



General Aviation Joint Steering
Committee (GAJSC)
Loss of Control Working Groups
Approach and Landing
&
Departure and En-route
October 29, 2014

This report provides an overview of the work of the 1st and 2nd Loss of Control Working Groups under the General Aviation Joint Steering Committee (GAJSC) since the FAA-Industry program was re-established in January 2011.

LETTER TO GENERAL AVIATION JOINT STEERING COMMITTEE CO-CHAIRS



October 29, 2014

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Mr. Griffin and Mr. Landsberg,

On behalf of the members of the Loss of Control working groups (LOCWG), we respectfully submit the attached report and safety enhancements to the General Aviation Joint Steering Committee (GAJSC).

The working groups studied fatal loss-of-control (LOC) accidents using the data-driven process of the Commercial Aviation Safety Team (CAST). The first working group was tasked with analyzing accidents which occurred during the approach and landing phase of flight and the second and final working group analyzed the remaining accidents which occurred during the en-route and departure phase of flight.

Resulting from that process and the hard work and dedication of the group members, comprehensive safety enhancements (SEs) were drafted that, when fully implemented, stand to significantly reduce the likelihood of similar accidents from occurring in the future.

We look forward to the acceptance and implementation of the SEs. From this collaboration and partnership between industry and government, the safety of general aviation will be improved.

Sincerely,

Kevin Clover
LOCWG Government Chair
Federal Aviation Administration

David Oord
LOCWG Industry Chair
Aircraft Owners and Pilots Association

GENERAL AVIATION JOINT STEERING COMMITTEE
LOSS OF CONTROL WORKING GROUP

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I. GAJSC Loss of Control Working Group

Background

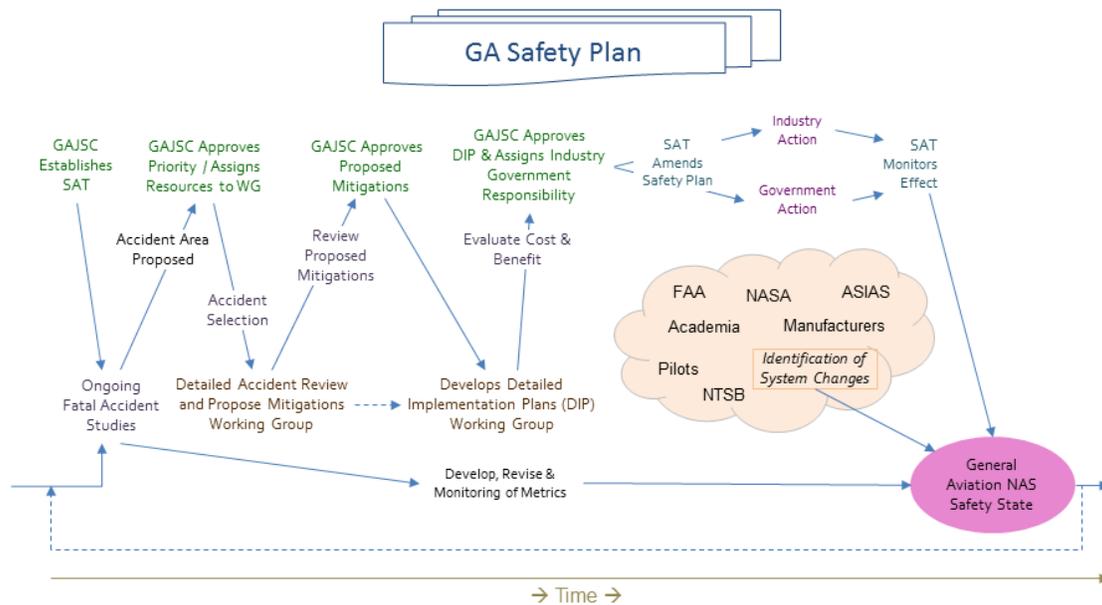
The General Aviation Joint Steering Committee (GAJSC) was reestablished in January 2011 after several years of being dormant. It originally was created in the mid-1990s to parallel the Commercial Aviation Safety Team (CAST) under the Safer Skies initiative. The GAJSC had many successes through the mid-2000s, 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 three safest years in GA (2006–2008)³ and plan for an annual improvement of a one percent reduction in the fatal accident rate. Meeting this reduction would result in a fatal accident rate of no greater than one fatal accident per 100,000 hours flown by 2018. It should be noted that the three year baseline did not include hours flown by two-place ultralight – now certificated Experimental Light-Sport Aircraft.

