–2008)³ and plan for an annual improvement of a 1 percent reduction in the fatal accident rate. Meeting this reduction would result in a fatal accident rate of no greater than 1 fatal accident per 100,000 hours flown by 2018.

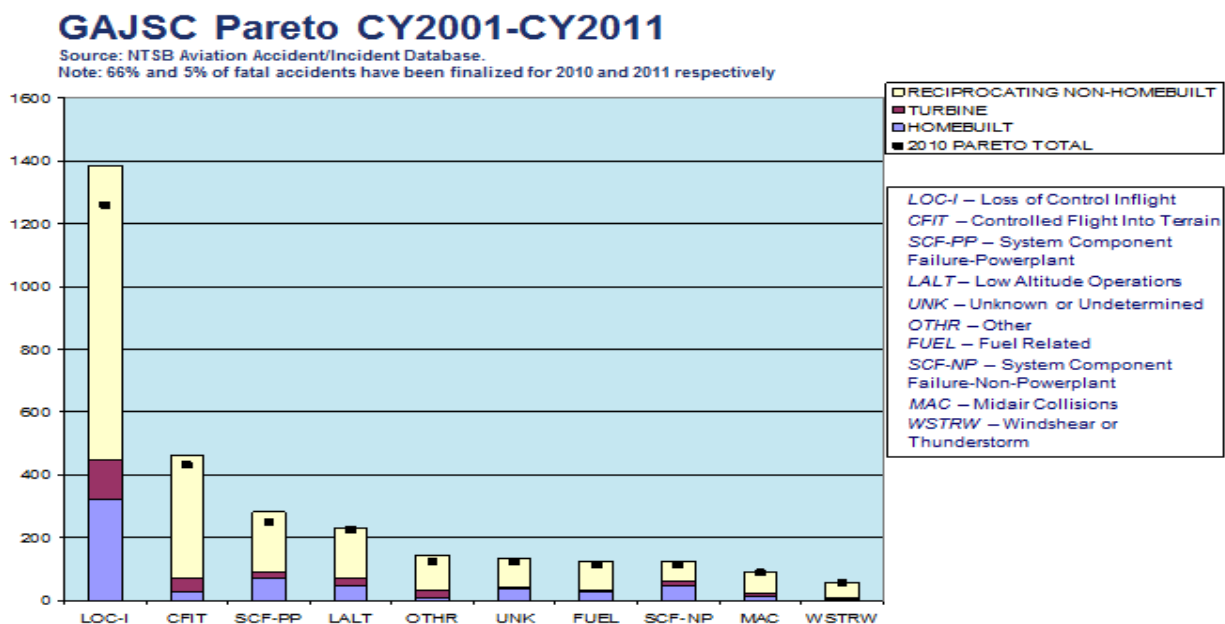
The SAT decided to focus on fatal accidents in Title 14 Code of Federal Regulations (14 CFR) part 91 GA operations, on demand 14 CFR part 135 operations, and 14 CFR part 137 aerial application operations. While FAA safety efforts in air carrier operations have moved from analysis of fatal accident data to more proactive work analyzing incidents and non fatal accidents, the SAT determined such preventative work was not yet appropriate because of the number of fatal accidents in GA. Instead, it recommended the FAA and the GA industry undertake root cause analysis of fatal GA accidents, an undertaking not conducted since the early 2000s.

² The FAA and industry jointly established a safety metric in the mid 1990s based on the number of fatal accidents in 1 year. At that time, industry and the FAA were reluctant to establish a rate based metric because of limitations in the exposure data from GA. Through joint work under the GAJSC General Aviation Data Improvement Team, the exposure data (hours flown) was improved and currently has an accuracy of approximately 1.6 percent Standard Error, which was deemed acceptable for transitioning to a rate based metric and goal for GA safety for 2007–2018.

³ The 3 years with the fewest fatal accidents since World War II were 2006–2008. Converted to a rate, these years experienced 1.12 fatal accidents per 100,000 hours flown.

The FAA developed an overview of the 2001–2010 fatal GA accidents. It determined 40.2 percent of fatal accidents, or 1,259, were identified as “Loss of Control” (LOC) according to the CAST–International Civil Aviation Organization (ICAO) Common Taxonomy.⁴ The GAJSC, being data driven, decided to focus on LOC, the highest risk area. It also plans to conduct future work in other accident areas.

Figure 1.2 – GAJSC Fatal Accident Pareto Calendar Year 2001–2011



GAJSC should focus on LOC during the “approach and landing” phase of flight because of its applicability to the three main GA communities: experimental amateur built, certified piston engine airplanes and turbine airplanes.

At its April, 26, 2011, meeting, the GAJSC approved the charter and formation of an LOC work group (see appendix 1) to examine approach and landing accidents (see appendix 5). Its membership will consist of appropriate government and industry subject matter experts (SME) to support the project over 9 months.

Organization

The Loss of Control Work Group (LOCWG) held its first meeting in September 2011 at the headquarters of the Aircraft Electronics Association (AEA). It was scheduled to begin work in August 2011, but the FAA’s temporary funding problems prevented a number of key LOCWG members from participating. The LOCWG was co chaired by the Experimental Aircraft Association (EAA) and FAA Flight Standards (AFS–850), with technical support and process guidance provided by the FAA’s Office of Accident Prevention and Analysis (AVP).

⁴ The CAST-ICAO Common Taxonomy Team (CICTT) was formed in the late 1990s to standardize accident analysis taxonomy in aviation.

The LOCWG has three subteams based on the accident selection subsets of experimental amateur built, certified piston engine airplanes, and turbine engine powered airplanes. Appendix 3 contains a list of the seven meetings of the LOCWG including its hosts.

All participating organizations in GAJSC were offered an opportunity to nominate technical experts based on the expertise identified in the LOCWG charter. The final membership of the LOCWG is included in appendix 2.

II. Scope of This Report

This report is organized according to the following tasks contained in the LOCWG charter (appendix 1 to this report):

1. The work group will conduct an in depth analysis and review of the LOC approach and landing accidents provided by the SAT. The SAT established a statistically acceptable process to reduce the 279 approach and landing accidents that occurred during 2001–2010 into a data set that can be practically reviewed by the work group within the timeframe.
2. The work group will review and determine the applicability of other work done in the area of LOC and approach and landing accidents. This work includes the Flight Safety Foundation’s Approach and Landing Accident Reduction (ALAR) tool kit.
3. The work group will develop and prioritize safety intervention strategies that will reduce the potential for LOC approach and landing fatal accidents. In addition to documenting its analysis results and recommended intervention strategies, the work group will also document its assumptions regarding the analysis.
4. The work group will present the prospective interventions to the GAJSC for review and approval. The report will include the analysis and rationale for how the intervention strategies were dispensed.
5. Following the GAJSC’s approval of the interventions, the work group will develop a detailed implementation plan (DIP) for each intervention.

Each DIP 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 interventions.

The work group will present each DIP to the GAJSC for review and approval.

6. The work group, as the pilot project, will provide feedback to the GAJSC about what worked and what did not work with respect to this process to help assist with future work groups.

Additionally, the report includes recommendations for areas of further investigation are included at the end of the report (section IV). The appendices contain detailed information about the analysis and processes used by the LOCWG in formulating the safety enhancements (SE).

III. Taskings

I.0 Task 1

The working group will conduct an in depth analysis and review of the LOC approach and landing accidents provided to the working group by the SAT. The SAT has established a statistically acceptable process to reduce the 279 approach and landing accidents that occurred during 2001 through 2010 into a data set that can be practically reviewed by the working group within the timeframe provided.

The number of GA accidents from 2001 to 2010 made a detailed review of all fatal accident, including all LOC, approach, and landing accidents prohibitive from a time and resource perspective. To address the issue of data volume, the SAT asked the GAJSC participants from the Center for Excellence in General Aviation Research (CGAR) to develop a method to select representative accidents to be used by the LOCWG in their analysis.

The GAJSC members from CGAR randomly selected 60 accidents for turbine, certified piston airplanes, and experimental amateur built aircraft respectively. From the 60 randomly selected accidents given to each group, the first 30 well documented accidents from this list were analyzed in detail. The detailed process for accident selection is included in appendix 4. They provided the accident selections to the LOCWG before its first meeting. Additionally, the National Transportation Safety Board (NTSB) assisted by compiling the accident dockets containing additional information about the accident sequence and pilot data, including post mortem information from the medical examination, to facilitate the root cause analysis.

2.0 Task 2

The working group will review and determine the level of applicability of other work done in the area of LOC and approach and landing accidents. This work includes the Flight Safety Foundations Approach and Landing Accident Reduction (ALAR) tool kit.

The LOCWG took advantage of the expertise of its individual members and invited SMEs. The SMEs provided briefings about angle of attack indicators, electronic recovery control system, upset recovery training, and the use of prescription and over the counter drugs. A list of these briefings is included in appendix 6.

The LOCWG considered the solutions on existing work conducted in the area of LOC and approach and landing accidents offered during the briefings. When applicable to the risks identified in this study, the LOCWG incorporated these fixes into the final recommendations.

3.0 Task 3

The working group will develop and prioritize safety intervention strategies that will reduce the potential for LOC approach and landing fatal accidents. In addition to documenting its analysis results and recommended intervention strategies, the working group will also document its assumptions regarding the analysis.

3.1 Methodology

Three subteams of the LOCWG membership (reciprocating non homebuilt, experimental amateur built, and turbine) were assigned a set of 30 accident reports to analyze. Each subteam developed an event sequence spreadsheet (see appendix 13). Each spreadsheet included the events necessary to provide context for understanding the nature of the accident sequence. The subteams then evaluated the events to determine if they represented a “problem” involving hardware/software failure or human execution errors, decisions, or procedural non compliance.

If the subteam members considered an event was considered contributory to the accident, they developed a statement describing why it contributed to the accident. They identified the specific nature of the problem associated with an event in the sequence along with the factors that could have precipitated the problem. These contributing factors were then restated in more general terms as standard problem statements to make them relevant beyond the specific accident.

The subteams rated the standard problem statements as described below. They developed potential interventions to address each standard problem statements. Appendix 11 contains a list of potential interventions, and appendix 9 lists the standard problem statements the LOCWG used, along with their respective frequencies.

3.2 “Standard Problem Statement” Rating System

Ratings.

The subteams used the following rating factors to prioritize the interventions: power (P); confidence (C); and applicability (A). They determined the overall effectiveness (OE) using the scores assigned to “P,” “C,” and “A.”

Power indicates how important a problem was to an accident and the degree to which an intervention could have resolved the problem and broken the chain of events. There was confusion in previous CAST Joint Safety Analysis Teams (JSAT) about the practical meaning of power. In practice, “P” sometimes was scored to indicate the relative power of the targeted problem in the accident; at other times it indicated the power of an intervention to resolve a specific problem and thereby break the chain of events. As a result, “P” often failed to integrate the two concepts and instead scored one side of the concept to the exclusion of the other.

Recognizing this confusion, the process changed following the Approach and Landing JSAT. The two factors within outlined above were partitioned into “P1” and “P2” so each could be rated separately.

P1 indicates the importance of the problem or contributing factor as a causal link in the accident.

P2 indicates the ability of the rated intervention to mitigate the problem or contributing factor.

The 0–6 rating scales used to evaluate P1 and P2 were similar to those used for previous ratings. The two scores were combined arithmetically to produce a single power rating. This explicitly addressed the past confusion and yielded a single power score conceptually equivalent to the power rating used by previous JSATs.

The LOCWG will incorporate the change into revised process guidelines. In sum, P1 focuses on the problem or contributing factor, while P2 focuses on the intervention.

Confidence indicates how strongly the subteam believed everyone and everything would perform as expected if the interventions were implemented. The confidence factor assesses the real world, in which interventions are seldom perfect or 100 percent effective.

Applicability indicates how frequently the problems being addressed by the specific intervention recur. Applicability provides a bridge from the specifics of the accident to future operations.

Overall Effectiveness.

To support prioritization of the proposed interventions, the subteams ranked each intervention by its overall effectiveness. To do this, it was necessary to reduce the P/C/A ratings to a single value that roughly approximated OE. The intent was for the OE score to provide the first sort of the interventions.

The following algorithm is used to convert P/C/A to OE:

$$OE = P \times C/6 \times A/6 = P \times C \times A/36$$

Appendix 10 lists the interventions ranked by OE.

3.3 Bucketed Interventions.

The three subgroups proposed 204 individual interventions. They bucketed the interventions according to common themes or concentration areas such as training, policy, technology, medical, and miscellaneous (for the list of bucketed interventions, see appendix 12). This resulted in a manageable number of 98 interventions that were divided between two groups responsible for assessing the feasibility of each intervention.

3.4 Assigning Feasibility

The feasibility assessment was accomplished by assigning a numerical value to each intervention for each of the following six elements:

1. Technical,

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2. Financial,
3. Operational,
4. Schedule,
5. Regulatory, and
6. Sociological.

Feasibility values of 1, 2, or 3 were assigned to each feasibility element and are described as follows:

Technical feasibility is the ability of the project to take advantage of the current state of technology in pursuing further development.

3—Off-the-shelf technology, no development required.

2—Some development required, not currently in public use.

1—Major technology development effort required.

Financial feasibility should consider the total cost of the implementation, including the planning process. Financial feasibility also involves the capability of the participating organizations (FAA, manufacturers, and air carriers and operators) to provide the appropriate funding needed to implement the project.

3—Less than \$100 million to implement.

2—Between \$100 million and \$250 million to implement.

1—Greater than \$250 million to implement.

Operational feasibility involves the practicality of the project within the context of the operating environment including areas such as the National Airspace System, ground operations, maintenance, and inspection. It also considers which organizations within the aviation system are affected and the degree of the impact.

3—Minimal change to entities within the operating environment.

2—Modest change to operating environment.

1—Major change to operating environment.

Schedule feasibility addresses whether the project can contribute to achieving the goal in a selected timeframe. It must consider implementation schedule by project.

3—Less than 2 years to full implementation.

2—Full implementation in 2–5 years.

1—Longer than 5 years to full implementation.

Regulatory feasibility should be evaluated against current rules and certification process. A long approval process could be a deterrent.

3—No policy change.

2—Guidance change only (orders, handbooks, policy).

1—Rule change.

Sociological feasibility requires an evaluation of the project goals' compatibility with the prevailing goals of the political system. Worthy projects may face heavy opposition because of political factors.

3—Positive push from political system.

2—Neutral.

1—Negative.

Once each subteam completed all the feasibility evaluations, they collated their numbers and added the value for each feasibility element and the average value for that project into the spreadsheet. To build consensus and ensure the values were defensible, the LOCWG reviewed the numerical assessments for each feasibility element after the subteams entered all the values. Once this step was completed, the LOCWG combined the interventions in a single spreadsheet.

3.5 Generate Color coded Spreadsheets.

The initial step in generating color coded spreadsheets was to numerically sort the interventions by the overall effectiveness and feasibility ratings. This sorting identified clusters in the data where colors can be assigned. The LOCWG set break points for effectiveness and feasibility wherever naturally occurring breaks appeared between clusters of ratings. These breakpoints will be different for future work groups.

With the Overall Effectiveness and Average Feasibility columns populated, the spreadsheet was ready for use with an Excel feature called "Conditioning." This is a method of applying criteria to a set of numerical values and highlighting these in color. The condition format can be applied to the whole spreadsheet or a section, and the specific criteria may vary depending upon where the natural breakpoints occur in the ratings.

Colors for the LOCWG were assigned as follows:


	Overall Effectiveness	Feasibility
Red	0 to 2	0 to 2
Yellow	2 to 3	2 to 2.6
Green	3 to 5	2.6 to 3

Assigning red, yellow, and green colors permitted the work group to present interventions in instructive visual displays. For example, interventions with effectiveness “greens” could be clustered; or they could be clustered together with feasibility “greens.” The combination of numerical sorting and color conditioning is a very powerful tool. The visually coded numerical values give a strong sense of priority and order, and they help to visually segregate the data.

3.6 Prioritize Interventions.

The LOCWG’s next step was to determine the product of the overall effectiveness rating and the feasibility rating. The LOCWG multiplied OE, the already determined overall effectiveness value, by F, the feasibility value determined by the subgroups, to generate a rating used to determine priorities of interventions. This resultant product, OExF, was captured in the spreadsheet and shown in a separate column. The interventions should be sorted based on this product value to aid in their prioritization. This sort will portray how the color codes for effectiveness and feasibility compare (green green, green yellow, etc.). Figure 3.1 is an example from the LOCWG.

Figure 3.1 – Example Prioritization Sorting

 Prioritized Interventions					
Overall Effectiveness	Average Feasibility	OExF	Intervention No.	Intervention Bucket	INTERVENTION
3.8	2.8	10.7	9	1	#9(a) POLICY- FAA to develop policy that allows AOA indication as a secondary reference as non essential information to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low cost installations in part 23 aircraft.: 9 (b)FAA and industry should investigate and implement various financial incentives to encourage the installation of safety enhancing technologies.: 9(c) Regulatory- change to allow non required safety equipment to be exempt from 21.9
3.6	2.8	10.3	4	1	#4- MISC - Insurance industry should be kept informed of studies relating to reduction of LOC risk by installation of an AOA device in order to incentivise installations by means of enhanced coverages or discounts.
3.1	2.3	7.2	38	1	#38 - Policy - FAA remove the regulatory burden for development, certification, and installation of advanced technological flight deck safety related devices to encourage the accelerated adoption of advanced technology such as TAWS, synthetic vision, moving map, and weather in the cockpit.
2.5	2.2	5.4	30	1	#30 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve situational awareness and reducing pilot workload (electronic co-pilot)
2.8	1.7	4.7	33	1	#33 POLICY - FAA and industry to investigate ways to reduce the regulatory burden of incorporating auto-throttles into Part 23 aircraft and eventual integration into envelope protection system.
2.0	2.2	4.3	63	1	#63 TRAINING - FAA and Industry to develop and incorporate use of AOA education and training.

Based upon the resulting sort of OExF, a cutoff value for OExF was determined to identify the interventions most effective at reducing accident rates. The cutoff value for OExF will vary between work groups.

For each intervention contained in this OExF “product value set,” the associated intervention buckets were identified. These bucket areas and their remaining interventions were determined to be the high priority project areas.

A new spreadsheet was generated based upon a resorting of the data by intervention bucket and the product (OExF). This provided the team with a visual representation of the high priority project areas, their associated interventions, and the color coded relationships for all of the interventions within each specific project area.

3.7 Establish SEs.

The high priority project areas were reassigned to the subteams. The first task of the subteams was to organize the interventions in their respective buckets into SEs. An SE is a plan containing one or more intervention strategies to prevent or mitigate a problem associated with the cause of an accident.

The teams identified the agencies and organizations potentially affected by the outputs or actions of their specific SE. One or more individuals from each of these agencies and organizations should be identified and their assistance solicited to act as work group members during the DIP drafting and planning phase. It is important to note that the team may require the assistance of the GAJSC in identifying individuals of various agencies and organizations and obtaining approval for participation of the work group members.

4.0 Task 4

The working group will present the prospective interventions identified for implementation to the GAJSC for review and approval. The analysis and rationale for how all the intervention strategies were dispensed will be included in the report.

4.1 Developed SEs.

The LOCWG developed 28 SEs, which were presented to the SAT in May 2012. The SAT undertook an effectiveness assessment of the 28 SEs against 30 randomly selected LOC accidents. The scores developed during this assessment were used as an additional tool for the GAJSC's decision making process on which SEs would be assigned resources for implementation as part of the FAA Industry General Aviation Safety Plan.

4.2 Accident Analysis Methodology Compared to CAST.

Unlike the process used by CAST, because of the large number of accidents, the SAT did not score the SE effectiveness against all LOC approach and landing accident or the full set of fatal accidents between 2001 and 2011. As a result, the effectiveness scores and analysis are intended to be a decision tool as opposed to a comprehensive analysis of the aggregate effectiveness.

4.3 Rating the Effectiveness of the SEs.

The SAT assessed the effectiveness of each SE in mitigating the randomly selected accidents on a scale of 0.0 through 1.0. Over three meetings the effectiveness was scored which resulted in an effectiveness rating as shown in Figure 4.1. Additionally, Figure 4.2 shows the number of times (that is, "counts") each SE was identified as having any effectiveness in mitigating the contributing risks found in each of one of the randomly selected accidents.

Figure 4.1 – SE Effectiveness Score

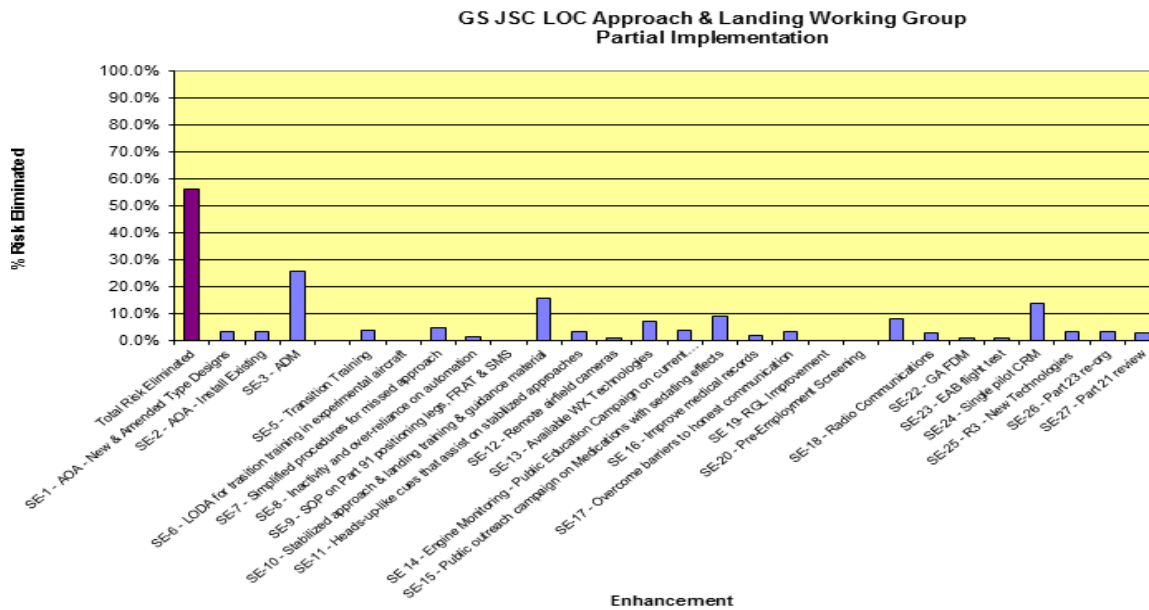
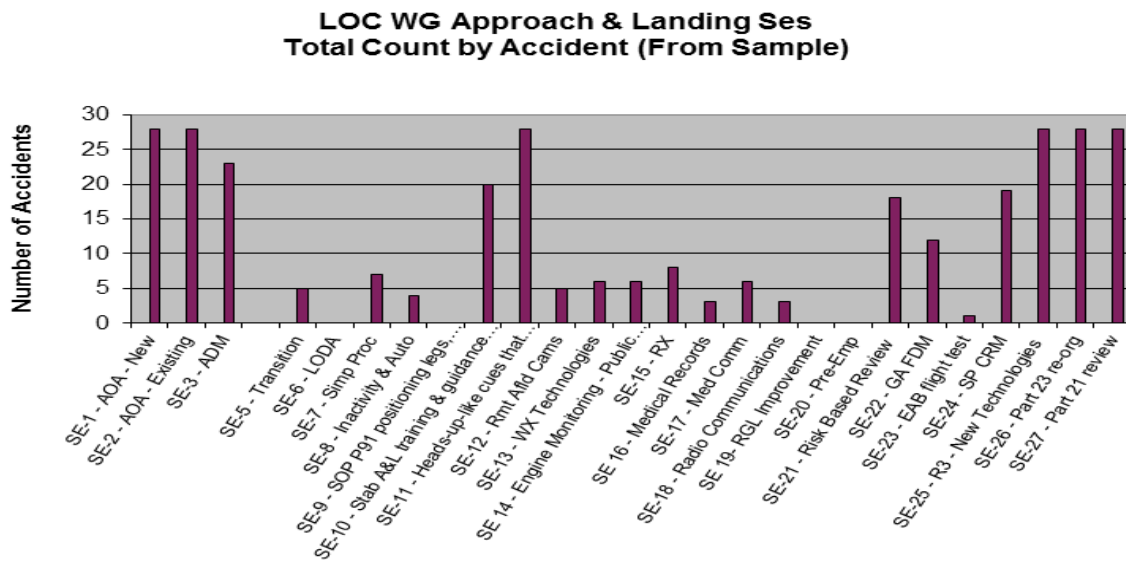


Figure 4.2 – SE Accident “Count” Against 30 Randomly Selected LOC Accidents



4.4 GAJSC Presented the Effectiveness Ratings of the SAT.

The GAJSC presented the 28 SEs several weeks before its June 6, 2012, meeting. It presented the results of the SAT’s effectiveness analysis at the meeting.

4.5 GAJSC Approved List of SEs.

The GAJSC approved 23 individual SEs with the Lead Organization for Overall Project Coordination (LOOPC) identified (see table 4.1). Appendix 7 contains a list of the approved SEs.

Table 4.1 – GAJSC Approved SEs

SE	Title	LOOC
SE-1	Angle of Attack (AOA) Systems–New & Current Production	General Aviation Manufacturers Association
SE-2	Angle of Attack (AOA)–Existing GA Fleet	General Aviation Manufacturers Association
SE-3	Aeronautical Decision Making	Aircraft Owners and Pilots Association
SE-4	Over Reliance on Automation	FAA–FAASTeam
SE-5	Transition Training	FAA AFS–800
SE-6	Transition Training	FAA Flight Standards Service General Aviation and Commercial Division (AFS–800)
SE-7	Utilization of Type Clubs	Experimental Aircraft Association
SE-8	Flight Training After Period of Flight Inactivity	FAA–FAASTeam
SE-9	Part 135 Safety Culture	National Air Transportation Association
SE-10	Stabilized Approach and Landing	FAA AFS–800
SE-12	Remote Airfield Weather Cameras	
SE-13	Weather Technologies	
SE-14	Engine Monitoring Technology	General Aviation Manufacturers Association
SE-15	Flight After Use of Medications with Sedating Effect	Aircraft Owners and Pilots Association
SE-16	Flight with Impairing or Incapacitating Medical Conditions	FAA–AAM
SE-17	Flight with Impairing or Incapacitating Medical Conditions	FAA–AAM
SE-21	Risk Based Flight Review	GAJSC SAT

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SE	Title	LOOC
SE-22	Flight Data Monitoring	FAA Office of Accident Investigation and Prevention (AVP-200)
SE-23	EAB/Flight Test	Experimental Aircraft Association
SE-24	Single-Pilot CRM	Aircraft Owners and Pilots Association
SE-25	Reduce Regulatory Roadblocks R ³	FAA Small Airplane Directorate (ACE-100)
SE-26	Reduce Regulatory Roadblocks R ³	FAA ACE-100
SE-27	Reduce Regulatory Roadblocks R ³	FAA ACE-100

5.0 Task 5

Following the GAJSC’s approval of the interventions, the LOCWG will develop a detailed implementation plan for each intervention.

5.1 Scope of this Section.

This section contains the statement of work (SOW) for each recommended SE’s DIP and the methodology used in developing the SOWs and DIPs. The entire DIP for each SE is located in appendix 8.

5.2 Methodology – Development of DIPs.

The DIPs contain the following elements: SOW, LOOPC, SE Description, Score, Total Resource Requirements, Outputs (with Resources, Lead Organization for Output Completion (LOOC), Timelines, and Actions), Relationship to Current Aviation Initiatives, and Performance Goals and Indicators. A description of the elements follows.

1. The SOW should, using brief, clear, and unambiguous text, include a description of the project’s objective, a brief statement of the approach, and the outcome(s).
2. The LOCWG was responsible for the identification of the LOOPC, the roles and responsibilities of which include—
 - Overseeing completion of necessary outputs (critical path elements, progress against the plan),
 - Conducting program status checks at predetermined implementation process milestones to verify performance against plan and completion of tasks,
 - Ensuring detailed plans are in place to achieve the project outputs,
 - Identifying and communicating resource needs to GAJSC, and
 - Reporting to the SAT the progress against the plan and the completion of tasks.

3. The SE description is a brief synopsis of the activity to prevent or mitigate a problem associated with the cause of an accident.
4. The SAT determined the score and prioritizes based on the relative ranking of SEs for potential risk reduction.
5. Resource requirements apply to organizational effect and financial or material requirements to complete the output. The LOCWG also was responsible for identifying the LOOC, the roles and responsibilities of which include—
 - Developing and implementing plan to accomplish that output,
 - Identifying and communicating resource needs to the Lead Organization for Overall SE Completion,
 - Reporting to the LOOPC the progress against the plan and the completion of tasks, and
 - Ensuring plans for output accomplishments contain an adequate number of milestones for program status checks and recovery actions before program end date.
6. Outputs are defined as the products and services produced and delivered or implemented in support of the stated SE.
7. Relationship to current aviation community initiatives are ongoing programs directly related to a specific output.
8. Performance Goals and Indicators for SEs are defined as the target levels of performance expressed as a tangible, measurable objective against which actual performance can be compared within specified time frames, including goals as quantitative standards, values, or rates. Performance goals may be applied to processes, outputs, and outcomes. They can be characterized as the expected benefit of the projects in accidents prevented. Performance indicators are measures applied to a process, output, or SE to ascertain the extent to which performance goals are met. This will be characterized as the methodology to measure the effectiveness of the intervention.

The LOCWG's minimum requirement for DIPs is that they contain strategies for implementing the interventions in the selected projects that are above the selected OExF cutoff value. Whenever possible, the lower ranked interventions should be included in the detailed plans unless the inclusion would result in activities requiring excessive resources or time to implement.

5.3 Safety Enhancements

SE–I Angle of Attack Systems—New and Current Production SOW.

To reduce the risk of inadvertent stall/departure resulting in LOC accidents, the GA community should install and use AOA based systems for better awareness of stall margin.

AOA systems are not in wide use in GA. The GA community should embrace to the fullest extent the stall margin awareness benefits of these systems. To help the GA community understand the safety benefits of AOA systems, a public education campaign should be developed by industry and the FAA. GA aircraft manufacturers should work to develop cost

effective AOA installations for new and existing designs currently in production. Owners and operators of GA aircraft should be encouraged to have AOA systems installed in their aircraft.

The DIP on this subject originally targeted the simple, low cost AOA systems currently available for GA airplanes. During development, it became obvious that other, more complex approaches offer safety benefits for airspeed/energy state awareness. For example, concepts such as fast/slow cues and pitch limits are examples of AOA based information that should be explored for use in the GA community.

SE-2 Angle of Attack Systems—Existing GA Fleet SOW.

To reduce the risk of inadvertent stall/departure resulting in LOC accidents, the GA community should install and use AOA based systems for better awareness of stall margin.

AOA systems are not in wide use in GA. The GA community should embrace to the fullest extent the stall margin awareness benefits of these systems. To help the GA community understand the safety benefits of AOA systems, a public education campaign should be developed by industry and the FAA. GA aircraft manufacturers should work to develop cost effective AOA installations and retrofit systems for the existing GA airplane fleet. Owners and operators of GA aircraft should be encouraged to install AOA systems in their aircraft.

The DIP on this subject originally targeted the simple, low cost AOA systems currently available for GA airplanes. During development, it became obvious that other, more complex approaches offer safety benefits for airspeed/energy state awareness. For example, concepts such as fast/slow cues and pitch limits are examples of AOA based information that should be explored for use in the GA community.

SE-3 Aeronautical Decision Making SOW.

To reduce the risk of loss of control accidents, the GA community should develop and implement a flight safety program focusing on aeronautical decision making (ADM). The initiative should focus on ADM in preflight planning; professional decision making; flight risk assessment tools (FRAT); and stabilized approaches, missed approaches, and go arounds.

SE-4 Over Reliance on Automation SOW.

Purpose: To reduce the risk of LOC accidents by improving certain aspects of flight training related to over reliance on automated flight systems.

Over reliance on automated flight systems has resulted in LOC accidents. The FAA and industry should encourage training that requires pilots to demonstrate proficiency in manual flying in the event of automation malfunction. As the lead organization, the FAA will promote existing publications that properly address the need for manual flying skills in the event of automation malfunction or failure.

SE-5 and SE-6 Transition Training SOW.

Transition training is not uniformly applied leading to accidents resulting from unfamiliarity with airframe and/or equipment. To reduce the risk of loss of control accidents, the GAJSC recommends the development of Web based tools that will aid in all aspects of transition to unfamiliar aircraft across GA, to include ADM (see ADM Detailed Implementation Plan), to identify the risk of inadequate training when operating unfamiliar equipment.

The FAA and industry should update existing documentation relating to transition training.

The FAA and industry should conduct an outreach campaign on the need for transition training including ADM when flying an airplane that is unfamiliar to the pilot. The FAA and industry should work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. The FAA in conjunction with industry organizations, type clubs, and kit manufacturers/makers of experimental amateur built aircraft will reach out to pilots of these aircraft to encourage education on operationally specific requirements.

The FAA should amend current policy⁵ that restricts type specific training in rented, kit, or experimental amateur built aircraft to allow proper transition training and reduce accidents.

SE-7 Utilization of Type Clubs SOW.

Type Clubs are groups of owners and operators centered around particular aircraft. To reduce LOC accidents, GAJSC will leverage type clubs to develop and disseminate critical safety related information.

The owners/operators of type clubs are most familiar with operating characteristics and procedures specific to particular aircraft and are in an excellent position to develop, communicate, and promote safety mitigation strategies that target loss of control accidents. Accordingly, the GAJSC will leverage type club owners/operators' knowledge and experience.

Large fleet aircraft operators, such as large flight schools, are also very familiar with the operating characteristics and procedures specific to particular aircraft. The GAJSC also will leverage these organizations for safety strategies that target loss of control accidents.

SE-8 Flight Training After Period of Flight Inactivity SOW.

Purpose: To reduce the risk of LOC accidents by improving certain aspects of flight training related to the return to flying after periods of flight inactivity.

Flight inactivity has resulted in LOC accidents. In partnership with industry organizations, the FAA should lead the promotion and dissemination of information on the adverse effects of flight inactivity.

⁵ FAA Order 8900.1 CHG 155 Volume 3, Chapter 11 – Use of Aircraft Issued Experimental Airworthiness Certificates in Flight Instruction for Compensation or Hire.

SE-9 Part 135 Safety Culture SOW.

To reduce LOC accidents, the GA community should advocate that part 135 operators conduct mixed operational missions under safety criteria similar to those governing commercial flights to increase safety margins and promote professionalism.

SE-10 Stabilized Approach and Landing SOW.

The FAA and industry will review the adequacy of the existing guidance and advisory material (including Practical Test Standards (PTS) on stabilized approaches and go arounds. Guidance and advisory material will be updated to include emphasis on stabilized approaches throughout various scenarios: wind, balked landings, and go arounds.

SE-12 and SE-13 Weather Technology

To reduce the risk of accidents due to weather related factors, pilots should rely upon accurate real time weather reporting. While ground based weather reporting systems (such as the Automated Weather Observing System or Automated Surface Observing Systems) 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.

SE-14 Engine Monitoring Technology SOW.

To reduce the risk of loss of control accidents due to engine failure related factors, the FAA and industry will review the current technological capabilities available for engine trend monitoring, engine health analysis, fuel management, and fuel indicator systems. Based on the existing available capabilities, the FAA will update guidance to promote their use. The FAA and industry will develop an educational outreach program to expand the installation and use of these systems.

SE-15 Flight After use of Medications With Sedating Effects SOW.

To reduce the risk of pilot impairment or incapacitation resulting in loss of control accidents, the GA community should implement programs to reduce the likelihood of the use of over the counter and prescription sedating medications that adversely affect the pilot's ability to safely operate aircraft.

Tools to improve pilot knowledge about the safe use of sedating medications are available to airmen, but knowledge and use of these tools is not widespread in GA. Additionally, these tools may not meet the needs of the GA community. The GA community should strive, to the fullest extent possible, to improve pilot knowledge and prevent the use of sedating medications that adversely affect flight safety. To help the GA community understand the safety benefits of informed use of medications, industry groups, academia, the FAA, insurance providers, and the medical community should develop educational tools, online reference materials, and surveys (both pre and post implementation) 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.

SE-16 and SE-17 Flight With Impairing or Incapacitating Medical Conditions SOW.

To reduce the risk of medical conditions known to the pilot causing in flight impairment or incapacitation resulting in loss of control accidents, the GA community should implement programs to reduce the likelihood of airmen failing to disclose known medical conditions and/or flying with known medical conditions that could adversely affect their ability to safely operate aircraft.

Barriers to open/honest communication between airmen and Aviation Medical Examiners (AME) have resulted in airmen failing to disclose possibly impairing medical conditions and subsequently flying with conditions that have contributed to in flight impairment and or incapacitation. The FAA Office of Aerospace Medicine (AAM) and the Aerospace Medical Association in conjunction with the Aircraft Owners and Pilots Association (AOPA) should develop methods or techniques and perform a study (or studies) that will help determine then mitigate barriers to an open and honest communication between pilots and their AMEs and develop methods to improve professionalism of pilots and their ability to conduct accurate medical self assessment before each flight.

SE-21 Risk Based Flight Review SOW.

To reduce LOC accidents due to reoccurring causal factors, the GAJSC will yearly, provide to the training and instructor community, a report of issues and risks found by the risk based working groups (such as LOCWG). These issues and risks can be used to develop a risk based flight review special emphasis initiative.

Once a pilot has been certificated, the only opportunity to evaluate skill levels and emphasize areas of special concern is during the pilot's biannual flight review. The GAJSC will work with the flight training and instructor community to get this information to certificated flight instructors (CFI) to have the areas of special concern included in all flight reviews. The program would have the flight training and instructor community provide feedback on the results and provide recommendations back to the GAJSC. The GAJSC will also provide the areas of concern to flight schools and include them in the program.

SE-21 Flight Data Monitoring SOW.

To reduce the risk of loss of control accidents by using Flight Data Monitoring (FDM) as a source of data support in overall industry wide safety initiatives.

GA FDM allows the GA community to use the benefits previously afforded to 14 CFR part 23 aircraft in approved Flight Operational Quality Assurance (FOQA) programs.

The growing emphasis on formalized safety initiatives in GA has increased the need for diverse data collection methodologies from diverse sources to provide feedback. The use of FDM had not been widely accepted in GA at the time of this analysis. The GA community should strive to encourage the acceptance and expansion of FDM programs to increase the amount of data collected.

To exploit these opportunities, the FAA and industry should develop a GA community campaign. GA aircraft manufacturers should work to develop cost effective FDM installations for new type designs and existing type designs currently in production. GA aircraft owners and operators should be encouraged to install FDM systems in their aircraft.

SE-23 E-AB/Flight Test SOW.

To reduce the risk of loss of control accidents, the FAA and industry should develop a best practice guide for how to flight test an experimental amateur built (E-AB) aircraft following a modification.

Additionally, testing for center of gravity (CG) limits, including lateral, should be added to Advisory Circular (AC) 90-89A, Amateur Built Aircraft and Ultralight Flight Testing Handbook. The FAA and industry will develop an educational outreach program to expand the awareness and use of AC 90-89A.

SE-24 Single Pilot CRM SOW.

Crew Resource Management (CRM) has been embraced by the air carrier industry as a necessary initiative that has helped mitigate aircraft accidents caused by human error. Even though traditional CRM focused on multicrewed environments, several elements (such as communications, teamwork, decision making, and situational awareness) can be applied to single pilot operations. There have been some single pilot CRM initiatives undertaken by the FAA and industry to develop learning materials directed at single pilot operators, but a more concerted and formalized industry wide effort should be undertaken. If single pilot operators learn and practice CRM skills targeted directly to them, many of the safety related benefits realized in the air carrier community should transfer to the GA community.

SE-25, SE-26 and SE-27 Reduce Regulatory Roadblocks (R³) SOW.

GA is going through a technical revolution that started in the mid 1990's and is accelerating today. At the same time the United States has a fleet of over 200,000 GA airplanes and over 100,000 instrument flight rules (IFR) capable GA airplanes, the majority of which are still

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equipped with 1960's to 1980's vintage instruments and avionics. Taking advantage of the rapidly expanding technical revolution is an important component of reducing GA accidents.

Data from the FAA AVP shows that the United States saw over a 60 percent drop in fatal controlled flight into terrain (CFIT) accidents from 2001 to 2010. CFIT accidents are predominantly instrument meteorological conditions (IMC) related and frequently the accident is on approach. 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 nonprecision approaches has helped the pilot during IMC operations. Contrasting these technologies with the 1960s vintage panel so typical of the GA fleet, makes it clear a dramatic decrease in CFIT accidents is possible.

The decrease in CFIT accidents is due, in large part, to new technology. In the 1990s, the FAA Small Airplane Directorate (ACE-100) applied a risk management approach to avionics certification by putting the appropriate level of certification on the product. It was this FAA initiative along with several industry/National Aeronautics and Space Administration (NASA) initiatives that brought about the glass cockpits that are in virtually every new part 23 airplane. However, new airplanes, even after 10 years, make up only between 5 and 10 percent of the GA fleet. These airplanes could not have lowered the accident rate this dramatically. The FAA must recognize that the bulk of the safety enhancing technology that lowered the accident rate was in the form of handheld equipment not installed in the airplane.

The FAA must also recognize that the vast majority of pilot/owners of the 200,000+ fleet of GA airplanes votes on safety equipment with their money and purchase decisions. The cost to purchase an FAA approved device⁶, installed in the instrument panel costs 5–10 times more than the same technology in handheld form. Based on purchase history, the pilot/owner community has apparently determined that the safety benefits of FAA approved devices are not worth the cost difference.

CFIT accident scenarios are easily addressed with new awareness technology, but this is not completely the case for LOC accidents. The technology to address LOC accidents can, in some cases, be designed as a portable device; but more typically, technologies that can address LOC accidents must be installed on the airplane. This is the main reason that cost keeps this technology out of small airplanes. Two good examples are a simple AOA indicator and an autopilot. The AOA indicator provides pilots with an awareness (visual and audio) of their margin above stall. The system accounts for all conditions such as weight and acceleration by design, whereas using stall speed does not. AOA system installations should be easy because they are not required equipment and do not interface with any existing equipment. The cost to put an existing AOA system on a certified airplane is almost 10 times higher than putting it on a homebuilt. The other example is an autopilot. An AOPA Air Safety Institute report points out that LOC accidents at night and in IMC would drop by 50 percent simply by installing autopilots in the more than 100,000 IFR capable GA airplanes. Homebuilders can install an autopilot for as little as \$2,500. However, for most light airplanes that cost would be between \$10,000 and

⁶ FAA approved avionics would include added costs from the certification process, including technical standard orders, supplemental type certificates, and installation approvals.

\$15,000 with the airplane value around \$20,000 to \$100,000. That is simply too large a fraction of the airplane's value to justify the expense.

The AOA system and the autopilot are not required equipment in all but a few high end part 23 airplanes. The only requirement that should be placed on these devices is that their failure would not cause a safety problem for the pilot. Clearly the FAA is on the right track, but must find ways to help reduce the cost to about half of what it costs today to install safety enhancing technology. Given that an installation may have minimal risk but offer substantial safety benefit, the FAA needs to apply a risk management approach to address the current situation in which the FAA is actually an obstacle to getting safety enhancing technology into the GA fleet. The FAA will need to identify the right level of certification. This will entail moving away from a single level of safety and performance. The shift should incorporate a continuum of certification rigor to match the continuum of safety expectations. If done properly the GA fleet can reap the potential benefit of reward with a balanced risk approach.

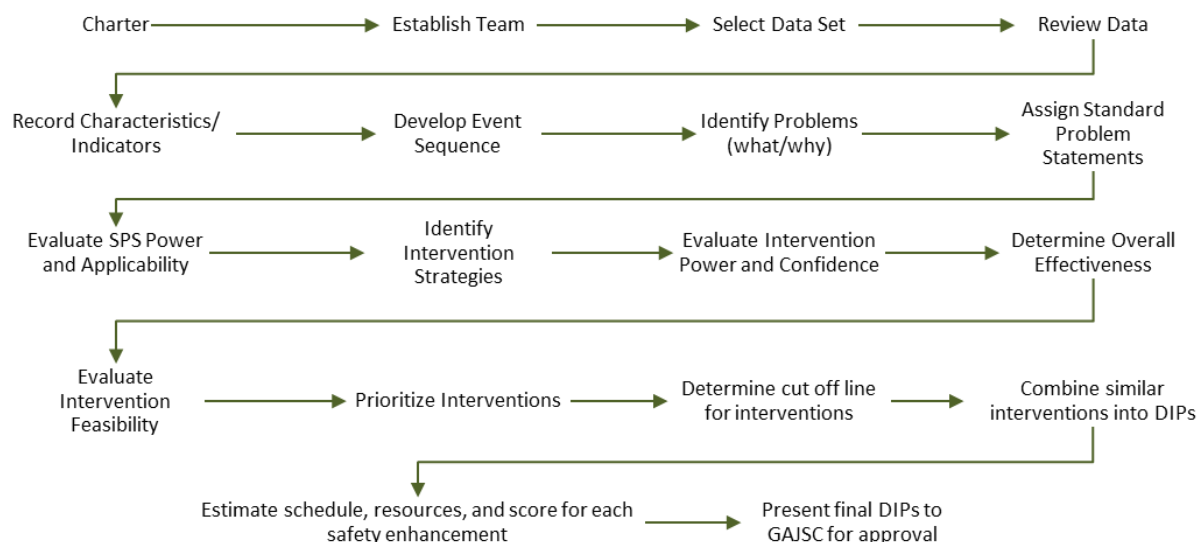
6.0 Task 6

The working group, as the pilot project, will provide feedback to the GAJSC about what worked and what did not work with respect to this process to help assist with future working groups.

The GAJSC's first project following its reestablishment in 2011 was specifically chartered as a "pilot project" and each member of the GAJSC was asked to identify "lessons learned" during the work of the GAJSC to help adapt the CAST methodology to the GAJSC. Lessons learned from the accident analysis, accident selection and establishment of the work group include the need for a formalized membership process, approval of the methodology for narrowing down the volume of accidents, and the appropriate size of the work group. A joint meeting was held between the LOCWG and the SAT in January 2012 to summarize the lessons learned⁷ in preparation for future work.

⁷ See, Power Point, GAJSC – 3 Year Plan Framework – 01132012.pp

The LOCWG followed a hybrid of processes established by CAST’s JSAT and Joint Safety Implementation Team (JSIT). Based on the JSAT and JSIT process handbooks and the lessons learned in the development of the LOCWG process, the following process is recommended as a baseline for future GAJSC work groups.



The LOCWG used the JSAT Process Handbook, Rev. D and JSIT Process Handbook, Rev. B to generate its unique process for GA.

IV. Areas of Focus for Further Study and Technical Studies.

Scope of this Section.

The LOCWG identified several areas warranting further attention and, in some cases, study based on the root cause analysis conducted.

Medical Issues and Drugs.

The LOCWG examined the frequency with which medical issues were involved in fatal GA accidents, including the use of over the counter drugs, prescription drugs, and the use of illegal drugs by pilots involved in GA accidents. While the NTSB only rarely identifies drugs or medical issues as causal to GA accidents, the LOCWG identified a great number of accidents in which autopsy identified drugs at rates that likely affected the pilot’s ability to deal with stressful situations or, in other cases, are known to cause drowsiness and impeded ability to focus. The GAJSC approved three SEs intend to mitigate the risk from pilots not fully understanding the use of over the counter medications or prescription drugs.

It should be noted that the NTSB and the Department of Transportation Inspector General previously identified the use of over the counter and prescription drugs as an issue and called for additional attention by the FAA.

Part 23 Regulatory Reform Aviation Rulemaking Committee.