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 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.

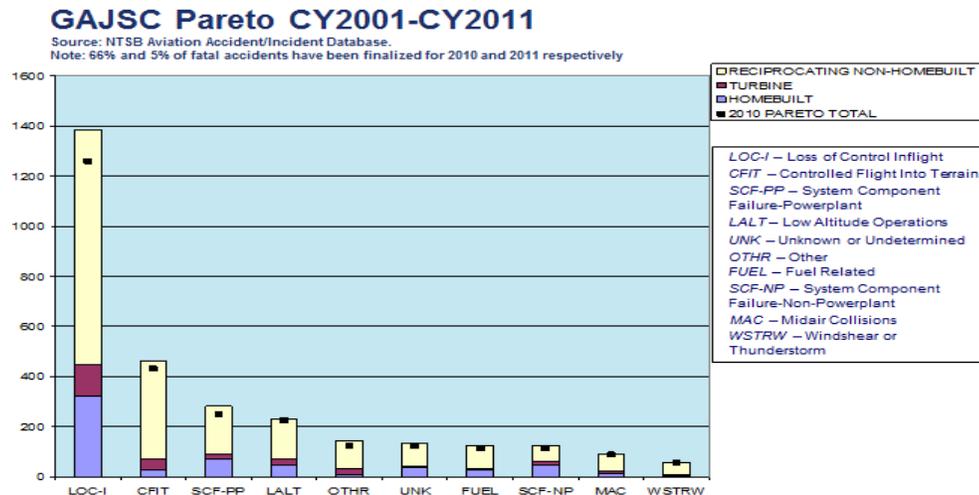
The FAA developed an overview of the 2001–2010 fatal GA accidents. It determined 40.2 percent of fatal accidents, or 1,259, were identified as “Loss of Control” (LOC) according to

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 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



The GAJSC decided to focus the first LOC working group on accidents which occurred during the “approach and landing” phase of flight because of its applicability to the three main GA aircraft certifications: experimental amateur built, certified piston engine airplanes and turbine airplanes.

At its April, 26, 2011, meeting, the GAJSC approved the charter and formation of the first LOC working group (see appendix 1) to examine approach and landing accidents (see appendix 8). Its membership consisted of appropriate government and industry subject matter experts (SME) to support the project over nine months.

At its October 3, 2012, meeting, the GAJSC approved the subsequent charter and formation of the second LOC working group (see appendix 4) to examine the remaining en-route and departure accidents (see appendix 9). Its membership consisted of SMEs that would support the project over 12 months.

Organization

The first Loss of Control Working group (LOCWG 1.0) focused on approach and landing accidents, 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 1.0 members from participating. The LOCWG 1.0 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 1.0 had three sub teams 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 1.0, including its hosts.

All participating organizations in GAJSC were offered an opportunity to nominate technical experts based on the expertise identified in the LOCWG 1.0 charter. The final membership of the LOCWG 1.0 is included in appendix 2.

The second Loss of Control Working group (LOCWG 2.0), focused on en-route and departure LOC accidents, and held its first meeting in September 2012 at the headquarters of the Aircraft Electronics Association (AEA). The LOCWG 2.0 was co-chaired by the Aircraft Owners and Pilots Association (AOPA) and the FAA Flight Standards (AFS-850). Appendix 6 contains a list of the seven meetings of the LOCWG 2.0, including its hosts.