In parallel to the GAJSC, the FAA in 2011 created a new Aviation Rulemaking Committee (ARC), which was the result of the Part 23 Certification Process Study developed jointly by the FAA and industry in 2009. Several members of the GAJSC also participate in the Part 23 ARC. The DIPs in SE-25, SE-26, and SE-27 are specifically targeted for implementation using the expertise of the Part 23 ARC, but some of the work is already being carried out directly by the FAA's ACE-100.

Inclusion of E-LSA in GA Accident Metrics.

The experimental-light sport aircraft (E-LSA) accident data was not fully considered when the FAA identified the baseline data was identified for its GA accident metrics; that is, 1.12 fatal accidents per 100,000 hours average during 2006–2008⁸. The majority of E-LSA aircraft at that time were still being operated under exemptions to 14 CFR part 103 (“two place ultralight trainers”) and not N registered. Because these aircraft were not N registered, they were not part of the FAA or NTSB fatal accident statistics.

The SAT initiated a cursory review of E-LSA accidents and identified between 3 (2009) and 11 (2011) unregistered/previously E-LSA fatal accidents per year since the regulatory transition of E-LSA. During the baseline years, the unregistered fatal accident count in the United States included 11 (2006), 8 (2007), and 4 (2008) fatal accidents. However, the FAA required N registrations for these aircraft as of January 31, 2008. It subsequently issued exemptions for N number registration until January 31, 2010. As a result, some fat ultralight fatal accidents were included in annual rates beginning in 2008, and all such fatal accidents were included in the annual rates beginning in 2010. This fleet has a higher fatal accident rate than the rest of GA, which the FAA did not take into account when setting its baseline metric of 1.12 per 100,000 hours. As a result, the baseline metric may be off by as much as 3 percent. This in turn could make achievement of the 2018 target rate more difficult. The SAT volunteered to further review the effect of these previously unregistered fatal accidents on the FAA's accident metric and 2018 fatal accident rate target.

General Aviation Accident Metric.

The GAJSC, the SAT, and the LOCWG discussed in great detail the applicability of the current GA safety metrics (that is, number of fatal accidents per 100,000 hours) for GA and its various segments. It was noted that EAB aircraft typically do not conduct point to point flying, but instead conduct short flights, often in the pattern, compared to a business jet flying direct, at flight levels, for hours with an autopilot engaged. The discussions resulted in the tasking of the SAT, with CGAR's support, to review and determine whether more appropriate metrics exist for GA.

⁸ The FAA's original safety metric for GA was established based on a 1996–1998 baseline with the target year of 2007 and based on fatal accidents. Industry and FAA reworked the metric and goal in 2008 based on a commitment to shift to a rate-based metric and goal. The change was enabled by enhancements to the GA activity survey that resulted in an acceptable statistical error for flight exposure data.

Appendix I — LOCWG Charter

CHARTER

Working Group (“CAST Joint Safety Analysis and Implementation Team”)
Loss of Control – Approach and Landing Accidents
April 26, 2011

Working Group (“CAST Joint Safety Analysis and Implementation Team”)

Loss of Control – Approach and Landing Accidents

April 26, 2011

A. Background

The General Aviation Joint Steering Committee (GAJSC) chartered a Safety Analysis Team (SAT) to conduct a review of fatal general aviation accidents for 2001 through 2010. The SAT reviewed 2,472 fatal general aviation accidents based on CAST/ICAO Common Taxonomy Team (CICCT) categories and identified Loss of Control (LOC) accidents as the most prevalent accident type with 1,259 fatal accidents during the SAT timeframe. Industry and Government have agreed to purpose a data-driven approach to identifying high priority safety initiatives for general aviation and jointly agree to work toward the mitigation of accident causes. The GAJSC is being proposed [has] chartered a pilot project to study the Loss of Control accidents, specifically those occurring during the approach and landing phase of flight, and determine the contributing factors and intervention strategies. While the focus of this pilot project is approach and landing, the SAT expects to continue analysis of LOC accidents and may charter a future working group to look at other types of LOC accidents.

B. Tasks

1. The working group will conduct an in-depth analysis and review of the LOC approach and landing accidents provided to the working group by the SAT. The SAT has established a statistically acceptable process to reduce the 279 approach and landing accidents that occurred during 2001 through 2010 into a data-set that can be practically reviewed by the working group within the timeframe provided.
2. The working group will review and determine the level of applicability of other work done in the area of LOC and approach and landing accidents. This work includes the Flight Safety Foundations Approach and Landing Accident Reduction (ALAR) tool-kit.
3. The working group will develop and prioritize safety intervention strategies that will reduce the potential for LOC approach and landing fatal accidents. In addition to documenting its analysis results and recommended intervention strategies, the working group will also document its assumptions regarding the analysis.

4. The working group will present the prospective interventions identified for implementation to the GAJSC for review and approval. The analysis and rationale for how all the intervention strategies were dispensed will be included in the report.

5. Following the approval of the GAJSC of the interventions, the working group will develop a detailed implementation plan for each intervention.

5.1 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 interventions.

5.2 The working group will present each detailed implementation plan to the GAJSC for review and approval.

6. The working group, as the pilot project, will provide feedback to the GAJSC about what worked and what did not work with respect to this process to help assist with future working groups.

C. Products

The working group will deliver the following to the GAJSC:

- Progress reports
- A report documenting analysis and recommendations on mitigation strategies
- An implementation plan for review and approval
- Detailed implementation plans, including metrics for monitoring effectiveness of mitigation strategies.

D. Membership

The working group will include representatives with the appropriate technical background provided by industry and Government including several members from the SAT that can further assist with the data analysis.

E. Resources

The GAJSC participating organizations agree to provide appropriate financial, logistical, and personnel resources necessary to carry out this charter and approved implementation strategies. The working group will primarily use conference calls for the technical meetings, but have the discretion to also meet face-to-face at the discretion of the working group government/industry co-chairs.

F. Schedule

The working group is expected to exist for nine months, but can be extended at the discretion of the GAJSC. The working group is requested to target its deliverables as follows:

- September 2010: Report documenting analysis and recommendations for mitigations.
- May 2012: An implementation plan including metrics for monitoring effectiveness of mitigations.

G. Specific Resources

The GAJSC recognizes that the LOC working group will be the pilot project for the new joint-FAA-industry safety program for general aviation and as a result the organizations providing personnel resources to this project are asked for discretion in possible changes in the need for resources. However, based on an initial assessment, it is expected that the working group consist of two co-chairs and representatives from government and industry.

H. LOC Approach and Landing Membership

Name	Organization	Email
Kevin Clover (Co-Chair)	FAA	kevinclover@faasafety.gov
David Oord (Co-Chair)	AOPA	David.Oord@aopa.org

I. Approved

This charter was approved by the GAJSC on April 26, 2011.

Bruce Landsberg, Industry Co-Chair

Tony Fazio, Government Co-Chair

Appendix 2 — Participants

GAJSC SAT Co-Chairs

Industry – Jens Hennig, General Aviation Manufacturers Association (GAMA)

FAA – Corey Stephens, FAA Office of Accident Investigation and Prevention, AVP–200

Working Group Co-Chairs

Industry – David Oord, Experimental Aircraft Association (EAA)

FAA – Kevin Clover, FAA General Aviation and Commercial Division (AF–850)

Working Group Members

Aircraft Owners and Pilots Association (AOPA) –Kristine Hartzell

Aircraft Electronic Association (AEA) - Ric Peri

Aviation Insurance Association (AIA) - Steve Meyers, Thomas Hollinger

Center for General Aviation Research (CGAR) - Alan Stolzer and Dave Esser (Embry-Riddle Aeronautical University), Jim Higgins and Dana Siewert (University of North Dakota)

FAA, Flight Standards - Robert Potts, Jim Watson

FAA, Small Aircraft Division, ACE–100 - Lowell Foster, David Sizoo, Jim Brady

FAA, Office of Accident Investigation and Prevention, AVP–100 - Tony James

FAA, Office of Accident Investigation and Prevention, AVP–210 - Patrick Forrester, Sean Hafner

Garmin - Bill Van Zwoil

General Aviation Manufacturers Association (GAMA) - Kate Fraser

Hawker Beechcraft Corporation - Robert Ramey

Jeppesen - Richard Fosnot, Martin Plumleigh

National Air Transport Association – Lindsey McFarren

Society of Aviation Flight Educators (SAFE) - Jeff Edwards

Appendix 3 — LOCWG Meetings

August 3–September 1, 2011—Aircraft Electronics Association, Kansas City, Missouri

October 2–27, 2011—University of North Dakota, Grand Forks, North Dakota

November 29–December 1, 2011—Aircraft Owners and Pilots Association, Frederick, Maryland

January 10–12, 2012—Embry-Riddle Aeronautical University, Daytona Beach, Florida

February 7–9, 2012—FAA, Long Beach FSDO, Long Beach, California

March 20–22, 2012—Jeppesen, Denver, Colorado

April 10–12, 2012—Boeing, Seattle, Washington

Appendix 4 — Accident Selection Process

[April 20, 2011 Version]

****DRAFT Version 2****

Proposed Methodology for JSC SAT Accident Selection

In order to provide a quantitative framework for investigation of selected focal areas, the Safety Analysis Team (SAT) will utilize appropriate and empirically-based vetting protocols which will endeavor to provide a meaningful foundation for the team's subsequent analyses. The underlying foundation of the methodology will use the following principles: (1) Preprocessing of the search criteria will be as exhaustive as practical; (2) Random selection (each resultant accident report will have an equal probability of being selected) will be utilized; and (3) During the post analytical process, pruning and/or outlier removal will only occur when there exists a substantial lack of information contained in the report that was not readily apparent in the preprocessing tasks, when an accident report was inaccurately and obviously misclassified, or when there is a justifiable basis to believe the report will not materially contribute to the focal area.

Preprocessing

The National Transportation Safety Board's (NTSB's) aviation accident database and its associated interactive search capability will be utilized in the selection of accidents needed for further inquiry. Unless otherwise directed by the JSC or by the majority of the SAT, all accident selections will utilize the following criteria:

Investigation Type:	Accident
Injury Severity:	Fatal (with Non-Fatal augmentation; see below)
Category:	Airplane
Operation:	All General Aviation*
Report Status:	Probable Cause

*SAT may decide to include 135 reposition and other non-revenue flights

If desired by a majority vote of the SAT, further narrowing of selection criteria can be utilized with the following parameters:

Amateur Built (may be used as an additional sample; see below)

Engine Type

Purpose of Flight

Broad Phase of Flight

Further preprocessing activities will use a word string phrase or phrases agreed upon by the majority vote of the SAT and congruent with the selected focal areas. Once agreed upon, all records used for a focal area must use the same criteria and word string phrase or phrases.

Random Selection

If the resultant search query from the NTSB's database exceeds thirty (30) separate accident reports, a random sample of the available reports will be collected. The random sample shall include a minimum of thirty (30) samples. If thirty (30) reports are not available, Non-Fatal accidents may be used to bring the total sample size to thirty (30). In addition, the SAT may decide that a separate and additional sample involving Amateur Built aircraft be utilized.

A software tool, such as Microsoft's Excel or IBM's SPSS, will be used to randomize and select the sample. The randomizing shall only use the NTSB report number, and once run, shall constitute the master list of accident reports that will be used for analysis. Further information within the accident report will be accessed only after the master list is compiled.

Post-Analysis

Each report will be assigned to at least two members of the subgroup tasked with the focal area. Each member will review the report and make an initial judgment as to the suitability of the report as it relates to the task at hand. When making this judgment, the subgroup member must be able to answer question 1 in the affirmative and question 2 in the negative.

1. Does the report have adequate information available in order to form an appropriate qualitative assessment?
2. Has the accident outlined in the report been obviously misclassified, or does the report contain an error that would render any conclusion drawn therein not relevant to the focal area?

If the majority of subgroup members assigned to the specific accident report are in agreement that the answers to question 1 is in the affirmative or question 2 is in the negative, then the next available accident from the randomized master list shall be selected for analysis. The process would then repeat.

Once a report has passed this initial check, the subgroup members assigned to a report will conduct a preliminary analysis of the accident report.

If, after completing the analysis, the members of the subgroup tasked with the analysis of the accident report unanimously conclude that the accident in question will not materially contribute to the analysis of the focal area, the report will be excluded. In making the decision to exclude any accident report, the following question should be answered in the negative:

3. Will the accident report materially contribute to the analysis of the considered focal area?

If there is doubt as to the answer of this question, the question should be answered in the positive, and the report should be included for further analysis.

Working Group

When the subgroup compiles a sample list of accidents per the above methodology, they shall forward the list to the assigned working group. In addition, the subgroup will also forward an additional list of reports, known as the reserve dataset, to be used in the event the working group concludes that a particular accident report is not suitable for further analysis given the focal area. In the event that no accident report remains in the reserve dataset, the subgroup shall reconvene to generate additional reports drawn from the master list and processed in accordance with the post-analysis procedures listed above.

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Appendix 5 — Accident Set Reviewed by the LOCWG

ATL07FA029 Cessna 340A Charleston, SC	DEN03FA111 RV-6A La Junta, CO
CH101FA093 Cessna 172 Centralia, IL	LAX02LA109 RV-4 Jacumba, CA
CH105FA260 Piper PA-32-300 Wabash, IN	LAX03LA192 Argus Aviation CA-7 Angleton, TX
CH106FA076 Cessna 421B Whelling, IL	NYC06LA136 Lancair 360 Montgomery, NY
CH106FA232 Piper PA-23-250 Sault Ste Marie, MI	SEA03LA118 Herrin Hornet Newberg, OR
CH108FA053 Beech V35B Springfield, IL	IAD02LA089 Puhl Genesis Petersburg, WV
DEN03FA068 Cessna 310D Provo, UT	CH106LA164 Zenair Cricket MC-12 Lee's Summit, MO
CH104FA255 Cirrus SR-22 Park Falls, WI	SEA08LA145 Lancair Legacy Murrieta, CA
DEN07FA059 Beech H-18 Great Bend, KS	ATL02LA099 Comp Air 7 Merritt Island, FL
DFW06FA021 Piper PA-34-220T Tomball, TX	DFW05LA102 - Spearman Raptor Bogalusa, LA
DFW07FA036 Cessna 310Q Waco, TX	CH107LA113 Murphy Moose SR3500 Cotter, AR
FTW04FA045 Cessna 172 Grand Saline, TX	ATL04LA158 Pitts S-1 Durham, NC
LAX01LA303 Cessna P206B Willits, CA	CH102LA176 BAR/Curtiss JN-4D Owatonna, MN
LAX02FA061 Cessna T337H Buena Park, CA	DEN07LA108 RV-6 Edgewater, CO
LAX04FA066 Cessna 421C Claremont, CA	DFW07FA023 Glasair Mineral Wells, TX
LAX05FA262 Piper PA-28-235 Big Bear City, CA	FTW04LA040 RV-6A Carthage, TX
LAX06FA089 Piper PA-30 Visalia, CA	LAX06LA170 RANS S-18 Stinger Llano, CA
MIA04FA047 Piper PA-23-160 Lake Worth, FL	MIA08FA141 Socata TBM700 Kennesaw, GA
MIA08FA091 AeroFab Lake LA-250 Skaneateles, NY	DFW08FA057 Piper PA-46-500TP San Antonio, TX
MIA08FA081 Cirrus SR22 Waxhaw, NC	ANC07FA073 Piper PA-46-350P Sitka, AK
NYC07FA100 Piper PA-23-250 Windham, CT	NYC07FA065 Socata TBM 700 Dartmouth, MA
NYC01FA109 BE 36 Middletown, RI	LAX07FA059 Piper PA-46-350P Concord, CA
SEA08FA013 Grumman American AA-5A Sequim, WA	ATL06FA044 Beech 200 Myrtle Beach, SC
DFW05LA118 Cessna 182 Little Rock, AR	LAX06FA071 LearJet 35A Truckee, CA
NYC03LA019 Mooney M20R Vineyard Haven, MA	DFW05FA170 Beech E90 New Roads, LA
NYC06FA145 Raytheon Acft Company B36TC North Garden, VA	IAD05FA047 Pilatus PC-12/45 Bellefonte, PA
NYC07FA159 Mooney M20F Brooks, KY	DCA05MA037 Cessna 560 Pueblo, CO
CH102FA094 Piper / PA-31P Daleville, IN	NYC05FA042 Embraer EMB-110P1 Swanzey, NH
NYC06FA048 Beech D-55 Dawson, GA	DEN05FA051 Beech BE-90 Rawlins, WY
MIA01FA151 Mooney M20J Monroe, NC	SEA05FA025 Cessna 208B Bellevue, ID
CH101FA235 Payne Giles G-202 Oshkosh, WI	IAD04FA021 Mitsubishi MU-2B-60 Ferndale, MD
CH107LA150 Vans RV-7A Marysville, OH	LAX04FA165 Mitsubishi MU-2B-40 Napa, CA
CH108FA224 Lancair Legacy Oshkosh, WI	NYC03FA080 Dassault Aviation DA-20 Swanton, OH
LAX04LA106 Thorpe T-18 Compton, CA	DEN04MA015 Cessna 208B Cody, WY
NYC08LA001 Varieze Chesapeake, VA	IAD03FA043 Beechcraft B200 Leominster, MA
SEA03FA041 KIS TRI-R TR-1 Puyallup, WA	DEN03FA045 Piper PA-46-500TP Albuquerque, NM - INCOMPLETE
ATL05LA078 Earnest Jodel D-9 Memphis, TN	IAD03FA035 Socata TBM 700 Leesburg, VA
CH101FA244 Hamilton SH3 Oshkosh, WI	FTW03FA036 Israel Aircraft Industries 1124A Taos, NM
DFW07LA090 RV-6 Sinton, TX	DCA03MA008 Beech King Air 100 Eveleth, MN
IAD02LA028 Wilburn Jodel F-12 Clarksville, VA	DEN01FA113 Mitsubishi MU-2B-20 Cerrillos, NM
MIA03LA045 Bornhofen Twinjet 1500 Melbourne, FL	DEN01FA094 Cessna 208B Steamboat Springs, CO
ATL04LA001 Hornet Saint Marys, GA	NYC06LA160 Aerial Productions Intl. Inc. Acrojet Special
CH104LA026 BD5B Traverse City, MI	

Appendix 6 — Technical Briefings Provided to LOCWG

October 25, 2011, Small Airplane Directorate, AOA Technologies

October 25, 2011, SAFE, Past Initiatives on Loss of Control

October 25, 2011, Garmin International, Flight Envelope Protection

November 29, 2011 FAA Civil Aeromedical Institute (CAMI), Aeromedical Issues

January 10, 2012 Randall Brooks, Upset Recovery Training Association (UPRTA)

Appendix 7 — Safety Enhancements Overview

SE Output	LOOC	Outreach?	Training Provider?	Public Notification of New Product?
1.1	AOPA	Y	N	N
1.2	GAMA	N	N	N
1.3	AEA	N	N	N
1.4	FAA ACE-100	N	N	N
1.5	SAFE	Y	Y	N
2.1	AOPA	Y	N	N
2.2	AOPA	Y	N	N
2.3	SAFE	N	Y	N
2.4	AIA	N	N	N
3.1	AOPA	Y	N	N
3.2	AOPA	Y	N	N
3.3	AOPA	N	N	N
4.1	FAA AFS-600	Y	Y	N
5.1	AOPA	Y	N	Y
5.2	GAMA	N	N	Y
5.3	AOPA	Y	N	N
6.1	FAA AFS-800	N	N	Y
6.2	GAJSC	N	N	N
7.1	FAA AFS-800	N	N	N
7.2	FAA AFS-800	Y	N	Y
8.1	AOPA	Y	N	Y

General Aviation Joint Steering Committee
Loss of Control, Approach and Landing, Final Report

SE Output	LOOC	Outreach?	Training Provider?	Public Notification of New Product?
9.1	NATA	Y	N	N
9.2	FAA AVP-100	N	N	N
10.1	FAA AFS-800	Y	Y	N
10.2	AOPA	N	N	N
10.3	FAA AFS-600	N	N	Y
11.1	N/A			
12.1	FAA AVP-200	N	N	
12.2	AOPA	N	N	
13.1	FAAST	Y	N	
14.1	GAMA	Y	N	N
14.2	GAMA	N	N	Y
14.3	FAA AFS-800	Y	N	N
15.1	AOPA	Y	N	N
15.2	FAA AFS-600	N	Y	N
15.3	FAA AAM-600	N	N	Y
15.4	CAMI	N	N	N
16.1	CAMI	N	N	N
17.1	AOPA	N	N	N
18.1	N/A			
19.1	N/A			
20.1	N/A			
21.1	GAJSC	Y	Y	N
22.1	AOPA	Y	N	N
22.2	AOPA	N	N	N

General Aviation Joint Steering Committee
 Loss of Control, Approach and Landing, Final Report

SE Output	LOOC	Outreach?	Training Provider?	Public Notification of New Product?
23.1	EAA	N	N	Y
23.2	FAA AFS-300	N	N	Y
23.3	EAA	Y	N	N
23.4	FAA AFS-300	N	N	Y
23.5	EAA	Y	N	N
24.1	AOPA	Y	N	N
24.2	GAJSC	N	N	N
24.3	FAA AFS-800	Y	N	N
25.1	FAA ACE-100	N	N	N
26.1	FAA ACE-100	N	N	Y
27.1	AEA	N	N	Y

Appendix 8 — 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 interventions.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Angle of Attack (AOA) Systems — New & Current Production

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–1

Statement of Work

To reduce the risk of inadvertent stall/departure resulting in loss-of-control (LOC) accidents, the GA community should install and use AOA-based systems for better awareness of stall margin.

AOA systems are not in wide use in GA. The GA community should embrace to the fullest extent the stall margin awareness benefits of these systems. To help the GA community understand the safety benefits of AOA systems, a public education campaign should be developed by industry and the Federal Aviation Administration (FAA). GA aircraft manufacturers should work to develop cost-effective AOA installations for new and existing designs currently in production. Owners and operators of GA aircraft should be encouraged to have AOA systems installed in their aircraft.

This Detailed Implementation Plan (DIP) originally targeted the simple, low-cost AOA systems currently available for GA airplanes. During development, it became obvious that other, more complex approaches offer safety benefits for airspeed/energy state awareness. Concepts such as fast/slow cues and pitch limits are examples of AOA-based information.

Safety Enhancement 1 (SE–1)

Public education campaign on the safety benefits of AOA systems supplementing existing stall warning systems

Score: _____

Output 1 (Needed for SE–1 & SE–2 (Output 1)):

The industry and FAA will develop a public education campaign on the safety benefits of AOA systems supplementing existing stall warning systems.

Resources— _____

Aircraft Owners and Pilots Association (AOPA) (Lead Organization for Overall Output Coordination (LOOC)), Experimental Aircraft Association (EAA), FAA Safety Team (FAASTeam), aircraft manufacturers, AOA manufacturers, Aircraft Electronics Association (AEA), National



Air Transportation Association, National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), training providers, and the Type Clubs Coalition (TCC)

Total Government/Industry Resources—

\$150,000

Timeline—

Six months after SE approval.

Actions—

1. The industry and FAASTeam will determine what communication methods are most appropriate for the different segments of the community.
2. The FAASTeam and industry will promote the use of AOA systems by various segments of GA using the methods developed in #1 above.

Relationship to Current Aviation Community Initiatives—

There is a SAFE initiative on incorporating AOA into private pilot training curricula.

AOPA and EAA have written articles on AOA.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a public education program to explain the benefits of AOA systems for GA owners and operators.

- Indicator: The AOA education program is designed and implemented 180 days after approval.
- Indicator: Survey the community for acceptance.

Output 2:

Applicants for new and amended airplane type designs under Title 14, Code of Federal Regulations (14 CFR) part 23 and special light-sport aircraft agree to incorporate AOA systems in their designs.

Resources—

GAMA (LOOC), Light Aircraft Manufacturers Association, manufacturers, and ASTM International Technical Committee F37 (ASTM F37)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Two months for GAMA to issue communication from SE approval; six months for manufacturers to respond to GAMA's letter.