The final membership of the LOCWG 2.0 is included in appendix 5.

II. Scope of This Report

This report is organized according to the following tasks contained in the LOCWGs charters:

1. Conduct an in depth analysis and review of the Loss of Control accidents provided by the SAT. The SAT established a statistically acceptable process to reduce the 1,259 accidents that occurred during 2001–2010 into a data set that can be practically reviewed by the working groups within the timeframe.
2. Review and determine the applicability of other work done in the area of LOC. This work includes the Flight Safety Foundation’s Approach and Landing Accident Reduction (ALAR) tool kit.
3. The working groups will develop and prioritize safety intervention strategies that will reduce the potential for LOC 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 groups 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 working 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 working group will present each DIP to the GAJSC for review and approval.

Using the experience gained through the first working group, LOCWG 2.0 decided the DIPs were both difficult to create and cumbersome to track the responsible association

and tasks. Instead of creating and presenting DIPs, the second working group created comprehensive Safety Enhancements (SEs) for consideration – clearly stating expected timeline, responsible parties, and tasks.

6. The working groups provided feedback to the GAJSC about what worked and what did not work with respect to this process to help assist with future working 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

1.0 Task 1

The working group conducted an in depth analysis and review of the LOC accidents provided by the SAT. The SAT established a statistically acceptable process to reduce the LOC 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 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.

For LOCWG 1.0, 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 sub group, the first 30 well documented accidents from the lists were analyzed in detail. The detailed process for accident selection is included in appendix 7.

For LOCWG 2.0, members of CGAR randomly selected a total of 120 LOC accidents, irrespective of certification basis. The 120 randomly selected accidents were subsequently reduced to the first 90 well documented accidents.

Differing from the first working group, LOCWG 2.0 utilized two sub teams to analyze 90 selected accidents. It was determined through the previous working group that causal factors were not specific to aircraft certification, eliminating the need to segment the accidents and subject matter experts.

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 reviewed and determined 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 working groups 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 10 and 11.

The LOCWG considered the solutions on existing work conducted in the area of LOC 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 developed and prioritized safety intervention strategies that will reduce the potential for LOC accidents occurring in the future. In addition to documenting its analysis results and recommended intervention strategies, the working group also documented its assumptions regarding the analysis.

3.1 Methodology

Sub teams of the LOCWG membership, three in LOCWG 1.0 and two in LOCWG 2.0 were assigned a set of accident reports to analyze. Each sub team utilized an event sequence spreadsheet (see appendixes 19 and 20). Each spreadsheet included the events necessary to provide context for understanding the nature of the accident sequence. The sub teams then evaluated the events to determine if they represented a “problem” involving hardware/software failure or human execution errors, decisions, or procedural noncompliance.

If the sub team 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 (SPS) to make them relevant beyond the specific accident. The list of SPS continues past each working group, making them available to subsequent working groups.

The sub teams rated the standard problem statements as described below. They developed potential interventions to address each standard problem statements. Appendix 16 contains a list of potential interventions, and appendix 13 lists the standard problem statements the LOCWGs used, along with their respective frequencies.

3.2 “Standard Problem Statement” Rating System

Ratings

The sub teams 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 CAST Joint Safety Analysis Teams (JSATs).

The LOCWG incorporated 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 respective sub team 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 sub teams 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 Overall Effectiveness (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:

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

Appendixes 13 and 14 list the interventions ranked by OE.

3.3 Bucketed Interventions

The LOCWG 1.0 three subgroups proposed 204 individual interventions. They “bucketed” or grouped 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 17). This resulted in a manageable number of 98 interventions that were divided between two groups responsible for assessing the feasibility of each intervention.

LOCWG 2.0 two subgroups proposed 187 new individual interventions (see appendix 18). These new interventions were bucketed using the same methodology from the first working group. This resulted in a manageable number of 97 new interventions in which feasibility was assessed.