Actions—

1. The GA Joint Steering Committee (GAJSC) requests that GAMA communicate with manufacturers, encouraging them to incorporate AOA systems into all new and amended airplane type designs.
2. The GAJSC requests that ASTM F37 incorporate AOA systems into its standards.
3. Manufacturers respond by indicating their intentions regarding incorporation of AOA systems into existing production airplanes and new airplane type designs.

Relationship to Current Aviation Community Initiatives—

There is a reorganization under part 23 to reduce fatal accidents by half with new airplane designs. LOC accidents make up such a large percentage of GA accidents that simply targeting LOC accidents and integrated safety equipment like AOA awareness could cut fatal accidents in half, thereby allowing the part 23 reorganization effort to meet the goals for new airplanes.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Include AOA in new airplane designs.

- Indicator: Letters received from manufacturers indicating their intentions.

Output 3:

Encourage avionics (Primary Flight Display (PFD)/Head-Up Display (HUD)) manufacturers to include AOA system capability as standard equipment.

Resources—

AEA (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Two months for AEA to issue communication after SE approval; six months for manufacturers to respond to AEA's letter.

Actions—

1. The GAJSC requests that AEA communicate with the avionics manufacturers to include AOA systems as standard equipment.
2. Manufacturers respond by indicating whether they intend to incorporate AOA systems as standard equipment.

Relationship to Current Aviation Community Initiatives—

ASTM International Technical Committee Avionics Standard Development (ASTM F39).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Manufacturers include AOA as standard equipment.

- Indicator: Letters received from manufacturers indicating their intentions.

Output 4:

The FAA will task the appropriate standards organization to review and amend as necessary the appropriate technical standard to include AOA in PFD/HUD design standards.

Resources—

FAA ACE 100 (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Ten months for the FAA to issue the request. The FAA will publish the developed standard twelve months later.

Actions—

1. The FAA will task the appropriate standards organization to review and amend as necessary the appropriate technical standard to include AOA in PFD/HUD design standards.

Relationship to Current Aviation Community Initiatives—

None.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Establish a standard for AOA in avionics.

- Indicator: Standard being published.

Output 5 (Needed for both SE-1 & SE-2 (Output 3)):

AFS-800/AFS-200 in coordination with AFS-600 will establish policy and implement AOA education and training in coordination with the training community through appropriate handbooks, ACs, or policy.

Resources—

AFS-800 (LOOC), AFS-600, AFS-200, University Aviation Association, NAFI, SAFE, Jeppesen, King Schools, ASA and TCC

Total Government/Industry Resources—

\$200,000

Timeline—

Eighteen months after SE approval.

Actions—

1. The FAA and industry will determine the training needs of owners and the pilot community for AOA systems.
2. The FAA and industry will promote the use of the training materials/programs developed by action 1.

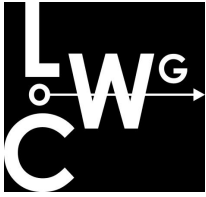
Relationship to Current Aviation Community Initiatives—

There is a SAFE initiative to incorporate AOA in private pilot training curricula. AOPA and EAA published articles on AOA systems.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement an AOA training program for GA owners and operators.

- Indicator: An AOA training program will be designed and implemented 18 months after approval.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Angle of Attack (AOA) Systems – Existing GA Fleet

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–2

Statement of Work

To reduce the risk of inadvertent stall/departure resulting in loss-of-control (LOC) accidents, the GA community should install and use AOA-based systems for better awareness of stall margin.

AOA systems are not in wide use in GA. The GA community should embrace to the fullest extent the stall margin awareness benefits of these systems. To help the GA community understand the safety benefits of AOA systems, a public education campaign should be developed by industry and the Federal Aviation Administration (FAA). GA aircraft manufacturers should work to develop cost-effective AOA installations and retrofit systems for the existing GA airplane fleet. Owners and operators of GA aircraft should be encouraged to install AOA systems in their aircraft.

This Detailed Implementation Plan (DIP) originally targeted the simple, low-cost AOA systems currently available for GA airplanes. During development, it became obvious that other, more complex approaches offer safety benefits for airspeed/energy state awareness. Concepts such as fast/slow cues and pitch limits are examples of AOA-based information.

Safety Enhancement 1 (SE–1)

Public education campaign on the safety benefits of AOA systems supplementing existing stall warning systems

Score: _____

Output 1 (Needed for SE-1 (Output 1) & SE2):

The industry and FAA will develop a public education campaign on the safety benefits of AOA systems supplementing existing stall warning systems.

Resources— _____

Aircraft Owners and Pilots Association (AOPA) (Lead Organization for Overall Output Coordination (LOOC)), Experimental Aircraft Association (EAA), FAA Safety Team



(FAASTeam), aircraft manufacturers, AOA manufacturers, Aircraft Electronics Association (AEA), National Air Transportation Association, National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), training providers, and the Type Clubs Coalition (TCC)

Total Government/Industry Resources—

\$150,000

Timeline—

Six months after SE approval

Actions—

1. The industry and FAASTeam will determine what communication methods are most appropriate for the different segments of the community.
2. The FAASTeam and industry will promote the use of AOA systems by various segments of GA using the methods developed in #1 above.

Relationship to Current Aviation Community Initiatives—

There is a SAFE initiative on incorporating AOA into private pilot training curricula.

AOPA and EAA have written articles on AOA.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a public education program to explain the benefits of AOA systems for GA owners and operators.

- Indicator: The AOA education program is designed and implemented 180 days after approval.
- Indicator: Survey the community for acceptance.

Output 2:

Owner/operators should be encouraged to install AOA systems into the existing fleet.

Resources—

AOPA (LOOC), manufacturers, EAA, type clubs, AEA, and manufacturers

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Within 12 months of SE approval, the AEA will conduct a tracking survey with the AOA manufacturers to track demand for systems. If warranted, AOPA and EAA will conduct an additional survey to measure installation by members.

Actions—

1. The FAA will develop a policy that allows AOA indication as a supplemental reference as non-essential information to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low-cost certification in part 23 aircraft (See Reduce Regulatory Roadblocks DIP).
2. The AEA and FAA Aviation Career Education will review and update as necessary the existing policy memo for installation of AOA systems, as well as other simple safety enhancing equipment that qualify as minor alterations.
3. The FAA Associate Administrator for Aviation Safety will sponsor an amended policy memo for installation of AOA systems and other simple safety-enhancing equipment that qualify as minor alterations.
4. The GAJSC will ask the AEA to track the annual production of AOA systems to determine whether demand has increased.
5. If AOA system demand has increased (production has doubled – Action 4), the GAJSC will ask AOPA and EAA to survey their members on AOA installations in their aircraft (those not covered in SE-2 and SE-3 Output 1).

Relationship to Current Aviation Community Initiatives—

Part 23 reorganization is an effort to reduce fatal accidents by half with new airplane designs. Furthermore, the part 23 reorganization effort recognizes the need to address the very large existing fleet of small airplanes. As part of the part 23 reorganization effort, alterations and modifications of older airplanes are being addressed in an effort

to upgrade these airplanes with safety-enhancing equipment. LOC accidents make up a large percentage of the overall GA accidents. In addition to reducing the fatal accidents in new airplanes by half, the Aviation Rulemaking Committee (ARC) for the part 23 reorganization would like to see a substantial reduction in fatal accidents in the existing fleet. Targeting LOC accidents with simple devices like AOA systems may make a significant reduction in fatal accidents in the existing fleet. The FAA Small Airplane Directorate (ACE-100) will prepare an AOA systems installation letter.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: The inclusion of AOA in existing small airplane fleet airplane designs.

- Indicator: An increase in the production of AOA systems.
- Indicator: A 5 percent increase in AOA system installations by owners and operators within 5 years.
- Indicator: Sales of AOA indicators.

Output 3 (Needed for both SE-1 (Output5) & SE-2):

AFS-800/-200 in coordination with AFS-600 establish policy and implement AOA education and training in coordination with the training community through appropriate to handbooks, ACs or policy.

Resources—

AFS-800 (LOOC), AFS-600, AFS-200, University Aviation Association, NAFI, SAFE, Jeppesen, King Schools, ASA, AOPA, EAA and TCC

Total Government/Industry Resources—

\$200,000

Timeline—

18 months after SE approval.

Actions—

1. The FAA and industry will determine the training needs of owners and the pilot community for AOA systems.
2. The FAA and industry will promote the use of the training materials/programs developed by action 1.

Relationship to Current Aviation Community Initiatives—

There is a SAFE initiative to incorporate AOA in private pilot training curricula. AOPA and EAA published articles on AOA systems.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement an AOA training program for GA owners and operators.

- Indicator: An AOA training program will be designed and implemented 18 months after approval.

Output 4:

The GAJSC will inform the insurance industry of studies and results (see below) relating to the reduction of LOC risk by the installation of an AOA indicator, in order to incentivize installations by means of enhanced coverages or discounts.

Resources—

AVP (LOOC), pilot and owner groups, manufacturers, and the GA research community

Total Government/Industry Resources—

Less than \$50,000

Timeline—

12 months after SE approval.

Actions—

1. FAA AVP will annually update the GA JSC pareato. As part of this activity, the LOC accident rate will be updated. The number of installed AOA units in the GA fleet as determined under Output 2 above will also be reported.
2. The GAJSC will report to the insurance industry on the metrics established in Action 1.
3. If research is conducted to correlate unstabilized approach rates of aircraft with and without AOA installations on aircraft participating in the GA FDM program, results of this research will be reported to the GA JSC. The results of this study will be provided to the insurance community (if the research is completed).

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Incentivize the installation of AOA in the GA fleet by means of enhanced insurance coverage or discounts.

- Indicator: LOC metrics and number of AOA installations in the GA fleet are reported annually to the GA JSC and passed on to the insurance industry representative on the GA JSC.

Indicator: There is an increase in the number of insurance policies with AOA premium reductions..



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Aeronautical Decision Making (ADM)

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–3

Statement of Work

To reduce the risk of loss-of-control accidents, the GA community should develop and implement a flight safety program focusing on Aeronautical Decision Making (ADM). The initiative should focus on ADM in preflight planning; professional decision making; flight risk assessment tools (FRAT); and stabilized approaches, missed approaches, and go-arounds.

Safety Enhancement 3 (SE–3)

Public education campaign raising awareness of the need for ADM, with an emphasis on preflight planning.

The FAA and industry will promote the use of FRATs with associations, type clubs, and operator groups.

The FAA and industry will review and improve scenario-based training and educational materials promoting ADM.

Score:

Output 1:

The Federal Aviation Administration (FAA) and industry will develop a public education campaign on the safety benefits of ADM in preflight planning, professional decision making, FRATs, and stabilized approaches, missed approaches, and go-arounds.

Resources—

AOPA (Lead Organization for Overall Output Coordination (LOOC)), Experimental Aircraft Association (EAA), FAA (AFS–800), aircraft manufacturers, AOA manufacturers, Aircraft Electronics Association(AEA), National Air Transportation Association (NATA), National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), training providers, and Type Clubs Coalition



Total Government/Industry Resources—

\$500,000

Timeline—

Twelve months after SE approval.

Actions—

1. The industry and FAA will determine what communication methods are most appropriate for the different segments of the GA community.
2. The FAA and industry will promote the use of ADM by various segments of the GA community, using the methods developed in action 1.

Relationship to Current Aviation Community Initiatives—

There is an aeronautical model known as “Three P – Perceive Process and Perform.”

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a public education program to promote sound ADM among GA owners and operators.

- Indicator: An ADM education program is designed and implemented 6 months after SE approval.

Output 2:

The industry will develop a public education campaign on the availability and safety benefits of FRATs.

Resources—

AOPA (LOOC), EAA, National Business Aviation Association (NBAA), NATA, NAFI, SAFE, FAA (AFS-800), General Aviation Manufacturers Association (GAMA), aircraft manufacturers, insurance companies, and Flight School Association of North America (FSANA)

 Total Government/Industry Resources—

\$100,000

 Timeline—

Six months after SE approval.

 Actions—

1. The organizations listed in the resources section will encourage their members to use FRATs.
2. AEA will work with aircraft manufacturers to add a FRAT verification question to primary flight displays (PFD).
3. NATA will work with Fixed-Base Operators (FBO) to require a FRAT be completed before aircraft rental.
4. AIA will ask insurance companies to encourage insured pilots to use FRATs.

 Relationship to Current Aviation Community Initiatives—

AOPA, NBAA, NATA, and existing military FRATs.

 Performance Goals & Indicators for Outcomes/Outputs—

Goal: Increased use of FRATs before flight.

- Indicator: An increased number of FBOs require FRATs.
- Indicator: An increased number of completed FRATs are in the Center of Excellence for General Aviation Research (CGAR) FRAT database.

Output 3:

The FAA and industry will develop new and improved interactive scenario-based training encouraging sound ADM. This work will include the development of Web-based ADM training tools.

 Resources—

AOPA (LOOC), EAA, type clubs, avionics manufacturers, NAFI, SAFE, and FAA Flight Standards Service General Aviation & Commercial Division (AFS-800)

Total Government/Industry Resources—

\$5,000,000

Timeline—

Thirty-six months after SE approval.

Actions—

1. The GAJSC will ask AOPA to emphasize interactive scenario-based ADM training in existing flight training initiatives.
2. The GAJSC will ask SAFE, NAFI, and the flight training community to emphasize the use of personal computer and Web-based interactive scenario-based training.

Relationship to Current Aviation Community Initiatives—

There currently are FAA-Industry Training Standards (FITS).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Increase awareness and use of scenario-based ADM training.

- Indicators: A survey verifies the increased use of scenario based ADM training at universities and flight schools.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Over-Reliance on Automation

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–4

Statement of Work

Purpose: To reduce the risk of loss-of-control (LOC) accidents by improving certain aspects of flight training related to over-reliance on automated flight systems.

Over-reliance on automated flight systems has resulted in LOC accidents. The FAA and industry should encourage training that requires pilots to demonstrate proficiency in manual flying in the event of automation malfunction. As the lead organization, the FAA will promote existing publications that properly address the need for manual flying skills in the event of automation malfunction or failure.

Safety Enhancement 4 (SE–4)

Awareness campaign to reduce LOC accidents resulting from over-reliance on automated flight systems.

Score: _____

Output 1:

AFS–800/AFS–200 in coordination with AFS–600 will establish policy and implement training that pilots demonstrate proficiency in manual flying in the event of failure or malfunction of automated systems (where applicable) in coordination with the training community through appropriate handbooks, ACs, or policy.

Resources— _____

AFS–800 (Lead Organization for Overall Output Coordination (LOOC)), AFS–600, AFS–200, AOPA, and flight training providers (for example, UAA, SAFE, FlightSafety International (FSI), and SimCom Training Centers)

Total Government/Industry Resources— _____

Less than \$50,000



Timeline—

Two years after SE approval.

Actions—

1. The industry and FAA will determine which communication methods are most appropriate for different segments of the pilot community to promote existing publications referencing autopilot malfunctions and failures.
2. Work with flight instruction community, training centers, and flight training providers (such as FSI or SimCom) to promote proper training of manual flying in the event of automated systems malfunction or failure during recurrent training, flight review, or transition training.

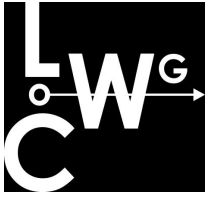
Relationship to Current Aviation Community Initiatives—

No GA initiatives known – (Commercial Aviation Safety Team safety initiatives – SE-30).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a program to reduce over-reliance on automation in various sectors of GA, and enlist the flight instruction/training community on ensuring manual flying skills that can cope with automation failure.

- Indicator: Publications are identified, improved, if needed, and promoted on the necessity of manual flying skills in the event of automation failure within 18 months after approval.
- Indicator: Ensure the flight instruction/training community has incorporated manual flying skills training in its programs within 2 years after approval.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Transition Training

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–5 and (SE)–6

Statement of Work

Transition training is not uniformly applied leading to accidents resulting from unfamiliarity with airframe and/or equipment. To reduce the risk of loss-of-control accidents, the GA Joint Steering Committee (GAJSC) recommends the development of Web-based tools that will aid in all aspects of transition to unfamiliar aircraft across GA, to include Aeronautical Decision Making (ADM) (see ADM Detailed Implementation Plan), to identify the risk of inadequate training when operating unfamiliar equipment.

The Federal Aviation Administration (FAA) and industry should update existing documentation relating to transition training.

The FAA and industry should conduct an outreach campaign on the need for transition training including ADM when flying an airplane that is unfamiliar to the pilot. The FAA and industry should work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. The FAA in conjunction with industry organizations, type clubs, kit manufacturers/makers of experimental amateur-built aircraft will reach out to pilots of these aircraft to encourage education on operationally specific requirements.

The FAA should amend current policy which restricts type-specific training in rented, kit, or experimental amateur-built aircraft to allow proper transition training and reduce accidents.

Safety Enhancement 5 (SE–5)

Development of Web-based tools that will aid in all aspects of transition to unfamiliar aircraft across GA, to include Aeronautical Decision Making (ADM) (see ADM Detailed Implementation Plan), to identify the risk of inadequate training when operating unfamiliar equipment. Public education campaign on the importance of transition training.

Score: _____

Output 1:

The Web-based tools will define transition training, identify when transition training should be recommended versus required, identify an hourly recommendation or requirement, and specify what should be included in training.

Resources—

Aircraft Owners and Pilots Association (AOPA) (Lead Organization for Overall Output Coordination (LOOC))

Total Government/Industry Resources—

\$150,000

Timeline—

Twelve months after SE approval.

Actions—

1. AOPA will develop Web-based transition training tools.
2. AOPA will report back to the GAJSC on user feedback, site use and any survey results.

Relationship to Current Aviation Community Initiatives—

Aircraft Owners and Pilots Association (AOPA) currently promotes transition training in its current publications.

Joint FAA/AOPA/Experimental Aircraft Association (EAA) effort on advisory circular (AC) 90–109.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Development of Web-based tools to help identify the appropriate transition training requirements and/or recommendations.

- Indicator: Web-based tools developed and being used.

Output 2:

The General Aviation Manufacturers Association (GAMA) and FAA will revise and update the current AC 61–103 on transition training.

Resources—

GAMA, AOPA, National Association of Flight Instructors (NAFI), and FAA (AFS–800)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Eighteen months after output 1 completion.

Actions—

1. GAMA leads review process of AC 61–103 in coordination with the FAA and industry.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Publication of revised AC 61–103.

- Indicator: Change in guidance material.

Output 3:

The industry and FAA will develop a public awareness campaign on the benefits of and resources available on transition training, including promotion of AC 61–103.

Resources—

AOPA (LOOC), FAA (AFS–800), EAA, GAMA, NBAA, aircraft manufacturers, National Air Transportation Association, NAFI, Society of Aviation and Flight Educators, training providers, and type clubs coalition.

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after output 2 completion.

Actions—

1. The industry and FAA will determine what communication methods are most appropriate for the different segments of the community.
2. The FAA and industry will promote the use of transition training by various segments of GA using the methods developed in action 1 above.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Develop communication methods that are applicable to various segments of the GA community.

- Indicator: Publication of articles and information about the values of transition training.

Safety Enhancement 6 (SE-6)

The FAA will amend current policies to more easily allow letters of deviation authority (LODA) from Title 14, Code of Federal Regulations (14 CFR) § 91.319(a) through (h) for transition training in experimental aircraft.

Score:

Output 1:

The FAA (AFS-800) will draft and publish an AC on the LODA process and amend guidance in FAA Order 8900.1, Flight Standards Information Management System.

Resources—

FAA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

One year to develop the draft policy regarding LODA experimental aircraft.

Actions—

1. The FAA will amend the policy that allows inspectors to more easily issue a LODA to conduct transition training in experimental aircraft.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Publication of AC.

- Indicator: LODA policy amended.

Output 2:

GAJSC will develop a petition for rulemaking to amend § 91.319(a) to provide a more permanent solution to compensated transition training in experimental aircraft for recreational purposes with appropriate safety criteria for both the aircraft and operator.

Resources—

GAJSC (LOOC – AOPA Lead), FAA, EAA, and AKIA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months for GAJSC to draft petition to the FAA.

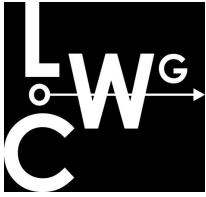
Actions—

1. GAJSC petitions for rulemaking to amend § 91.319(a) to provide a more permanent solution to compensated transition training in experimental aircraft for recreational purposes with appropriate safety criteria for both the aircraft and operator.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: FAA considers petition and amends § 91.319(a).

- Indicator: Regulatory change.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Utilization of Type Clubs

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–7

Statement of Work

Type Clubs are groups of owners and operators centered around particular aircraft. To reduce loss-of-control (LOC) accidents, the GA Joint Steering Committee (GAJSC) will leverage type clubs to develop and disseminate critical safety-related information.

The owners/operators of type clubs are most familiar with operating characteristics and procedures specific to particular aircraft and are in an excellent position to develop, communicate, and promote safety mitigation strategies that target loss-of-control accidents. Accordingly, the GAJSC will leverage type club owners'/operators' knowledge and experience.

Large fleet aircraft operators such as large flight schools are also very familiar with the operating characteristics and procedures specific to particular aircraft. The GAJSC also will leverage these organizations for safety strategies that target loss-of-control accidents.

Safety Enhancement 7 (SE–7)

Type clubs and operator groups will review the airplane's existing procedures, if any, and develop simplified procedures and checklists for missed approach, go-around, and other critical phases of flight to reduce the likelihood of fatal loss-of-control accidents caused by high pilot workload.

Score:

Output 1:

FAA Safety Team (FAAST) will ask the Type Club Coalition (TCC) and large GA operators to review their common practices regarding missed approach, go-around, and other approach and landing procedures/checklists to determine whether or where pilots are getting task-saturated/fixated. The TCC will request this information from individual type clubs.

FAAST will ask for feedback from the TCC regarding effectiveness of these common practices for missed approaches, go-arounds, and other procedures/checklists where pilots are getting task-saturated/fixated.

Resources—

AFS-800 (Lead Organization for Overall Output Coordination (LOOC)), TCC, Aircraft Owners and Pilots Association (AOPA), Experimental Aircraft Association (EAA), FAA Aircraft Certification Service (AIR) Small Airplane Directorate (ACE-100), and large GA operators.

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Two months for the initial communication; six months for TCC and large GA operators to respond.

Actions—

1. EAA to request from the TCC and large GA operators their common/best practices.
2. TCC and large GA operators will review published flight manuals/procedures (if developed) and compare them to common practices, looking for disconnects that could create higher workloads.
3. TCC and large GA operators will identify possible best practices that will reduce pilot workload for the targeted procedures.

Relationship to Current Aviation Community Initiatives—

ACE-100 has ongoing relationships with type clubs.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Obtain information from type clubs and large GA operators pertaining to pilot workload during missed approaches, go-arounds, and other procedures and checklists.

Indicator: Responses from type clubs and large GA operators will indicate whether the existing procedures and practices for possible approach scenarios unnecessarily add to pilot workload or cause fixation.

Output 2:

ACE-100 will communicate the findings from SE-7 (OP-1) to operators and/or original equipment manufacturers (OEM).

Resources—

ACE-100 (LOOC), TCC, AOPA, EAA, FAAST, large GA operators, and the General Aviation Manufacturers Association

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after output 1 completion.

Actions—

1. ACE-100 will review information generated by type clubs and large GA operators.
2. ACE-100 will collaborate with the OEMs, type clubs, and large GA operators to identify, evaluate, and synthesize identified procedure changes for potential revision.
3. Determine who is best able to implement the new/revise procedures, if applicable.

Relationship to Current Aviation Community Initiatives—

There is a developing relationship between the FAAST and TCC.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Simplify pilot workload during missed approaches, go-arounds, and other procedures/checklists.

- Indicator: The creation and adoption of procedures based on the review of differences between the manufacturer and operator common practices.
- Indicator: Survey of operators to determine implementation of procedures.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Flight Training After Period of Flight Inactivity

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–8

Statement of Work

Purpose: To reduce the risk of loss-of-control (LOC) accidents by improving certain aspects of flight training related to the return to flying after periods of flight inactivity.

Flight inactivity has resulted in LOC accidents. In partnership with industry organizations, the Federal Aviation Administration (FAA) should lead the promotion and dissemination of information on the adverse effects of flight inactivity.

Safety Enhancement 8 (SE–8)

Awareness campaign to reduce LOC accidents resulting from returning to flying after periods of flight inactivity.

Score: _____

Output 1:

Develop guidelines and best practices to assist pilots in regaining proficiency safely after extended periods of flight inactivity.

Resources— _____

Aircraft Owners and Pilots Association (AOPA) Lead Organization for Overall Output Coordination (LOOC), FAA Flight Standards Service General Aviation & Commercial Division (AFS–800), Experimental Aircraft Association (EAA), and National Air Transportation Association (NATA)

Total Government/Industry Resources— _____

Less than \$50,000



Timeline—

Twelve months after SE approval.

Actions—

1. Identify existing programs and best practices (possible collection via a GA FDM study of pilots returning after an extended period of inactivity).
2. Leverage existing programs and practices to develop guidelines. Publish these guidelines in appropriate documents including the Pilot's Handbook of Aeronautical Knowledge.
3. Once guidelines are published, disseminate them through continuous outreach via AOPA, EAA, NATA, FAA Safety Team (FAAST), National Association of Flight Instructors, and Society of Aviation and Flight Educators.
4. Encourage insurance industry to promote and incentivize clients to follow guidelines and best practices after periods of flight inactivity.

Relationship to Current Aviation Community Initiatives—

FAAST: CFI Before You Fly.

Soaring Safety Foundation: First Flight.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Establish effective guidelines that pilots can use regarding flight inactivity.

- Indicator: Guidelines will be developed.
- Indicator: Awareness program will be designed and implemented within 6 months after guidelines are developed.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Part 135 Safety Culture

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–9

Statement of Work

To reduce loss-of-control (LOC) accidents, the GA community should advocate that Title 14, Code of Federal Regulations (14 CFR) part 135 operators conduct mixed operational missions under safety criteria similar to those governing commercial flights to increase safety margins and promote professionalism.

Safety Enhancement 9 (SE–9)

Public education campaign on the safety benefits of standard operating procedures (SOP) for 14 CFR part 91 positioning legs, flight risk assessment tools (FRAT), and Safety Management Systems (SMS).

Score: _____

Output 1:

NATA will develop a public education campaign on the safety benefits of SOP for part 91 positioning legs, the use of FRATs, and positive safety culture.

Resources— _____

NATA (Lead Organization for Overall Output Coordination (LOOC)), National Business Aviation Association (NBAA); FAA Flight Standards Service Air Transportation Division, 135 Air Carrier Operations Branch (AFS–250); FAA Office of Accident Investigation and Prevention, Accident Investigation Division (AVP–100); and the National Transportation Safety Board (NTSB)

Total Government/Industry Resources— _____

Less than \$50,000

Timeline—

Two months after SE approval.

Actions—

1. NATA and NBAA will promote the development and use of SOPs for part 91 positioning legs, FRATs, and positive safety culture through SMS.
2. NATA and NBAA will encourage third party audits, which include assessing safety culture among member part 135 companies to review implementation of action 1.
3. GAJSC will request that AFS–250 brief the Flight Safety Foundation’s Corporate Aviation Safety Seminar on these issues.
4. NATA and NBAA will encourage part 135 member companies to conduct self-assessments of safety culture using existing assessment tools (such as the Transport Canada tool or the International Civil Aviation Organization tool).

Relationship to Current Aviation Community Initiatives—

There is ongoing SMS awareness from NATA, NBAA (International Business Aviation Council), and Air Charter Safety Foundation (ACSF).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Increase use of SOPs on 14 CFR part 91 positioning legs.

Goal: Increase professionalism and positive safety culture in 14 CFR part 135 operations.

- Indicator: Survey main auditing programs for an increase in successful operations audits (Wyvern Ltd.; ARG/US International, Inc.; International Standard for Business Aircraft Operations; and ACSF).

Output 2:

GAJSC will request that the NTSB and AVP–100 collect information on accident reports indicating the entity with operational control of the accident flight.

Resources—

AVP–100 (LOOC), NTSB

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twelve months after SE approval.

Actions—

1. AVP-100 will revise FAA Form 8020-23, Accident/Incident Report, to reflect combined parts 91 and 135 operations to clearly indicate which entity has operational control of the accident flight.
2. NTSB will include a field in its Form 6120.1, Pilot/Operator Aircraft Accident Report, that indicates the entity with operational control of the accident flight.

Relationship to Current Aviation Community Initiatives—

There is a joint NTSB/Experimental Aircraft Association, Experimental Amateur-Built study.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: To obtain the ability to capture part 135 operators conducting part 91 flights.

- Indicator: A change in reporting formats and the data collected.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Stabilized Approach and Landing

SAT Version: 1.75

General Aviation Safety Enhancement (SE)–10

Statement of Work

The Federal Aviation Administration (FAA) and industry will review the adequacy of the existing guidance and advisory material (including Practical Test Standards (PTS)) on stabilized approaches and go-arounds. Guidance and advisory material will be updated to include emphasis on stabilized approaches throughout various scenarios, including wind and go-arounds.

Lead Organization for Overall Project Coordination (LOOPC):

FAA (AFS-800)

Safety Enhancement 10 (SE–10)

FAA and industry to promote and emphasize the use of the stabilized approach and landing concepts through training and guidance material changes. FAA and industry will also review the adequacy of the existing guidance and advisory material (including PTS) on go-arounds.

Score:

Output 1:

Reemphasize criteria pertaining to stabilized approaches.

Resources—

FAA (AFS-800) (Lead Organization for Overall Output Coordination (LOOC)), Aircraft Owners and Pilots Association (AOPA), National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), and University Aviation Association (UAA).



Total Government/Industry Resources—

\$100,000

Timeline—

12 months after SE approval.

Actions—

1. FAA and industry will conduct outreach programs that emphasize stabilized approaches, to include go-around maneuvers.
2. Update the sections of the appropriate handbooks and the PTS to emphasize stabilized approach criteria.
3. UAA training committee will develop guidance for establishing personal criteria for a stabilized approach.
4. Training providers teach and enforce personal criteria for a stabilized approach.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Reemphasize established stabilized approach criteria to the GA community.

- Indicator: Handbooks and training material are updated.
- Indicator: Training syllabi are updated to reflect emphasis on stabilized approaches

Output 2:

Emphasize the effects of wind on traffic pattern operations during flight review and transition training. Particular emphasis should be placed on turn from base to final.

Resources—

AOPA (LOOC), NAFI, SAFE, FAA Flight Standards Service General Aviation and Commercial Division (AFS-800), and National Air Transportation Association.

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after SE approval.

Actions—

1. Reemphasize guidance available regarding the effects of wind on traffic pattern.
2. Ensure that the effects of wind on traffic patterns are included in flight review and during transition training.

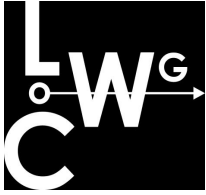
Relationship to Current Aviation Community Initiatives—

Flight Safety Foundation: Approach and Landing Accident Reduction Toolkit.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Prevent pilots from stalling/spinning the aircraft on turn from base to final due to inability to correct for wind during traffic pattern.

- Indicator: Decrease of loss-of-control accidents in the pattern.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Weather Technology

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–12 and SE–13

Statement of Work

In order to reduce the risk of 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.

Safety Enhancement 12 (SE–12)

Deploy cost-effective technologies that can provide real-time weather information (including actual conditions as viewed through a remote camera) at remote airports.

Score: _____

Output 1:

FAA and industry to determine the most effective remote real-time weather systems (including actual conditions as viewed through a remote camera) currently available.

Resources— _____

Federal Aviation Administration (FAA) (Lead Organization for Overall Output Coordination (LOOC); AJV-23; AOPA; airport associations; EAA; and the National Weather Service (NWS)

Total Government/Industry Resources— _____

Less than \$50,000

Timeline—

Twelve months after SE approval.

Actions—

1. Meet with appropriate FAA and industry organizations to determine what systems exist for remote weather monitoring and develop recommendations for participation.
2. Report the team's recommendations to the GAJSC.
3. The GA Joint Steering Committee (GAJSC) recommend the most suitable and cost-effective remote real-time weather systems (including actual conditions as viewed through a remote camera) to AAAE, AOPA, EAA and other industry members to promote their installation.

Relationship to Current Aviation Community Initiatives—

AJV-23 currently oversees the Alaska Airport Camera Program (<http://akweathercams.faa.gov/sitelist.php>).

NAV CANADA currently has an airport camera program (<http://www.metcam.navcanada.ca/hb/index.jsp?lang=e>).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Identify the most viable remote weather system (including actual conditions as viewed through a remote camera).

- Indicator: Information obtained from study is briefed to the GAJSC and passed to AOPA, EAA and AAAE.

Output 2:

Deployment of the weather/camera system identified in Output 1 at airports that have organizations willing to install them. Special emphasis will be placed on airports that have had a higher incidence of weather-related accidents or have unique local weather phenomena. These locations will be determined based on a risk assessment.

Resources—

AOPA (LOOC), AAAE, NASAO and EAA

Total Government/Industry Resources—

TBD

Timeline—

Sixty months after SE approval.

Actions—

1. AAAE, AOPA and EAA will work with their members and promote installations of weather/camera systems at airports in the Contiguous 48 states.
2. AOPA will maintain a list of installations and will report progress every six months.

Relationship to Current Aviation Community Initiatives—

AJV-23 currently oversees the Alaska Airport Camera Program (<http://akweathercams.faa.gov/sitelist.php>).

NAV CANADA currently has an airport camera program (<http://www.metcam.navcanada.ca/hb/index.jsp?lang=e>).

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Deploy remote weather/camera systems in as many airports as possible.

- Indicator: The weather/camera systems at the airports identified in Action 1 have been deployed.

Safety Enhancement 13 (SE-13)

The FAA and industry will educate the GA community on and promote the use of available weather information technologies, such as the National Oceanic and Atmospheric Administration (NOAA) Aviation Digital Data Service (ADDS) icing tool.

Score:

Output 1:

Educate the GA community regarding available weather information technologies and their use.

Resources—

FAA Safety Team (FAAST) (LOOC), Experimental Aircraft Association (EAA), AOPA, National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), and training providers

Total Government/Industry Resources—

\$75,000

Timeline—

12 months after SE approval, with ongoing updates.

Actions—

1. FAAST will evaluate current weather information available on the FAAsafety.gov Web site and develop a training module on existing weather information technologies for pilots.
2. AOPA, EAA, NAFI, SAFE, and training providers will develop and distribute information concerning existing weather information technologies for pilots.

Relationship to Current Aviation Community Initiatives—

NOAA hosts the NWS Aviation Weather Center ADDS
(<http://www.aviationweather.gov/adds/metars/>).

The FAA issued Advisory Circular 00–45G, Aviation Weather Services.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Training and information on existing weather information technologies are readily available to pilots.

- Indicator: Online training courses are available on existing weather information technologies.
- Indicator: The FAA and industry groups writes and distributes articles concerning existing weather information technologies and promoting their use.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Engine Monitoring Technology

SAT Version: 1.75

General Aviation Safety Enhancement (SE)–14

Statement of Work

To reduce the risk of loss-of-control accidents due to engine-failure-related factors, the Federal Aviation Administration (FAA) and industry will review the current technological capabilities available for engine trend monitoring, engine health analysis, fuel management and fuel indicator systems. Based on the existing available capabilities, the FAA will update guidance to promote their use. The FAA and industry will develop an educational outreach program to expand the installation and use of these systems.

Safety Enhancement 14 (SE–14)

The FAA and industry will develop a public education campaign based on the current available technological capabilities on the use of engine monitoring, engine analysis, and fuel-monitoring/indicator systems.

The FAA and industry will review the adequacy of the existing engine monitoring, engine analysis, fuel management, and fuel indicator systems technologies.

The FAA and industry will emphasize proper use of fuel management software, if equipped, on every flight.

Score: _____

Output 1:

GAMA will review the state of the industry for engine monitoring, engine analysis, fuel management, and fuel indicators to include fuel management software.

Resources— _____

GAMA (Lead Organization for Overall Output Coordination (LOOC)), FAA, Aircraft Owners and Pilots Association (AOPA), and Aircraft Electronics Association (AEA)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after SE approval.

Actions—

1. GAMA to generate report of current capabilities and options.

Relationship to Current Aviation Community Initiatives—

N/A

Output 2:

GAMA to review current capabilities report and develop guidance on the appropriate use of engine monitoring, engine analysis, fuel management, and fuel indicator systems including fuel management software.

Resources—

GAMA (LOOC), AOPA, FAA Small Airplane Directorate (ACE-100), FAA Air Traffic Control Products and Publications (AJV-362), AEA, and training providers.

Total Government/Industry Resources—

\$10,000

Timeline—

Six months after output 1 completion.

Actions—

1. GAMA to update guidance on the proper use of available technologies.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Develop and implement a public education program to promote use of engine monitoring, engine analysis, fuel management, and fuel indicator systems.

- Indicator: Survey public for response

Output 3:

The FAA and industry will develop a public education campaign on the safety benefits of the proper use of fuel management software, if equipped, on every flight.

Resources—

FAA (AFS-800) (LOOC) and AOPA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after OP-1 and OP-2 approval.

Actions—

1. FAA (AFS-800) and industry will develop and implement a public education campaign on the safety benefits of the proper use of fuel management software, if equipped, on every flight.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Develop and implement a public education program to promote use of engine monitoring, engine analysis, fuel management, and fuel indicator systems.

- Indicator: Survey public for response; use same survey as output 2.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Flight after use of Medications with Sedating Effects

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–15

Statement of Work

To reduce the risk of pilot impairment or incapacitation resulting in loss-of-control accidents, the GA community should implement programs to reduce the likelihood of the use of over-the-counter and prescription sedating medications that adversely affect the pilot's ability to safely operate aircraft.

Tools to improve pilot knowledge about the safe use of sedating medications are available to airmen, but knowledge and use of these tools is not widespread in GA. Additionally, these tools may not meet the needs of the GA community. The GA community should strive, to the fullest extent possible, to improve pilot knowledge and prevent the use of sedating medications that adversely affect flight safety. To help the GA community understand the safety benefits of informed use of medications, industry groups, academia, the Federal Aviation Administration (FAA), insurance providers, and the medical community should develop educational tools, online reference materials, and surveys (both pre- and post-implementation) 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.

Safety Enhancement 15 (SE–15)

A public education/outreach campaign to promote the understanding of the effects of medications and the need to use current FAA recommendations and guidance on the use of flying while under the influence of medications to ensure that medications do not decrease a pilot's alertness and increase the risk of subtle or serious impairment of the airman's flight capabilities.

The FAA, Jeppesen, and other flight-training instruction content organizations will include medication awareness training for all pilots in their basic and advanced training curriculums. They will incorporate the "I'M SAFE" personal checklist from the AIM into the training curriculum, as well as all preflight risk assessment tools for use before each flight.

Encourage medical organizations to provide guidance to aeromedical- and nonaeromedical-trained physicians to emphasize the importance of learning if patients are

pilots and to recognize the importance of educating pilot patients about the possible hazards to flight associated with medications prescribed to or used by them.

The AAM will evaluate the feasibility of the development, deployment, and upkeep of an online “medication wait time tool” that an airman or health-care provider can use to help determine when a pilot could safely operate an aircraft after the last dose of a medication.

Score:

Output 1:

The industry and FAA will develop improved public education campaigns that provide information on best practices to minimize the risk of subtle or serious impairment after the use of over-the-counter and/or prescription medications.

Resources—

AOPA (Lead Organization for Overall Output Coordination (LOOC)), Experimental Aircraft Association (EAA), FAA (AAM), Society of Aviation and Flight Educators, National Association of Flight Instructors, training providers, and Type Clubs Coalition.

Total Government/Industry Resources—

\$70,000

Timeline—

Six months after SE approval.

Actions—

1. The FAA and industry will determine what communication methods are most appropriate for the different segments of the community.
2. The FAA and industry will promote the use of current guidance found in the FAA Aeronautical Information Manual (AIM), “I’M SAFE” personal checklist (within the AIM), the FAA Medications and Flying brochure, and the Aviation Medical Examiners guide.

Relationship to Current Aviation Community Initiatives—

There is an AOPA initiative on improving medication knowledge tools currently available to members.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a public education program to explain the benefits of knowledgeable and safe use of medications.

- Indicator: Implementation of education programs to improve the use of information available in the AIM, “I’M SAFE” personal checklist, and Medications and Flying brochure designed and implemented 180 days after approval.
- Indicator: AOPA and EAA will develop anonymous surveys to evaluate the use of sedating medications (prescription and over-the-counter) and understanding of hazards associated with these medications before and after implementation of the outreach programs and communicate the results of the surveys.

Output 2:

The FAA Office of Aerospace Medicine (AAM), AFS-600 and flight training educational content providers will incorporate training on current guidance and best practices to minimize the risk of pilot impairment after the use of over-the-counter and/or prescription medications into their basic and advanced training curriculum. As a part of this initiative, they will incorporate the “I’M SAFE” personal checklist into their training programs and hazard assessment tools.

Resources—

AFS-800 (LOC), AAM, and flight training content providers

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Two months for AAM to issue communication from SE approval; six months for content providers to respond to AAM's letter.

Actions—

1. The GA Joint Steering Committee (GAJSC) requests that AAM communicate with other flight training content providers to encourage them to incorporate training on current guidance and best practices to minimize the risk of pilot impairment after the use of over-the-counter and/or prescription medications into their basic and advanced training curriculums.
2. Flight training organizations will respond by indicating whether they intend to incorporate medication awareness training into their training syllabi.

Relationship to Current Aviation Community Initiatives—

This program expands on AOPA and FAA medication education awareness programs.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Inclusion of medication awareness training in basic and advanced flight training syllabi.

- Indicator: Flight training organizations write letters to AAM indicating their intentions.
- Indicator: Flight training organizations incorporate medication awareness training into their basic and advanced syllabi.

Output 3:

The GA community (the FAA, pilot and owner associations, manufacturers and other interested segments of the industry) will write an “open letter” to GA pilots and physicians who treat pilots, urging them to consider the effects that over-the-counter and prescribed medication may have on ones piloting ability. This letter is to be written and approved by those entities listed below under “Resources”, and will end with a letter signed by leaders in the GA community (from this group and any other parties the group feels should be added and who agree to participate). The final signed letter will be available to be utilized in print and electronic publications for a joint public outreach campaign that will precede a major GA event (such as EAA AirVenture).

Resources—

FAA - AAM (LOOC), AOPA, EAA, GAMA, SAFE, NAFI, NTSB

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months for organizations listed above in “Resources” to draft letter and obtain approval from parent organizations and seek out any additional organizations. Approval of the letter by these organizations will include signature approval by the appropriate representative of each organization (President, Administrator, etc.).

One month after the letter is signed, it will be made available for use by the GA in print and electronic media.

Actions—

1. The AAM, AOPA, EAA, GAMA, SAFE, NAFI, NTSB, etc, will draft “an open letter” to GA pilots and physicians who treat pilots urging them to consider the effects that over-the-counter and prescription medications can have on a pilot’s flying ability.
2. After the groups have drafted the letter, it will go to each group for final approval and signing.
3. The final signed copy of this letter will be made available to the GA community to use in a coordinated public outreach campaign prior to a major GA event. This letter will be used in print and electronic publications to reach the GA community and physicians.

Relationship to Current Aviation Community Initiatives—

This is an expansion of current AOPA and FAA programs to educate airmen about medications and flying.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Improved awareness by pilots and health-care providers of the need to understand the occupations of their patients and the importance of properly educating patients who operate aircraft of the best practices when using sedating medications.

- Indicator: Creation of letter that is signed by leaders in the GA community.
- Indicator: Publication of this letter in print and electronically where the pilot and physician communities will see it.

Output 4:

AAM will develop and deploy an online resource designed to give guidance on wait times associated with specific sedating medications (such as diphenhydramine).

Resources—

AAM (LOOC), FAA Civil Aerospace Medical Institute Toxicology, and AOPA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

One year after SE approval.

Actions—

1. The AAM, CAMI and industry will identify specific sedating medications that have been found as possible contributing factors in past GA accidents.
2. AAM will inform the GA JSC on which medications were identified and what guidance will be given to the pilot community.
3. AAM will produce an online resource with this information and the URL will be made available to all GA JSC member organizations for communication to their members.

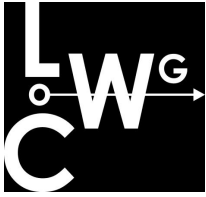
Relationship to Current Aviation Community Initiatives—

AOPA has online medication tools available for its members.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implementation of an online medication wait time tool for pilots and health-care providers.

- Indicator: Identification of specific sedating medications from historical GA accidents.
- Indicator: Presentation to the GA JSC on which medications were identified by AAM and what guidance will be given to the pilot community
- Indicator: Production of an online resource with the information from the above Indicator and the URL given to all GA JSC member organizations for communication to their members.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Flight with Impairing or Incapacitating Medical Conditions

SAT Version: 1.75

General Aviation (GA) Safety Enhancements (SE)–16 and SE–17

Statement of Work

To reduce the risk of medical conditions known to the pilot causing in-flight impairment or incapacitation resulting in loss-of-control accidents, the GA community should implement programs to reduce the likelihood of airmen failing to disclose known medical conditions and/or flying with known medical conditions that could adversely affect their ability to safely operate aircraft.

Barriers to open/honest communication between airmen and Aviation Medical Examiners (AME) have resulted in airmen failing to disclose possibly impairing medical conditions and subsequently flying with conditions that have contributed to in-flight impairment and or incapacitation. The Federal Aviation Administration (FAA) Office of Aerospace Medicine (AAM) and the Aerospace Medical Association in conjunction with the Aircraft Owners and Pilots Association (AOPA) should develop methods or techniques and perform a study(ies) that will help determine then mitigate barriers to an open and honest communication between pilots and their AMEs and develop methods to improve professionalism of pilots and their ability to conduct accurate medical self-assessment before each flight.

Safety Enhancement 16 (SE–16)

The GA Joint Steering Committee (GAJSC) recommends the FAA Medical Certification Division improve electronic medical records to assist the applicant in accurately reporting previously reported historical medical events/records so AMEs have a complete and accurate history when providing medical examinations.

Score: _____

Output 1:

The FAA is continuing to improve the electronic airman medical record system and MedExpress to provide the airman and AME with a comprehensive history, including relevant information from all prior exams, to help the AME and airman work together to ensure an accurate evaluation of the airman’s fitness to fly.



Resources—

FAA Office of Aerospace Medicine (Lead Organization for Overall Output Coordination (LOOC))

Total Government/Industry Resources—

\$7,000,000

Timeline—

Twelve months after SE approval.

Actions—

1. The FAA will determine the methods that are most appropriate to improve collecting and sharing of the airman's medical history from exam to exam in the electronic medical record between different AMEs and provide the airman with information that he/she has entered on prior examination.

Relationship to Current Aviation Community Initiatives—

This supports the FAA's ongoing electronic medical record improvements.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement an improved electronic record that provides the airman and the AME with historical record data to help update present exam information.

- Indicator: Evaluation of possible design improvements of electronic records for airmen and AME (1 year after SE approval).
- Indicator: Updated electronic medical record with improved access to historical records.

Safety Enhancement 17 (SE-17)

AOPA/Experimental Aircraft Association (EAA) will work with pilot community to determine additional methods to overcome barriers to open and honest communication of potentially hazardous medical issues and improve pilot professionalism and the ability to conduct accurate medical self-assessment before each flight.

Score: _____

Output 1:

AOPA/EAA will develop anonymous surveys to evaluate barriers to honest, open, professional communication between AMEs and airmen.

AOPA/EAA will develop anonymous surveys to evaluate pilot understanding of the implication of flight with potentially impairing medical conditions and what motivates a pilot to fly with a condition that endangers himself/herself or others.

AOPA/EAA will use the results of these surveys to help develop strategies to encourage airmen to use professional risk assessment when confronted with potentially impairing medical conditions.

Resources—

AOPA (LOOC) and EAA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Two months for AOPA/EAA to issue communication; 6 months for other organizations to respond to AOPA/EAA communication.

Actions—

1. The GAJSC requests that AOPA communicate with other GA industry groups to determine barriers and methods to overcome those barriers to providing accurate medical histories to medical professionals as well as barriers to medical risk self-assessment when confronted with potentially impairing medical conditions.
2. AOPA will publish best practices for improved pilot professionalism and in a pilot's ability to conduct accurate medical self-assessment before each flight.
3. Develop and conduct a survey to assess the effectiveness of action 2.

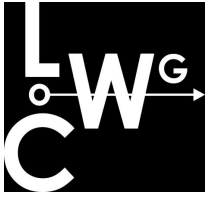
Relationship to Current Aviation Community Initiatives—

This program expands on AOPA and FAA medication education awareness programs.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Encourage pilots to use open communication, medical self-assessment, and professionalism to mitigate the risk of flying with potentially impairing medical conditions.

- Indicator: Identification of barriers to honest communication between airmen and medical professionals.
- Indicator: Improved use of individual risk assessment tools including the "I'M SAFE" checklist before flight.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Risk Based Flight Review

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–21

Statement of Work

To reduce loss-of-control (LOC) accidents due to reoccurring causal factors, the General Aviation Joint Steering Committee (GAJSC) will yearly, provide to the training and instructor community, a report of issues and risks found by the risk-based working groups (such as Loss of Control working group). These issues and risks can be used to develop a risk-based flight review special emphasis initiative.

Once a pilot has been certificated, the only opportunity to evaluate skill levels and emphasize areas of special concern is during the pilot's biannual flight review. The GAJSC will work with the flight training and instructor community to get this information to certificated flight instructors (CFI) to have the areas of special concern included in all flight reviews. The program would have the flight training and instructor community provide feedback on the results and provide recommendations back to the GAJSC. The GAJSC will also provide the areas of concern to flight schools and include them in the program.

Safety Enhancement 21 (SE–21)

The FAA will compile and disseminate risk-based concerns to flight instructors and flight schools to highlight regional and national risks in training and flight reviews. National risk-based concerns identified by the GAJSC in studies for that year should also be shared.

Score:

Output 1:

The GAJSC will identify and compile data on safety risks that were identified in the risk studies completed during the previous 12 months. This data will be disseminated to flight training and instructor community for use in training and flight reviews. This program is intended to cover national trends but region-specific risks will be included if identified in the accident data. This reporting will continue until the GAJSC has completed its fatal accident studies.

Resources—

GAJSC (Lead Organization for Overall Output Coordination (LOOC)), National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), and University Aviation Association (UAA).

Total Government / Industry Resources—

\$25,000

Timeline—

Six months after SE approval.

Actions—

1. The GAJSC will compile risks found by the working groups during the study of fatal accident data. AVP-200 will draft a letter identifying the top three risks discovered in the previous year's study. This letter will be forwarded to the SAT and then to the GAJSC for approval and eventual dissemination.
2. The GAJSC will distribute the data to the flight training and instructor community as special emphasis items for the flight review and training.
3. The flight training and instructor community will provide feedback on the results and provide recommendations back to the GAJSC on its usefulness during flight reviews.

Relationship to Current Aviation Community Initiatives—

FAAST CFI/Designated Pilot Examiner initiative.

SAFE initiative.

Performance Goals & Indicators for Outcomes / Outputs—

Goal: Compile national risk-based LOC concerns.

- Indicator: Data compiled.

Goal: Develop a special emphasis initiative program for the flight review.

- Indicator: National (and possibly regional) risk-based data is integrated into a special emphasis flight review initiative.

Goal: Distribute information to flight schools and instructors.

- Indicator: Instructors and flight schools receive regional safety data and guidance explaining the special emphasis items to include in flight reviews and training.
- Indicator: Flight instructors include the special emphasis items in the flight review and provide feedback.
- Indicator: Flight schools include the special emphasis items in training and provide feedback.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Flight Data Monitoring

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–22

Statement of Work

To reduce the risk of loss-of-control accidents by using Flight Data Monitoring (FDM) as a source of data support in overall industry-wide safety initiatives.

GA FDM allows the GA community to use the benefits previously afforded to Title 14, Code of Federal Regulations (14 CFR) part 23 aircraft in approved Flight Operational Quality Assurance (FOQA) programs.

The growing emphasis on formalized safety initiatives in GA has increased the need for diverse data collection methodologies from diverse sources to provide feedback. The use of FDM had not been widely accepted in GA at the time of this analysis. The GA community should strive to encourage the acceptance and expansion of FDM programs to increase the amount of data collected.

To exploit these opportunities, the Federal Aviation Administration (FAA) and industry should develop a GA community campaign. GA aircraft manufacturers should work to develop cost-effective FDM installations for new type designs and existing type designs currently in production. GA aircraft owners and operators should be encouraged to install FDM systems in their aircraft.

Safety Enhancement 22 (SE–22)

Increase GA participation in the FDM program by creating a public education campaign on the safety benefits of FDM programs; assessing the GA community's current sentiment, perception of, and understanding of FDM before and after the public education campaign; determining the incentives, if any, required to generate a meaningful level of GA participation in a national FDM program; and creating a nonpunitive policy to promote the use of voluntary GA FDM programs similar to that used with FOQA.

Hold an Aviation Safety InfoShare (InfoShare)-like conference to communicate best practices and encourage other fleet operators and individual owners/operators to participate in a national FDM program.

Score: _____



Output 1:

The FAA and industry should develop a public education campaign on the safety benefits of FDM programs.

Resources—

Aircraft Owners and Pilots Association (AOPA) (Lead Organization for Overall Output Coordination (LOOC)), FAA (AVP-200), General Aviation Manufacturers Association (GAMA), aircraft manufacturers, National Association of Flight Instructors, Society of Aviation and Flight Educators, training providers, Type Clubs Coalition, and University Aviation Association

Total Government/Industry Resources—

\$250,000

Timeline—

Twelve months after SE approval.

Actions—

1. The FAA and industry will determine what communication methods are most appropriate for the different segments of the community.
2. The FAA and industry will promote the use of FDM programs by various segments of GA.

Relationship to Current Aviation Community Initiatives—

CGAR and Aviation Safety Information Analysis and Sharing (ASIAS) are currently supporting initiatives to expand the sources of flight data.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Design and implement a public education program to explain the benefits of FDM programs to GA owners and operators.

- Indicator: An FDM education program is designed and implemented.
- Indicator: The FAA surveys the community for acceptance.

Output 2:

A survey will be issued to the GA community.

Resources—

AOPA (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twelve months for AOPA to issue the survey.

Actions—

1. AOPA will issue a survey to evaluate the perceptions of GA fleet operators and individual GA operators concerning the requirements for participation in GA FDM programs.

Relationship to Current Aviation Community Initiatives—

There is a CGAR GA-ASIAS Phase III Project.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: A meaningful response from the GA community to the survey.

- Indicator: Participants return their surveys indicating their thoughts.

Output 3:

Generate a prioritized list of incentives, if any, driven by the survey results. These will be forwarded in a report outlining and prioritizing the incentives for FDM participation to the GA Joint Steering Committee (GAJSC).

Resources—

GAJSC SAT (LOOC), GAMA, and AOPA

Total Government/Industry Resources—

\$150,000

Timeline—

Six months for GAJSC SAT to analyze survey results and generate report.

Actions—

1. SAT will analyze results.
2. SAT will forward a report to GAJSC outlining and prioritizing the incentives for FDM participation.
3. GAJSC will determine the best method to implement incentives for FDM participation.

Relationship to Current Aviation Community Initiatives—

There is a CGAR GA-ASIAS Phase III Project.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Determine the appropriate incentives, if any, to obtain meaningful participation in a national FDM program.

- Indicators: Incentives are identified and prioritized.

Goal: SAT provides a report that prioritizes the incentives to the GAJSC.

- Indicators: The report is delivered.

Output 4:

The FAA expands policy to allow operators using GA FDM programs to realize the same protections from certificate and punitive actions as is currently available in FAA-approved FOQA programs.

Resources—

FAA (LOOC)

Total Government/Industry Resources—

\$200,000

Timeline—

Sixty months after SE approval.

Actions—

1. The FAA Air Transportation Division, Voluntary Safety Programs Branch (AFS-230) determines the best method to extend protections to all GA operators that participate in FDM programs.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: The FAA expands policy to allow greater participation in FDM programs.

- Indicator: Policy is expanded to include GA operators that want to participate in FDM programs.
- Indicator: One-thousand GA operators participate in FDM programs.

Output 5:

National (and international) operators are invited to attend an InfoShare-like conference.

Resources—

The FAA Office of Accident Prevention and Investigation, Safety Analytical Services (AVP-200) (LOOC), CGAR, and GAMA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after SE approval.

Actions—

1. An InfoShare-like conference is planned, communicated to operators, and hosted.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Open lines of communication to share safety data between participating organizations.

- Indicator: Adequate conference attendance.
- Indicator: Positive feedback from attendees.



General Aviation Safety Enhancement (SE)–23

Statement of Work

To reduce the risk of loss-of-control accidents, the Federal Aviation Administration (FAA) and industry should develop a best practice guide for how to flight test an experimental amateur-built (E–AB) aircraft following a modification.

Additionally, testing for center-of-gravity (CG) limits, including lateral, should be added to Advisory Circular (AC) 90–89A, Amateur-Built Aircraft and Ultralight Flight Testing Handbook. The FAA and industry will develop an educational outreach program to expand the awareness and use of AC 90–89A.

Safety Enhancement 23 (SE–23)

The FAA and industry will develop a public education campaign based on best practices to guide E–AB aircraft builders on when to reenter a structured flight test phase following a modification to an aircraft.

The FAA and industry will review and revise as necessary the adequacy of the existing guidance and advisory material on the issue of CG limits, including lateral, for amateur-built experimental aircraft.

Score: _____

Output 1:

The Type Club Coalition (TCC) will examine and develop a best practices guide for when flight tests should be done following a modification to an amateur-built aircraft.

Resources— _____

Experimental Aircraft Association (EAA) (Lead Organization for Overall Output Coordination (LOOC)), and TCC, E–AB kit manufacturers

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after SE approval.

Actions—

1. The TCC will define when flight tests should be conducted following a modification to an amateur-built aircraft.

Output 2:

The FAA will update the sections of AC 90–89A to emphasize when flight tests should be conducted following a modification to an amateur-built aircraft.

Resources—

AFS–350 (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after output 1 completion.

Actions—

1. The FAA will update the sections of AC 90–89A to emphasize when flight test should be conducted following a modification to an amateur built aircraft.

Relationship to Current Aviation Community Initiatives—

The Safety of Experimental Amateur-Built Aircraft study by the National Transportation Safety Board.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: FAA update of AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

- Indicator: Updated AC.

Output 3:

The FAA and industry will develop and implement a public education campaign to emphasize the use of the updated AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook for amateur experimental aircraft builders on when to reenter a flight test phase following a modification to an amateur-built aircraft.

Resources—

EAA (LOOC) and FAA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after Output 2.

Actions—

1. The EAA and FAA will develop and implement a public education campaign to emphasize the use of the updated AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: EAA and FAA will develop and implement a public education campaign.

- Indicator: Education campaign initiated.

Output 4:

The FAA will review and revise the sections of the AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook to include advisory material on the lateral CG limits for amateur-built experimental aircraft.

Resources—

AFS–350 (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twenty-four months after SE approval.

Actions—

1. The FAA will update the sections of the AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: FAA update of the AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

- Indicator: AC revised.

Output 5:

The FAA and industry will develop and implement a public education campaign to emphasize the use of the updated AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook for amateur experimental aircraft builders on the importance of CG limits, including lateral.

Resources—

EAA (LOOC) and FAA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after revised AC 90–89A released.

Actions—

1. The EAA and FAA will develop and implement a public education campaign to emphasize the use of the updated AC 90–89A Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

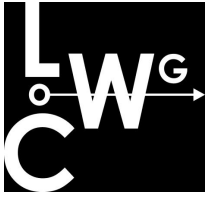
Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: EAA and FAA will develop and implement a public education campaign.

- Indicator: Campaign initiated.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Single-Pilot CRM

SAT Version: 1.75

General Aviation (GA) Safety Enhancement (SE)–24

Statement of Work

The air carrier industry has embraced Crew Resource Management (CRM) as a necessary initiative that has helped mitigate aircraft accidents caused by human error. Even though traditional CRM focused on multicrewed environments, several elements (such as communications, teamwork, decision making, and situational awareness) can be applied to single-pilot operations. There have been some single-pilot CRM initiatives undertaken by the Federal Aviation Administration (FAA) and industry to develop learning materials directed at single-pilot operators, but a more concerted and formalized industry-wide effort should be undertaken. If single-pilot operators learn and practice CRM skills targeted directly to them, many of the safety-related benefits realized in the air carrier community should transfer to the GA community.

Safety Enhancement 24 (SE–24)

Best practices regarding single-pilot CRM will be identified. The identified best practices should be communicated to the GA community through a public education campaign.

Score: _____

Output 1:

AOPA collects educational materials that have been developed by the FAA and industry sources that are specific to single-pilot CRM procedures.

Resources— _____

AOPA (Lead Organization for Overall Output Coordination (LOOC)), FAA (AFS–800), Experimental Aircraft Association (EAA), National Association of Flight Instructors (NAFI), Society of Aviation and Flight Educators (SAFE), University Aviation Association (UAA), training providers, and Type Clubs Coalition (TCC)



Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after SE approval.

Actions—

1. AOPA will ask all organizations listed in the resources section for educational materials developed specifically for single-pilot CRM.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Aggregate all single-pilot CRM educational materials.

- Indicator: Receipt of educational materials or the organizations’ responses.

Output 2:

The FAA and industry will identify the best practices regarding single-pilot CRM.

Resources—

GA Joint Steering Committee (GAJSC) subteam (LOOC), AOPA, FAA (AFS-800), EAA, NAFI, SAFE, UAA, Medallion Foundation, training providers, and TCC

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Six months after output 1 completion.

Actions—

1. The GAJSC subteam will ask subject matter experts to identify the best practices regarding single-pilot CRM.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Identification of the best practices regarding single-pilot CRM.

- Indicator: The GAJSC subteam generates a report outlining the best practices regarding single-pilot CRM.

Output 3:

The FAA and industry will conduct a public education campaign emphasizing the best practices regarding single-pilot CRM operational techniques.

Resources—

The FAA Safety Team (FAAST) (LOOC), AOPA, EAA, NAFI, SAFE, UAA, training providers, and TCC

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twelve months after output 2 completion.

Actions—

1. FAAST and the other organizations identified in the resources section will communicate directly to their constituencies the best practices regarding single-pilot CRM operational techniques.

Relationship to Current Aviation Community Initiatives—

N/A

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Increase the GA community's awareness of the best practices regarding single-pilot CRM operational techniques.

- Indicator: A survey conducted both *a priori* and *post hoc* demonstrates the GA community's increased knowledge and application of the best practices regarding single-pilot CRM operational techniques.



GAJSC – Loss of Control Working Group

Detailed Implementation Plan

Reduce Regulatory Roadblocks (R³)

SAT Version: 1.75

General Aviation (GA) Safety Enhancements (SE)–25, SE–26 and SE–27

Statement of Work

GA is going through a technical revolution that started in the mid-1990s and is accelerating today. At the same time the United States has a fleet of over 200,000 GA airplanes and over 100,000 instrument flight rules (IFR)-capable GA airplanes, the majority of which are still equipped with 1960s to 1980s vintage instruments and avionics. Taking advantage of the rapidly expanding technical revolution is an important component of reducing GA accidents.

Data from the Federal Aviation Administration’s (FAA) Office of Accident Investigation and Prevention (AVP) shows that the United States saw over a 60 percent drop in fatal controlled flight into terrain (CFIT) accidents from 2001 to 2010. CFIT accidents are predominantly instrument meteorological conditions (IMC)-related and frequently the accident is on approach. 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 nonprecision approaches has helped the pilot during IMC operations. Contrasting these technologies with the 1960s vintage panel so typical of the GA fleet makes it clear a dramatic decrease in CFIT accidents is possible.

The decrease in CFIT accidents is due, in large part, to new technology. In the 1990s, the FAA Small Airplane Directorate (ACE–100) applied a risk-management approach to avionics certification by putting the appropriate level of certification on the product. It was this FAA initiative along with several industry/National Aeronautics and Space Administration (NASA) initiatives that brought about the glass cockpits that are in virtually every new Title 14, Code of Federal Regulations (14 CFR) part 23 airplane. However, new airplanes, even after 10 years, make up only between 5 and 10 percent of the GA fleet. These airplanes could not have lowered the accident rate this dramatically. The FAA must recognize that the bulk of the safety enhancing technology that lowered the accident rate was in the form of handheld equipment not installed in the airplane.

The FAA must also recognize that the vast majority of pilot/owners of the 200,000+ fleet of GA airplanes votes on safety equipment with their money and purchase decisions. The cost to purchase an FAA-approved device⁹, installed in the instrument panel costs 5–10 times more than the same



technology in handheld form. Based on purchase history, the pilot/owner community has apparently determined that the safety benefits of FAA-approved devices are not worth the cost difference.

CFIT accident scenarios are easily addressed with new awareness technology, but this is not completely the case for loss-of-control (LOC) accidents. The technology to address LOC accidents can, in some cases, be designed as a portable device, but more typically, technologies that can address LOC accidents must be installed on the airplane. This is the main reason that cost keeps this technology out of small airplanes. Two good examples are a simple angle-of-attack (AOA) indicator and an autopilot. The AOA indicator provides the pilot with an awareness (visual and audio) of their margin above stall. The system accounts for all conditions such as weight and acceleration by design, whereas using stall speed does not. AOA system installations should be easy because they are not required equipment and do not interface with any existing equipment. The cost to put an existing AOA system on a certified airplane is almost 10 times higher than putting it on a homebuilt. The other example is an autopilot. An Aircraft Owners and Pilots Association (AOPA) Air Safety Institute report points out that LOC accidents at night and in IMC would drop by 50 percent simply by installing autopilots in the more than 100,000 IFR-capable GA airplanes. Homebuilders can install an autopilot for as little as \$2,500, but for most light airplanes that cost would be between \$10,000 and \$15,000, with the airplane value around \$20,000 to \$100,000. That is simply too large a fraction of the airplane's value to justify the expense.

The AOA system and the autopilot are not required equipment in all but a few high-end part 23 airplanes. The only requirement that should be placed on these devices is that their failure not cause a safety problem for the pilot. Clearly the FAA is on the right track, but must find ways to help reduce the cost to about half of what it costs today to install safety enhancing technology. Given that an installation may have minimal risk but offer substantial safety benefit, the FAA needs to apply a risk-management approach to address the current situation in which the FAA is actually an obstacle to getting safety-enhancing technology into the GA fleet. The FAA will need to identify the right level of certification. This will entail moving away from a single level of safety and performance. The shift should incorporate a continuum of certification rigor to match the continuum of safety expectations. If done properly the GA fleet can reap the potential benefit of reward with a balanced risk approach.

Safety Enhancement 25 (SE-25)

The FAA will institute streamlined processes in its Office of Aviation Safety (AVS) for certifying and installing novel technology that has a high probability of safety benefits with an accompanying low safety risk.

Score: _____

Output 1:

Develop a core group of FAA personnel charged with finding the most efficient approach to certifying novel aircraft equipment using a balanced risk-management methodology.

Resources—

FAA (Small Airplane Directorate (ACE–100)) (Lead Organization for Overall Output Coordination (LOOC)), manufacturers, and AOPA

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twenty-four months after SE approval.

Actions—

1. ACE–100 and Aircraft Certification Offices will form a group to certify novel technology in small certified airplanes.
2. The FAA will revise the certification process to allow engineer specialization for small airplanes.
3. The group identified in #1 above will identify the most efficient approach to getting novel equipment into the airplane.
4. The group needs a very good understanding of the products that are being modified and how those products are used operationally so that a risk-based approach to initial approval is incorporated. Consequently, the FAA group should engage with industry in the research and development phase.
5. The Associate Administrator for Aviation Safety (AVS–1) will issue guidance/endorsement of the specialized group process to the FAA Aircraft Certification Service (AIR) and FAA Flight Standards Service (AFS).
6. If successful, ACE–100 will market the success of a pilot project to expedite future projects using a balanced risk-management methodology.
7. ACE–100 will engage with NASA and the FAA William J. Hughes Technical Center (WJHTC) to provide a test airplane that can serve as a technology demonstrator for certain key technologies.
8. NASA and/or the WJHTC will demonstrate mature technologies to the FAA (AVS, AIR, AFS) as well as AOPA and industry advocates.

Relationship to Current Aviation Community Initiatives—

Small Airplane Directorate Avionics Certification Process Improvement.

Approved Model List.

FAA Organization Designation Authorization review.

FAA Flight Standards Service, Aircraft Maintenance Division (AFS-300) efforts toward process improvements for field approvals and STCs.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: New safety-enhancing technology is installed at a faster rate because the cost versus value equation is more appropriate for the airplane.

- Indicator: Track the volume of industry requests for FAA streamlined certification programs.
- Indicator: Numbers and rates of safety equipment installations.
- Indicator: Certification timeline improvements.

Safety Enhancement 26 (SE-26)

The 14 CFR Part 23 Reorganization Aviation Rulemaking Committee (ARC) will develop the top-level industry standard, as well as a lower tier standard for the existing fleet of small airplanes. The objective of this part 23 tier is to provide standards appropriate for alterations and modifications of older part 23, Civil Air Regulations (CAR) 3, CAR 4a, and Aeronautics Bulletin No. 7 airplanes. The criteria should include standards for safety-enhancing, nonrequired equipment as well as for general alterations. The burden of proof for low-risk safety-enhancing modifications would be that the equipment does not interfere with existing certified hardware. By providing current standards, FAA approval of safety-enhancing updates should be more efficient and less costly.

Score:

Output 1:

The second revision of the part 23 top-level industry standard will include standards appropriate for alterations and modifications of older part 23, CAR 3, CAR 4a, and Aeronautics Bulletin No. 7 airplanes.

Resources—

FAA (Small Airplane Directorate (ACE-100)) (LOOC)

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Thirty-six months after SE approval.

Relationship to Current Aviation Community Initiatives—

This output relates directly to the effort to move part 23 requirements into an industry standard and tier it based on an appropriate level of safety.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: The second revision of the part 23 top-level industry standard will include standards appropriate for alterations and modifications of older part 23, CAR 3, CAR 4a, and Aeronautics Bulletin No. 7 airplanes.

- Indicator: Addition of the lower tier is accomplished during or before the second revision of the part 23 industry standards.

Safety Enhancement 27 (SE-27)

Review 14 CFR §§ 21.8 and 21.9, and ensure these rules are not unintentionally producing roadblocks to the installation of nonrequired, safety-enhancing equipment. If these rules are creating an unintended roadblock, create paths that are more cost effective, up to and including using the exemption process.

Score: _____

Output 1:

Memo outlining the part 21 process review and recommendations. Memo needs to include the comparison of safety value added against the cost of compliance. Should identify rules where their compliance costs far exceed the safety value provided and recommendations should be made for changing these requirements.

Resources—

Aircraft Electronics Association (AEA) (LOOC) manufacturers and General Aviation Manufacturers Association

Total Government/Industry Resources—

Less than \$50,000

Timeline—

Twenty-four months after SE approval.

Actions—

1. Industry will poll equipment manufacturers, and modification shops will see if they experience problems related to part 21 process compliance.
2. Industry will capture in a memo the detailed problems, if any, shared by equipment manufacturers and modification shops.

Relationship to Current Aviation Community Initiatives—

14 CFR Part 23 Reorganization ARC.

Performance Goals & Indicators for Outcomes/Outputs—

Goal: Industry sends the FAA a memo outlining the part 21 process review and recommendations.

- Indicator: Track the volume of industry requests for FAA streamlined certification programs.
- Indicator: Numbers and rates of safety equipment installations.
- Indicator: Certification timeline improvements.
- Indicator: Number of problems related to the process.

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Appendix 9 — Standard Problem Statements


LWG C Standard Problem Statements		RECIP	E-AB	TURBINE	TOTAL
1	PILOT - Low pilot time in make and model	7	12	0	19
2	PILOT - Recency of experience/proficiency	7	5	1	13
3	PILOT - Distraction/Divided attention	2	2	5	9
4	PILOT - Aerodynamic stall - failure to recognize and execute corrective action	28	6	5	39
5	PILOT - Aerodynamic Stall/Spin	0	2	0	2
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.	0	0	1	1
7	PILOT - Aeronautical Decision Making- Poor Judgement	20	15	17	52
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.).	0	4	1	5
9	PILOT - Lack of knowledge of aircraft systems and limitations	2	7	2	11
10	PILOT - Lateral imbalance	0	1	0	1
11	PILOT - Failure to acknowledge traffic and maintain separation.	0	1	0	1
12	PILOT - Different types of operations in close proximity	0	1	1	2
13	PILOT - Failure of third party to voice concerns	0	2	0	2
14	PILOT - Evasive maneuver when low and/or slow	2	2	0	4
15	PILOT - Wake turbulence	0	1	0	1
16	PILOT - Flight testing at low altitude	0	1	0	1
17	AIRCRAFT - Loss of engine power	1	6	1	8
18	PILOT - Failure to maintain airspeed	1	10	3	14
19	PILOT - Operated aircraft while under influence of illegal drugs	2	0	0	2
20	PILOT - Improper traffic pattern procedures	6	6	0	12
21	PILOT - Not feeling well	1	0	0	1
22	PILOT - Improper preflight planning	7	5	3	15
23	PILOT - Recency of night experience	1	0	0	1
24	PILOT - Lack of aeronautical knowledge	1	1	1	3
25	PILOT - Aircraft improperly configured for specific operation	1	2	1	4
26	PILOT - Inadequate/missing transition training	3	1	0	4
27	WEATHER SERVICE - Inaccurate forecast	3	0	1	4
28	ENVIRONMENTAL - Weather deterioration	8	0	2	10
29	PILOT - Overload	5	1	2	8
30	PILOT - Lack of assertiveness/command with ATC	2	0	2	4
31	PILOT - Use of over-the-counter drugs and/or their effects on pilot performance	4	0	7	11
32	PILOT - Lack of piloting ability	4	3	6	13
33	PILOT - Loss of situational awareness	3	0	3	6
34	PILOT - Failure to verify information	1	0	3	4
35	PILOT - Inadquate/improper training	0	2	1	3
36	PILOT - Failure to follow procedure	4	1	11	16
37	AIRCRAFT - Powerplant control malfunction	0	0	1	1
38	PILOT - Fatigue	1	0	1	2

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39	PILOT - Poor safety culture	0	3	3	6
40	PILOT - Failure of instructor to intervene	1	0	0	1
41	AIRCRAFT - System component failure - non powerplant	1	0	0	1
42	PILOT - Failure to test/inspect aircraft after maintenance	0	0	0	0
43	AIRCRAFT - Improperly maintained / repaired	0	2	0	2
44	PILOT - Lack of CRM	0	0	1	1
45	WEATHER - Significant weather (SIGMET)	1	0	1	2
46	INFRASTRUCTURE/NAVAID - Out of service and/or malfunctioning	1	0	1	2
47	PILOT - Operated aircraft while under influence of unauthorized prescription drugs	4	0	0	4
48	PILOT - Low pilot time in complex / high performance	0	0	0	0
49	PILOT - Improper Go Around	1	0	0	1
50	PILOT - Failure fly a stabilized approach	2	0	0	2
51	PILOT - runway incursion	1	0	0	1
52	PILOT - Intentional non-compliance	0	15	0	15
53	PILOT - Unstabilized approach	10	3	0	13
54	AIRCRAFT - Unsafe flying characteristics	0	1	0	1
55	PILOT - Attention Allocation	0	2	0	2
56	AIRCRAFT - No Stall Warning System installed	0	1	0	1
57	ORGANIZATION - No or poor safety culture	0	3	0	3
58	FAA - ASI lack of knowledge of type of aircraft and certification requirements	0	2	0	2
59	BUILDER- Lack of knowledge of aircraft systems and limitations	0	1	0	1
60	Pilot - Spatial disorientation	1	0	0	1
61	PILOT - failed to monitor fuel level	0	2	0	2

Appendix 10 — LOCWG Prioritized Interventions

 Prioritized Interventions				
Overall Effectiveness	Average Feasibility	OE x F	Intervention No.	INTERVENTION
3.8	2.8	10.7	9	#9(a) POLICY- FAA to develop policy that allows AOA indication as a secondary reference as non essential information to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low cost installations in part 23 aircraft.: 9 (b)FAA and industry should investigate and implement various financial incentives to encourage the installation of safety enhancing technologies.: 9(c) Regulatory- change to allow non required safety equipment to be exempt from 21.9
4.5	2.3	10.5	32	#32 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve envelope protection and reducing pilot workload (easy button).
3.6	2.8	10.3	4	#4- MISC - Insurance industry should be kept informed of studies relating to reduction of LOC risk by installation of an AOA device in order to incentivise installations by means of enhanced coverages or discounts.
3.5	2.5	8.7	23	#23A RESEARCH - GA JSC to charter a study to examine all aspects of transition to unfamiliar aircraft across GA, to include ADM, in order to better understand the contribution of inadequate preparation to operate unfamiliar aircraft. #23B POLICY - FAA and industry to expand the use and promotion of AC 90-109 and AC 61-103 to the GA community until additional work has been completed. #23C TRAINING - FAA/industry outreach campaign on need for transition training including ADM when you fly airplane that is unfamiliar to you and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. Results of research (23A) can be used later to further refine specific transition training needs.
3.5	2.5	8.7	28	#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.
2.5	3.0	7.4	60	#60 - TRAINING - FAA and Industry incorporate CFI training on maintaining defensive position mentally and physically, and prebrief of positive control transfer in the training environment
3.1	2.3	7.2	38	#38 - Policy - FAA remove the regulatory burden for development, certification, and installation of advanced technological flight deck safety related devices to encourage the accelerated adoption of advanced technology such as TAWS, synthetic vision, moving map, and weather in the cockpit.
2.5	2.8	7.0	87	#87 RESEARCH - FAA and industry (such as NAFI, SAFE, etc.) to research and develop recommended practices regarding pilots who have extended periods of flying inactivity between flight reviews.
3.8	1.8	7.0	26	#26 - POLICY - FAA/Industry should encourage 135 operators to conduct mixed operational missions (i.e. part 91 repositioning flights, training, maintenance) under same flight and crew criteria as they operate their commercial flights in order to increase safety margins and promote professionalism.

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3.1	2.2	6.7	37	#37 TRAINING - Encourage final leg to be conducted as consistent angle, stabilized approaches using applicable technology in aircraft and on the ground
2.8	2.3	6.5	29	#29A RESEARCH - FAA/Government to sponsor research cost effective technologies that can provide realtime 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.
2.1	3.0	6.2	68	#68 - Training - FAA and industry to develop training and educational materials promoting professional decision making
2.0	3.0	5.9	11	#11 POLICY - FAA and industry collaborate to amend PPL PTS to include testing on botched landing recovery and when to initiate go-around in order to reduce the exacerbation of a poor touchdown.
2.5	2.3	5.8	65	#65 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, as appropriate, pertaining to stalls and unstabilized approaches.
1.9	3.0	5.6	54	#54 - Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.
2.5	2.2	5.4	30	#30 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve situational awareness and reducing pilot workload (electronic co-pilot)
2.5	2.2	5.4	93	#93A RESEARCH - FAA and industry to sponsor research to assess current capabilities of engine trend monitoring and analysis, and if needed develop guidance and new technologies where appropriate. #93B TECHNOLOGY - FAA and industry to promote the use of engine monitoring and trend analysis technologies on all GA aircraft.
1.8	3.0	5.3	98	#98 POLICY -FAA/ Industry promote development of type clubs
2.2	2.3	5.2	25	#25A POLICY - FAA and industry to review the adequacy of the existing guidance and advisory material (including PTS) on stabilized approach and go-around concepts inorder. #25B TRAINING - FAA and industry to promote and emphasis the use of the stabilized approach concepts (#25A) for use by the GA community (including type clubs).
2.0	2.5	5.0	1	#1 - MEDICAL - Industry groups, academia, FAA (CAMI, FFAST, 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.
2.0	2.5	5.0	84	#84 - TECHNOLOGY - Industry to develop a visual and aural indicator of low fuel quantity

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1.7	2.8	4.7	21	#21 POLICY - The FAA to improve internal data and information collection (PTRS) on incidents and performance of certificated personnel and air operators.
2.8	1.7	4.7	33	#33 POLICY - FAA and industry to investigate ways to reduce the regulatory burden of incorporating auto-throttles into Part 23 aircraft and eventual integration into envelope protection system.
2.0	2.2	4.3	63	#63 TRAINING - FAA and Industry to develop and incorporate use of AOA education and training.
1.4	3.0	4.3	55	#55 TRAINING - FAA and industry should review existing guidance material regarding radio communications and determine the best practices for dissemination to the GA community.
1.6	2.7	4.3	72	#72 - TRAINING - FAA and industry to provide training requirements which require pilots to demonstrate maneuvers with AND without use of advanced systems (auto-pilot, GPS) to assure both understanding of equipment installed and hand flying skill.
1.7	2.5	4.2	13	#13 - POLICY - FAA / academia develop a searchable index of topics for all guidance and policy material, advisory circulars so that safety information is easily accessible and identifiable
1.8	2.3	4.2	24	#24- POLICY/ TRAINING/PROCEDURES-- FAA revise ATC training policy to prohibit/ discourage clearances that would create an unstable approach and landing: i.e.no s-turns on final, no change in runway assignment when aircraft is within one mile of threshold. Especially true at large GA events, in order to reduce LOC accidents on final when unexpected clearances are given requiring increased workload
1.3	3.0	4.0	53	#53 TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on preflight planning and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. #53B TRAINING - FAA/industry promote the use of the flight risk analysis tools (FRAT) with type clubs and associations.
1.7	2.3	3.9	16	#16 POLICY - FAA to develop a recurrent process to review guidance materials for currency and relevancy and remove outdated materials.
2.0	1.8	3.6	22	#22 - POLICY - FAA and Industry to explore ways to expand sharing information of prospective flight crewmembers for comprehensive pre-employment screening to identify candidates' performance trends.
1.1	3.0	3.4	20	#20 - POLICY - FAA, in conjunction with industry organizations, type clubs, kit manufacturers/makers of experimental amateur-built to reach out to pilots of these aircraft to encourage education on operationally specific requirements, which includes amendment to current policy which reduces barriers for training in these type aircraft, in order to reduce accidents.
1.1	3.0	3.4	76	#76 - TRAINING - FAA and industry to promote flying the airplane first through further research into effective methods of communicating with pilots and an educational campaign.

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1.1	3.0	3.3	73	#73A TRAINING - FAA and industry to conduct outreach to emphasise that go-around procedures are part of normal operations. The sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, should updated to reflect this. #73B TRAINING - Industry promotion of training aids already available regarding weight and balance.
1.3	2.5	3.3	70	#70 - TRAINING - FAA and industry to recommend the inclusion into private pilot training curricula the demonstration of a 180 degree turn at an appropriate altitude during a power loss after take-off to emphasize the altitude required and other hazards to consider (aircraft control, wind).
1.1	3.0	3.2	14	#14 POLICY - Each FAA region (290 branch) collects information to develop a list of risk based items to disseminate to CFIs for incorporation in training/BFRs in order to address issues identified as significant threats.
1.0	3.0	3.1	64	#64 - TRAINING - FAA and Industry to emphasize proper use of fuel management software (if equipped) on every flight.
1.3	2.3	3.1	51	#51 TRAINING - FAA and industry to review existing single pilot CRM practices and develop best practices for dissemination to the GA community.
1.3	2.3	3.0	41	#41 TECHNOLOGY -- FAA and Industry promotes the use and development of Flight Data Monitoring (FDM) programs and technologies in Part 23 aircraft.
1.2	2.5	3.0	3	#3- MEDICAL - Aerospace medical associations to perform a study to mitigate barriers to an open and honest communication between pilots and their AMEs.
1.0	3.0	3.0	78	#78 - TRAINING - FAA and industry to emphasize during training the affects of wind on traffic pattern operations and also emphasize the written materials available to study for further understanding (PHAK, etc.).
1.0	3.0	3.0	80	#80 - TRAINING - FAA FAAS team to raise awareness of the importance of relevant Advisory Circulars when preparing aircraft flight test.
1.3	2.2	2.9	8	#8 - POLICY - Kit manufacturers should develop and implement a flight safety program in order to aid with decision making.
1.1	2.5	2.9	83	#83 POLICY - The FAA to modify AC 90-89a (flight testing handbook) to cover lateral CG issues.
0.9	2.8	2.5	82	#82 - POLICY - Industry to develop a best practice guide for when to flight test following a modification of an amateur built experimental aircraft.

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0.9	2.8	2.4	77	#77A RESEARCH - FAA and industry to research development of cost effective mobile or panel mount devices capable of ADS-B or ADS-B-like technologies for traffic monitoring in GA aircraft. #77B TRAINING - FAA/industry to promote cost effective traffic avoidance technologies for the GA community.
0.8	3.0	2.4	44	#44 - Training - FAA develop training and educational materials concerning decision making considerations in the selection of the most suitable airport or landing area appropriate to the specifics of the emergency situation.
0.8	3.0	2.3	59	#59 TRAINING - FAA ensures their ASIs receive appropriate training and education on differences in aircraft certification - e.g. E-AB, E-LSA, Part 23, etc.
0.7	3.0	2.2	45	#45 TRAINING - Helicopter industry (schools, operators, pilots, etc.) conduct outreach to educate the importance of rotor wing aircraft avoiding disruption of fixed wing airport traffic. (FAR 91.129)
1.0	2.2	2.2	85	#85 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK) pertaining to traffic pattern procedures.
1.6	1.3	2.1	61	#61 TRAINING -- Industry and operators train in a simulator pilots up to and including at least pusher if aircraft is equipped with shaker and pushers.
0.8	2.7	2.1	66	#66 - FAA (Certification and human factors), manufacturers, and Industry to look into confusion issues with starter/ignitor switches in operations and emphasize differences in training.
1.0	2.0	2.0	75	#75 TECHNOLOGY- FAA/industry to provide cost effective measures to install AOA/envelope protection technologies for the GA community
0.7	3.0	2.0	90	#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.
0.9	2.2	1.9	2	#2 - MISC - FAA works with the flight training industry to research, develop, and implement a risk assessment tool which quantifies an appropriate level of risk associated with pilots who have difficulty becoming certified; The flight instruction industry should utilize the tool, once developed, to identify pilots who should not continue through certification due to lack of skill and or ability to learn in order to reduce the likelihood of poorly skilled pilots operating without supervision in the NAS.
0.9	2.2	1.9	49	#49 TRAINING - EAA and industry to develop and disseminate experimental maintenance best practices and resources to the experimental amateur built community.
0.6	3.0	1.8	43	#43 TRAINING - FAA and industry to promote the concept that even though and aircraft is certified for flight into known icing conditions, pilots should still minimize their exposure to flight into icing conditions.

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0.6	3.0	1.8	71	#71 TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on inflight handling of abnormal situations and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities.
0.7	2.7	1.8	15	#15 POLICY - FAA to increase focus on enforcement options where pilot is found to have intentionally violated FARs, to encourage behavioral change to compliance.
1.3	1.3	1.7	7	#7 - MISC - FAA require second crew member for EMS operations in order to reduce the likelihood of fatal single pilot EMS accidents.
0.6	3.0	1.7	92	#92 TRAINING - AOPA ASI webinar / FFAST Outreach and education on the importance of abiding by limitations; ie. weight and within CG limits
0.6	2.8	1.6	91	#91 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK) and Flight Instructors Handbook, as appropriate, pertaining to takeoff and landing distance considerations (short and soft field, contamination, etc.).
0.5	3.0	1.5	96	#96 TRAINING -- Introduction to risk based decision-making for GA pilots (FAA Risk Management Handbook); integrate into pilot training programs; scenario based training
0.7	2.2	1.5	81	#81 TRAINING - EAA and Industry (including kit manufacturers) supply information about adding fuel bays and the impact on lateral CG / aircraft controllability.
0.6	2.0	1.2	5	#5 - MISC - FAA works with industry to research, develop and implement a risk assessment tool which quantifies an appropriate level of risk associated with pilots who have multiple violations; The FAA and industry should develop risk mitigations, such as remedial training or other existing measures in order to reduce the likelihood of additional accidents due to repeat offenses.
0.6	1.8	1.1	42	#42 - Training/Policy - develop performance based criteria and accident identification criteria for aircraft which may require SFAR training in order to increase the safety of their operator.
0.5	2.2	1.1	57	#57 POLICY - FAA should encourage in FAR 61.56 alternating aircraft types in which the pilot regularly operates.
0.4	2.7	1.1	27	#27 PROCEDURES - FAA and industry to promote the use and development of GPS approaches (deprecate the use of non-precision IAPs based upon land-based NAVAIDS)
0.5	2.0	1.0	36	#36 - TECHNOLOGY/POLICY - FAA and NASA should evaluate and if determined, reduce the regulatory burden to allow for ice deterrents to address inadvertent icing. For example, explore hydrophobic nano technology.

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0.5	1.7	0.8	47	#47 POLICY - FAA should require pilots who operate aircraft with deicing and anti-icing equipment to receive specific training in the operation of that equipment.
0.3	2.5	0.8	12	#12 POLICY- FAA to increase oversight and quality control of the DAR process, to ensure proper operating limitations are issued by DARs.
0.6	1.3	0.8	31	#31 RESEARCH - Industry to sponsor research to determine if there is a safety benefit to converting an MU-2 turboprop to a turbojet/turbofan configuration.
0.3	2.3	0.8	62	#62 - TRAINING - FSS to train personnel to be straight, factual and not vocalize opinion/judgement on operational decisions (go/no-go).
0.2	3.0	0.6	69	#69-TRAINING -FAA/industry to promote and disseminate available training aids regarding new equipment to the GA community.
0.2	2.8	0.5	67	#67 TRAINING - Flight instructor associations, industry, FAASTeam and type clubs to develop best practices to encourage CFI professionalism and disseminate to the flight instructor community.
0.1	3.0	0.3	46	#46 - Training - FAA and industry develop training and educational materials concerning decision making in emergency situations.
0.1	2.7	0.3	6	#6 - MISC - 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.
0.1	2.2	0.2	40	#40 - Research - FAA, NASA, industry, and academia should research and develop technologies which would alert flight crews of the presence and severity of mountain waves, wind shear, microbursts.
0.0	1.5	0.0	10	#10 POLICY - FAA to develop policy to allow safety systems that are able to be activated and deployed rapidly as an offset to onerous stall characteristic testing for Part 23 or LSA aircraft.
0.0	1.8	0.0	18	#18 - POLICY - FAA, industry, and academia coordinate study and if required develop guidance on human factors evaluation of critical phases of flight to ensure manufacturers are considering human factors in design of part 23 and LSA aircraft.
0.0	2.3	0.0	34	#34 TECHNOLOGY/POLICY - FAA should remove the regulatory burden to development, certification and installation of automatic ground collision avoidance systems.
0.0	3.0	0.0	48	#48 - Training - FAA and industry develop training and educational materials concerning the impact of aircraft gross weight on landing performance safety margins and the importance of monitoring AOA (if aircraft so equipped).

Appendix II — Intervention Feasibility

 Intervention Feasibility								
INT. NO.	INTERVENTION	TECHNICAL	FINANCIAL	OPERATIONAL	SCHEDULE	REGULATORY	SOCIOLOGICAL	OVERALL FEASIBILITY
1	#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.	2	3	2	2	3	3	2.5
2	#2 - MISC - FAA works with the flight training industry to research, develop, and implement a risk assessment tool which quantifies an appropriate level of risk associated with pilots who have difficulty becoming certified; The flight instruction industry should utilize the tool, once developed, to identify pilots who should not continue through certification due to lack of skill and or ability to learn in order to reduce the likelihood of poorly skilled pilots operating without supervision in the NAS.	2	3	2	2	3	1	2.2
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 and the pilot community and recommend enhancements to pilot medical program in order to improve open communication.	2	3	3	2	3	2	2.5
4	#4- MISC - Insurance industry should be kept informed of studies relating to reduction of LOC risk by installation of an AOA device in order to incentivise installations by means of enhanced coverages or discounts.	3	3	3	3	3	2	2.8
5	#5 - MISC - FAA works with industry to research, develop and implement a risk assessment tool which quantifies an appropriate level of risk associated with pilots who have multiple violations; The FAA and industry should develop risk mitigations, such as remedial training or other existing measures in order to reduce the likelihood of additional accidents due to repeat offenses.	2	3	2	1	2	2	2
6	#6 - MISC - 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.	2	3	3	3	3	2	2.7

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7	#7 - MISC - FAA require second crew member for EMS operations in order to reduce the likelihood of fatal single pilot EMS accidents.	3	1	1	1	1	1	1.3
8	#8 - POLICY - Kit manufacturers should develop and implement a flight safety program in order to aid with the decision making decisions.	3	3	2	2	2	1	2.2
9	#9(a) POLICY- FAA to develop policy that allows AOA indication as a secondary reference as non essential information to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low cost installations in part 23 aircraft.: 9 (b)FAA and industry should investigate and implement various financial incentives to encourage the installation of safety enhanceing technologies.: 9(c) Reglatory- change to allow non required safety equipment to be exempt from 21.9	3	3	3	3	3	2	2.8
10	#10 POLICY - FAA to develop policy to allow safety systems that are able to be activated and deployed rapidly as an offset to onerous stall characteristic testing for Part 23 or LSA aircraft.	2	3	1	1	1	1	1.5
11	#11 POLICY - FAA and industry collaborate to amend PPL PTS to include testing on bounced landing recovery and when to initiate go-around in order to reduce the exacerbation of a poor touchdown.	3	3	3	3	3	3	3
12	#12 POLICY- FAA to increase oversight and quality control of the DAR process, to ensure proper operating limitations are issued by DARs.	3	3	2	2	3	2	2.5
13	#13 - POLICY - FAA / academia develop a searchable index of topics for all guidance and policy material, advisory circulars so that safety information is easily accessible and identifiable	2	3	2	2	3	3	2.5
14	#14 POLICY - FAA collects information from regional offices to develop a list of risk based items to desseminate to CFIs for incorporation in training/BFRs in order to address issues identified as significant threats.	3	3	3	3	3	3	3

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15	#15 POLICY - FAA to increase focus on enforcement options where pilot is found to have intentionally violated FARs, to encourage behavioral change to compliance.	3	3	2	3	2	3	2.7
16	#16 POLICY - FAA to develop a recurrent process to review guidance materials for currency and relevancy and remove outdated materials.	3	3	2	1	3	2	2.3
18	#18 - POLICY - FAA, industry, and academia coordinate study and if required develop guidance on human factors evaluation of critical phases of flight to ensure manufacturers are considering human factors in design of part 23 and LSA aircraft.	2	3	2	1	2	1	1.8
19	#19 POLICY - Industry to work with Congress to allow manufacturers to respond to safety reporting program input to correct product deficiencies without fear of civil sanctions.	2	1	2	1	1	2	1.5
20	#20 - POLICY - FAA in conjunction with industry organizations, type clubs, manufacturers/makers of (Part 103 and other light recreational aircraft/recreational vehicles) reach out to pilots of these aircraft to encourage education on operationally specific requirements, which includes amendment to current policy which reduces barriers for "training" in these type aircraft/vehicles, in order to reduce accidents.	3	3	3	3	3	3	3
21	#21 POLICY - The FAA to improve internal data and information collection (PTRS) on incidents and performance of certificated personnel and air operators.	3	3	3	3	3	2	2.8
22	#22 - POLICY -FAA and Industry to explore ways to expand sharing information of prospective flight crewmembers for comprehensive pre-employment screening to exclude unsuitable candidates.	2	3	2	1	2	1	1.8

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23	#23A RESEARCH - GA JSC to charter a study to examine all aspects of transition to unfamiliar aircraft across GA, to include ADM, in order to better understand the contribution of inadequate preparation to operate unfamiliar aircraft. #23B POLICY - FAA and industry to expand the use and promotion of AC 90-109 and AC 61-103 to the GA community until additional work has been completed. #23C TRAINING - FAA/industry outreach campaign on need for transition training including ADM when you fly airplane that is unfamiliar to you and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. Results of research (23A) can be used later to further refine specific transition training needs.	2	3	2	2	3	3	2.5
24	#24- POLICY/ TRAINING/PROCEDURES-- FAA revise ATC training policy to prohibit/ discourage clearances that would create an unstable approach and landing: i.e.no s-turns on final, no change in runway assignment when aircraft is within one mile of threshold. Especially true at large GA events, in order to reduce LOC accidents on final when unexpected clearances are given requiring above average piloting skill.	3	3	2	2	2	2	2.3
25	#25A POLICY - FAA and industry to review the adequacy of the existing guidance and advisory material (including PTS) on stabilized approach and go-around concepts in order. #25B TRAINING - FAA and industry to promote and emphasize the use of the stabilized approach concepts (#25A) for use by the GA community (including type clubs).	2	3	3	2	2	2	2.3
26	#26 - POLICY - FAA/Industry should encourage 135 operators to conduct mixed operational missions (i.e. part 91 repositioning flights, training, maintenance) under same flight and crew criteria as they operate their commercial flights in order to increase safety margins and promote professionalism.	3	3	2	1	1	1	1.8
27	#27 PROCEDURES - FAA and industry to promote the use and development of GPS approaches (deprecate the use of non-precision IAPs based upon land-based NAVAIDS)	3	3	2	3	3	2	2.7
28	#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.	2	3	2	2	3	3	2.5
29	#29A RESEARCH - FAA/Government to sponsor research cost effective technologies that can provide realtime 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.	2	3	2	2	2	3	2.3

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30	#30 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve situational awareness and reducing pilot workload (electronic co-pilot)	2	3	2	1	2	3	2.2
31	#31 RESEARCH - Industry to sponsor research to determine if there is a safety benefit to converting an MU-2 turboprop to a turbojet/turbofan configuration.	1	2	1	1	2	1	1.3
32	#32 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve envelope protection and reducing pilot workload (easy button).	2	3	3	1	2	3	2.3
33	#33 POLICY - FAA and industry to investigate ways to reduce the regulatory burden of incorporating auto-throttles into Part 23 aircraft and eventual integration into envelope protection system.	2	2	1	2	1	2	1.7
34	#34 TECHNOLOGY/POLICY - FAA should remove the regulatory burden to development, certification and installation of automatic ground collision avoidance systems.	2	3	3	1	2	3	2.3
36	#36 - TECHNOLOGY/POLICY - FAA and NASA should evaluate and if determined, reduce the regulatory burden to allow for ice deterrents to address inadvertent icing. For example, explore hydrophobic nano technology.	3	2	3	1	2	1	2
37	#37 TRAINING - Encourage final leg to be conducted as consistent angle, stabilized approaches using applicable technology in aircraft and on the ground	2	3	2	2	2	2	2.2
38	#38 - Policy - FAA remove the regulatory burden for development, certification, and installation of advanced technological flight deck safety related devices to encourage the accelerated adoption of advanced technology such as TAWS, synthetic vision, moving map, and weather in the cockpit.	2	3	3	1	2	3	2.3

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40	#40 - Research - FAA, NASA, industry, and academia should research and develop technologies which would alert flight crews of the presence and severity of mountain waves, wind shear, microbursts.	2	2	2	1	3	3	2.2
41	#41 TECHNOLOGY -- FAA and Industry promotes the use and development of flight operations quality assurance programs and technologies in Part 23 aircraft.	3	3	2	2	2	2	2.3
42	#42 - Training/Policy - develop performance based criteria and accident identification criteria for aircraft which may require SFAR training in order to increase the safety of their operaton.	3	3	2	1	1	1	1.8
43	#43 TRAINING - FAA and industry to promote the concept that even though and aircraft is certified for flight into known icing conditions, pilots should still minimize their exposure to flight into icing conditions.	3	3	3	3	3	3	3
44	#44 - Training - FAA develop training and educational materials concerning decision making considerations in the selection of the most suitable airport or landing area appropriate to the specifics of the emergency situation.	3	3	3	3	3	3	3
45	#45 TRAINING - Helicopter industry (schools, operators, pilots, etc.) conduct outreach to educate the impoirtance of rotor wing aircraft avoiding disruption of fixed wing airport traffic. (FAR 91.129)	3	3	3	3	3	3	3
46	#46 - Training - FAA and industry develop training and educational materials concerning decision making in emergency situations.	3	3	3	3	3	3	3
47	#47 POLICY - FAA should require pilots who operate aircraft with deicing and anti-icing equipment to receive specific training in the operation of that equipment.	2	3	1	1	1	2	1.7

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48	#48 - Training - FAA and industry develop training and educational materials concerning the impact of aircraft gross weight on landing performance safety margins and the importance of monitoring AOA (if aircraft so equipped).	3	3	3	3	3	3	3
49	#49 TRAINING - EAA and industry to develop and disseminate experimental maintenance best practices and resources to the experimental amateur built community.	2	3	2	2	2	2	2.2
51	#51 TRAINING - FAA and industry to review existing single pilot CRM practices and develop best practices for dissemination to the GA community.	2	3	2	2	2	3	2.3
53	#53 TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on preflight planning and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. #53B TRAINING - FAA/industry promote the use of the flight risk analysis tools (FRAT) with type clubs and associations.	3	3	3	3	3	3	3
54	#54 - Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.	3	3	3	3	3	3	3
55	#55 TRAINING - FAA and industry should review existing guidance material regarding radio communications and determine the best practices for dissemination to the GA community.	3	3	3	3	3	3	3
57	#57 POLICY - FAA should encourage in FAR 61.56 alternating aircraft types in which the pilot regularly operates.	2	3	2	2	2	2	2.2
59	#59 TRAINING - FAA ensures their ASIs receive appropriate training and education on differences in aircraft certification - e.g. E-AB, E-LSA, Part 23, etc.	3	3	3	3	3	3	3

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60	#60 - TRAINING - FAA and Industry incorporate CFI training on maintaining defensive position mentally and physically and prebrief of positive control transfer in the training environment	3	3	3	3	3	3	3
61	#61 TRAINING -- Industry and operators train in a simulator pilots up to and including at least pusher if aircraft is equipped with shaker and pushers.	2	1	1	1	1	2	1.3
62	#62 - TRAINING - FSS to train personnel to be straight, factual and not vocalize opinion/judgement on operational decisions (go/no-go).	3	3	2	2	2	2	2.3
63	#63 TRAINING - FAA and Industry to develop and incorporate use of AOA education and training.	2	3	2	2	2	2	2.2
64	#64 - TRAINING - FAA and Industry to emphasize proper use of fuel management software (if equipped) on every flight.	3	3	3	3	3	3	3
65	#65 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, as appropriate, pertaining to stalls and unstabilized approaches.	2	3	2	2	2	3	2.3
66	#66 - FAA (Certification and human factors), manufacturers, and Industry to look into confusion issues with starter/ignitor switches in operations and emphasize differences in training.	3	3	3	2	3	2	2.7
67	#67 TRAINING - Flight instructor associations, industry, FAAS Team and type clubs to develop best practices to encourage CFI professionalism and disseminate to the flight instructor community.	2	3	3	3	3	3	2.8

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68	#68 - Training - FAA and industry to develop training and educational materials promoting professional decision making	3	3	3	3	3	3	3
69	#69-TRAINING -FAA/industry to promote and disseminate available training aids regarding new equipment to the GA community.	3	3	3	3	3	3	3
70	#70 - TRAINING - FAA and industry to revise private pilot training curriculum to demonstrate a 180 degree turn during a power loss after take-off to emphasize the altitude required and other hazards to consider (aircraft control, wind).	3	3	2	3	2	2	2.5
71	#71 TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on inflight handling of abnormal situations and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities.	3	3	3	3	3	3	3
72	#72 - TRAINING - FAA and industry to provide training requirements which require pilots to demonstrate maneuvers with AND without use of advanced systems (auto-pilot, GPS) to assure both understanding of equipment installed and hand flying skill.	3	3	3	3	2	2	2.7
73	#73A TRAINING - FAA and industry to conduct outreach to emphasise that go-around procedures are part of normal operations. The sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, should updated to reflect this. #73B TRAINING - Industry promotion of training aids already available regarding weight and balance.	3	3	3	3	3	3	3
75	#75 TECHNOLOGY- FAA/industry to provide cost effective measures to install AOA/envelope protection technologies for the GA community	2	2	2	2	2	2	2
76	#76 - TRAINING - FAA and industry to promote flying the airplane first through email campaign.	3	3	3	3	3	3	3


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77	#77A RESEARCH - FAA and industry to research development of cost effective mobile or panel mount devices capable of ADS-B or ADS-B-like technologies for traffic monitoring in GA aircraft. #77B TRAINING - FAA/industry to promote cost effective traffic avoidance technologies for the GA community.	2	3	3	3	3	3	2.8
78	#78 - TRAINING - FAA and industry to emphasize during training the affects of wind on traffic pattern operations and also emphasize the written materials available to study for further understanding (PHAK, etc.).	3	3	3	3	3	3	3
80	#80 - TRAINING - FAA FAAS Team to raise awareness of the importance of relevant Advisory Circulars when preparing aircraft flight test.	3	3	3	3	3	3	3
81	#81 TRAINING - EAA and Industry (including kit manufacturers) supply information about adding fuel bays and the impact on lateral CG / aircraft controllability.	2	3	2	2	2	2	2.2
82	#82 - POLICY - Industry to develop a best practice guide for when to flight test following a modification of an amateur built experimental aircraft.	3	3	3	3	2	3	2.8
83	#83 POLICY - The FAA to modify AC 90-89a (flight testing handbook) requirements a provision for determining lateral CG issues.	2	3	3	2	2	3	2.5
84	#84 - TECHNOLOGY - Industry to develop a visual and aural indicator of low fuel quantity	2	3	3	1	3	3	2.5
85	#85 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK) pertaining to traffic pattern procedures.	2	3	2	2	2	2	2.2

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87	#87 RESEARCH - FAA and industry (such as NAFI, SAFE, etc.) to research and develop recommended practices regarding pilots who have extended periods of flying inactivity between flight reviews.	2	3	3	3	3	3	2.8
88	#88 (a) POLICY - FAA to develop policy that allows non required safety enhancements to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low cost installations in part 23 aircraft. - 88(b) Regulatory change to allow non required safety equipment to be exempt from 21.9							
90	#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.	3	3	3	3	3	3	3
91	#91 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK) and Flight Instructors Handbook, as appropriate, pertaining to takeoff and landing distance considerations (short and soft field, contamination, etc.).	2	3	3	3	3	3	2.8
92	#92 TRAINING - AOPA ASI webinar / FAAST Outreach and education on the importance of abiding by limitations; ie. weight and within CG limits	3	3	3	3	3	3	3
93	#93A RESEARCH - FAA and industry to sponsor research to assess current capabilities of engine trend monitoring and analysis, and if needed develop guidance and new technologies where appropriate. #93B TECHNOLOGY - FAA and industry to promote the use of engine monitoring and trend analysis technologies on all GA aircraft.	2	3	2	2	2	2	2.2
96	#96 TRAINING -- Introduction to risk based decision-making for GA pilots (FAA Risk Management Handbook); integrate into pilot training programs; scenario based training	3	3	3	3	3	3	3
98	#98 POLICY -FAA/ Industry promote development of type clubs	3	3	3	3	3	3	3

Appendix 12 — Bucketed Interventions

 Bucketed Interventions					
Overall Effectiveness	Average Feasibility	OE x F	Intervention No.	Intervention Bucket	INTERVENTION
3.8	2.8	10.7	9	1	#9(a) POLICY- FAA to develop policy that allows AOA indication as a secondary reference as non essential information to be installed as a minor alteration in part 23 airplanes, thereby facilitating simplified low cost installations in part 23 aircraft.: 9 (b)FAA and industry should investigate and implement various financial incentives to encourage the installation of safety enhancing technologies.: 9(c) Regulatory- change to allow non required safety equipment to be exempt from 21.9
3.6	2.8	10.3	4	1	#4- MISC - Insurance industry should be kept informed of studies relating to reduction of LOC risk by installation of an AOA device in order to incentivise installations by means of enhanced coverages or discounts.
3.1	2.3	7.2	38	1	#38 - Policy - FAA remove the regulatory burden for development, certification, and installation of advanced technological flight deck safety related devices to encourage the accelerated adoption of advanced technology such as TAWS, synthetic vision, moving map, and weather in the cockpit.
2.5	2.2	5.4	30	1	#30 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve situational awareness and reducing pilot workload (electronic co-pilot)
2.8	1.7	4.7	33	1	#33 POLICY - FAA and industry to investigate ways to reduce the regulatory burden of incorporating auto-throttles into Part 23 aircraft and eventual integration into envelope protection system.
2.0	2.2	4.3	63	1	#63 TRAINING - FAA and Industry to develop and incorporate use of AOA education and training.
3.5	2.5	8.7	23	2	#23A RESEARCH - GA JSC to charter a study to examine all aspects of transition to unfamiliar aircraft across GA, to include ADM, in order to better understand the contribution of inadequate preparation to operate unfamiliar aircraft. #23B POLICY - FAA and industry to expand the use and promotion of AC 90-109 and AC 61-103 to the GA community until additional work has been completed. #23C TRAINING - FAA/industry outreach campaign on need for transition training including ADM when you fly airplane that is unfamiliar to you and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. Results of research
2.1	3.0	6.2	68	2	#68 - Training - FAA and industry to develop training and educational materials promoting professional decision making
1.1	3.0	3.4	20	2	#20 - POLICY - FAA, in conjunction with industry organizations, type clubs, kit manufacturers/makers of experimental amateur-built to reach out to pilots of these aircraft to encourage education on operationally specific requirements, which includes amendment to current policy which reduces barriers for training in these type aircraft, in order to reduce accidents.
3.5	2.5	8.7	28	3	#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.

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1.8	3.0	5.3	98	3	#98 POLICY -FAA/ Industry promote development of type clubs
2.5	3.0	7.4	60	4	#60 - TRAINING - FAA and Industry incorporate CFI training on maintaining defensive position mentally and physically, and prebrief of positive control transfer in the training environment
2.5	2.8	7.0	87	4	#87 RESEARCH - FAA and industry (such as NAFI, SAFE, etc.) to research and develop recommended practices regarding pilots who have extended periods of flying inactivity between flight reviews.
1.6	2.7	4.3	72	4	#72 - TRAINING - FAA and industry to provide training requirements which require pilots to demonstrate maneuvers with AND without use of advanced systems (auto-pilot, GPS) to assure both understanding of equipment installed and hand flying skill.
1.3	2.5	3.3	70	4	#70 - TRAINING - FAA and industry to recommend the inclusion into private pilot training curricula the demonstration of a 180 degree turn at an appropriate altitude during a power loss after take-off to emphasize the altitude required and other hazards to consider (aircraft control, wind).
3.8	1.8	7.0	26	5	#26 - POLICY - FAA/Industry should encourage 135 operators to conduct mixed operational missions (i.e. part 91 repositioning flights, training, maintenance) under same flight and crew criteria as they operate their commercial flights in order to increase safety margins and promote professionalism.
3.1	2.2	6.7	37	6	#37 TRAINING - Encourage final leg to be conducted as consistent angle, stabilized approaches using applicable technology in aircraft and on the ground
2.0	3.0	5.9	11	6	#11 POLICY - FAA and industry collaborate to amend PPL PTS to include testing on botched landing recovery and when to initiate go-around in order to reduce the exacerbation of a poor touchdown.
2.5	2.3	5.8	65	6	#65 POLICY - FAA and industry to improve the sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, as appropriate, pertaining to stalls and unstabilized approaches.
2.2	2.3	5.2	25	6	#25A POLICY - FAA and industry to review the adequacy of the existing guidance and advisory material (including PTS) on stabilized approach and go-around concepts in order. #25B TRAINING - FAA and industry to promote and emphasize the use of the stabilized approach concepts (#25A) for use by the GA community (including type clubs).
1.1	3.0	3.4	76	6	#76 - TRAINING - FAA and industry to promote flying the airplane first through further research into effective methods of communicating with pilots and an educational campaign.
1.1	3.0	3.3	73	6	#73A TRAINING - FAA and industry to conduct outreach to emphasize that go-around procedures are part of normal operations. The sections of the Pilot's Handbook of Aeronautical Knowledge (PHAK), Practical Test Standards (PTS) and Flight Instructors Handbook, should be updated to reflect this. #73B TRAINING - Industry promotion of training aids already available regarding weight and balance.

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1.0	3.0	3.0	78	6	#78 - TRAINING - FAA and industry to emphasize during training the affects of wind on traffic pattern operations and also emphasize the written materials available to study for further understanding (PHAK, etc.).
1.8	2.3	4.2	24	6	#24- POLICY/ TRAINING/PROCEDURES-- FAA revise ATC training policy to prohibit/ discourage clearances that would create an unstable approach and landing: i.e.no s-turns on final, no change in runway assignment when aircraft is within one mile of threshold. Especially true at large GA events, in order to reduce LOC accidents on final when unexpected clearances are given requiring increased workload
2.8	2.3	6.5	29	7	#29A RESEARCH - FAA/Government to sponsor research cost effective technologies that can provide realtime 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.
2.5	2.2	5.4	93	8	#93A RESEARCH - FAA and industry to sponsor research to assess current capabilities of engine trend monitoring and analysis, and if needed develop guidance and new technologies where appropriate. #93B TECHNOLOGY - FAA and industry to promote the use of engine monitoring and trend analysis technologies on all GA aircraft.
2.0	2.5	5.0	84	8	#84 - TECHNOLOGY - Industry to develop a visual and aural indicator of low fuel quantity
1.0	3.0	3.1	64	8	#64 - TRAINING - FAA and Industry to emphasize proper use of fuel management software (if equipped) on every flight.
2.0	2.5	5.0	1	9	#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.
1.2	2.5	3.0	3	9	#3- MEDICAL - Aerospace medical associations to perform a study to mitigate barriers to an open and honest communication between pilots and their AMEs.
1.7	2.3	3.9	16	10	#16 POLICY - FAA to develop a recurrent process to review guidance materials for currency and relevancy and remove outdated materials.
1.0	3.0	3.0	80	10	#80 - TRAINING - FAA FAASTeam to raise awareness of the importance of relevant Advisory Circulars when preparing aircraft flight test.
1.4	3.0	4.3	55	11	#55 TRAINING - FAA and industry should review existing guidance material regarding radio communications and determine the best practices for dissemination to the GA community.
1.7	2.5	4.2	13	12	#13 - POLICY - FAA / academia develop a searchable index of topics for all guidance and policy material, advisory circulars so that safety information is easily accessible and identifiable


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1.7	2.8	4.7	21	13	#21 POLICY - The FAA to improve internal data and information collection (PTRS) on incidents and performance of certificated personnel and air operators.
2.0	1.8	3.6	22	13	#22 - POLICY - FAA and Industry to explore ways to expand sharing information of prospective flight crewmembers for comprehensive pre-employment screening to identify candidates' performance trends.
1.1	3.0	3.2	14	14	#14 POLICY - Each FAA region (290 branch) collects information to develop a list of risk based items to disseminate to CFIs for incorporation in training/BFRs in order to address issues identified as significant threats.
1.3	2.3	3.0	41	15	#41 TECHNOLOGY -- FAA and Industry promotes the use and development of Flight Data Monitoring (FDM) programs and technologies in Part 23 aircraft.
1.1	2.5	2.9	83	16	#83 POLICY - The FAA to modify AC 90-89a (flight testing handbook) to cover lateral CG issues.
0.9	2.8	2.5	82	16	#82 - POLICY - Industry to develop a best practice guide for when to flight test following a modification of an amateur built experimental aircraft.
0.9	2.8	2.5	82	16	#82 - POLICY - Industry to develop a best practice guide for when to flight test following a modification of an amateur built experimental aircraft.
1.3	2.3	3.1	51	17	#51 TRAINING - FAA and industry to review existing single pilot CRM practices and develop best practices for dissemination to the GA community.
1.9	3.0	5.6	54	18	#54 - Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.
1.3	3.0	4.0	53	18	#53 TRAINING - FAA/industry outreach campaign on need for ADM with emphasis on preflight planning and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. #53B TRAINING - FAA/industry promote the use of the flight risk analysis tools (FRAT) with type clubs and associations.
1.3	2.2	2.9	8	18	#8 - POLICY - Kit manufacturers should develop and implement a flight safety program in order to aid with decision making.
4.5	2.3	10.5	32	19	#32 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve envelope protection and reducing pilot workload (easy button).

General Aviation Joint Steering Committee
Loss of Control, Approach and Landing, Final Report

Appendix 13 — Example of Event Sequence

 Experimental Amateur-Built Sub-Group																	
SORT	ID	#	FDR Time	Local Time	Event/Data Point	Problem (What)	Contributing Factors (Why)	SPS No.	Standard Problem Statement	P ₁	A	IS No.	Intervention Strategy	P ₂	C	Power	OE
CHI01FA235 Payne Giles G-202 Oshkosh, WI																	
1					Pilot entered Fisk arrival in between a Cherokee and a Luscombe Luscombe estimated Giles speed at 90 mph, and was wandering vertically and laterally	Low proficiency in make and model	Very few hours flight time in small aircraft in previous 4 years	1	PILOT - Low pilot time in make and model	4	5		#23A RESEARCH - GA JSC to charter a study to examine all aspects of transition to unfamiliar aircraft across GA, to include ADM, in order to better understand the contribution of inadequate preparation to operate unfamiliar aircraft. #23B POLICY - FAA and industry to expand the use and promotion of AC 90-109 and AC 61-103 to the GA community until additional work has been completed. #23C TRAINING - FAA/industry outreach campaign on need for transition training including ADM when you fly airplane that is unfamiliar to you and work with type clubs and associations to incorporate best practices from advisory material and promote use and training in those communities. Results of research (23A) can be used later to further refine specific transition training needs.	3	2	3.4	0.952
					Three Birddogs approaching airport on right base for 36R expecting 36L	Divided attention	Non standard arrival procedure	3	PILOT - Distraction/Divided attention	3	3		#76 - TRAINING - FAA and industry to promote flying the airplane first through email campaign.	3	3	3.0	0.75
							Multiple traffic targets using different approaches to same runway	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.).	3	3		#77A RESEARCH - FAA and industry to research development of cost effective mobile or panel mount devices capable of ADS-B or ADS-B-like technologies for traffic monitoring in GA aircraft. #77B TRAINING - FAA/industry to promote cost effective traffic avoidance technologies for the GA community.	4	3	3.4	0.857
							High traffic/workload environment	29	PILOT - Overload	4	3		#24- POLICY/ TRAINING/PROCEDURES-- FAA revise ATC training policy to prohibit/ discourage clearances that would create an unstable approach and landing: i.e no s-turns on final, no change in runway assignment when aircraft is within one mile of threshold. Especially true at large GA events, in order to reduce LOC accidents on final when unexpected clearances are given requiring above average piloting skill.	2	1	2.7	0.222
					Giles asked if he could turn final. Controller needed to let last Birddog in ahead of Giles. Giles appeared to overshoot base to final Sudden bank to right	Stalled, lost control		4	PILOT - Aerodynamic stall - failure to recognize and execute corrective action	5	4		#32 - TECHNOLOGY / POLICY - FAA to reduce the regulatory barriers to encourage the development and installation of smart technology to integrate the piloting, navigation and control systems to improve envelope protection and reducing pilot workload (easy button).	4	4	4.4	1.975
			8:47:21		Giles observed crashed on ground 1/2 mile south of runway												