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,
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 the working groups 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 working groups entered all the values.

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 LOCWGs set break points for effectiveness and feasibility wherever naturally occurring breaks appeared between clusters of ratings. These breakpoints will be different for future working 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 working 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 LOCWGs' 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, OE x F, 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 portrayed how the color codes for effectiveness and feasibility compare (green green, green yellow, etc.). Figure 3.1 is an example from the LOCWG 1.0.

Figure 3.1 – Example Prioritization Sorting

 Prioritized 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.

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

For each intervention contained in this OE x F “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 (OE x F). This provided the teams 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 Safety Enhancements (SEs)

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

The teams identified the agencies, organizations, or associations potentially affected by the outputs or actions of their specific SE. One or more individuals from each of these agencies and organizations were identified and their assistance solicited to act as working group members during the SE 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 working group members.

Common contributing factors from the first working group were evidenced through the analysis of the second working group. 19 interventions that were above the LOCWG 2.0 cut off line were interventions used in developing LOCWG 1.0 Safety Enhancements. Due to the fact that the interventions were already being enacted as part of an existing approved SE, no further action was warranted but strengthened the prior analysis and need for action.

4.0 Task 4

The working group presented 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 was included in the report.

4.1 Developed SEs

The LOCWG 1.0 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.

The LOCWG 2.0 developed nine new SEs, which were assessed by the SAT using the same process and methodology as the first working group’s SEs.

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. The effectiveness was scored which resulted in an effectiveness rating as shown in Figure 4.1 for LOCWG 1.0. 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

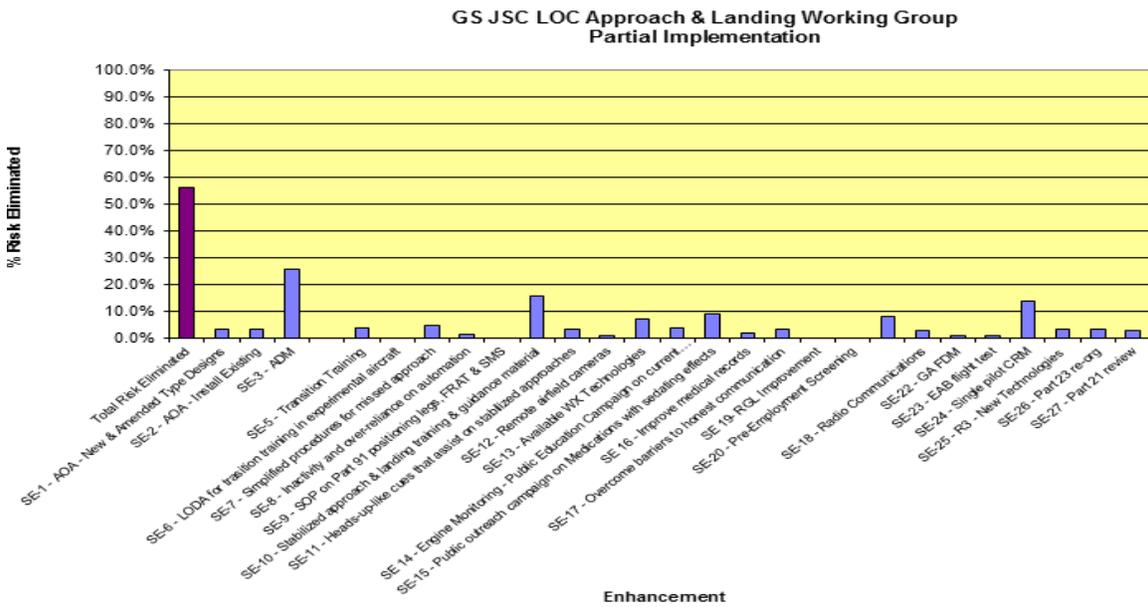
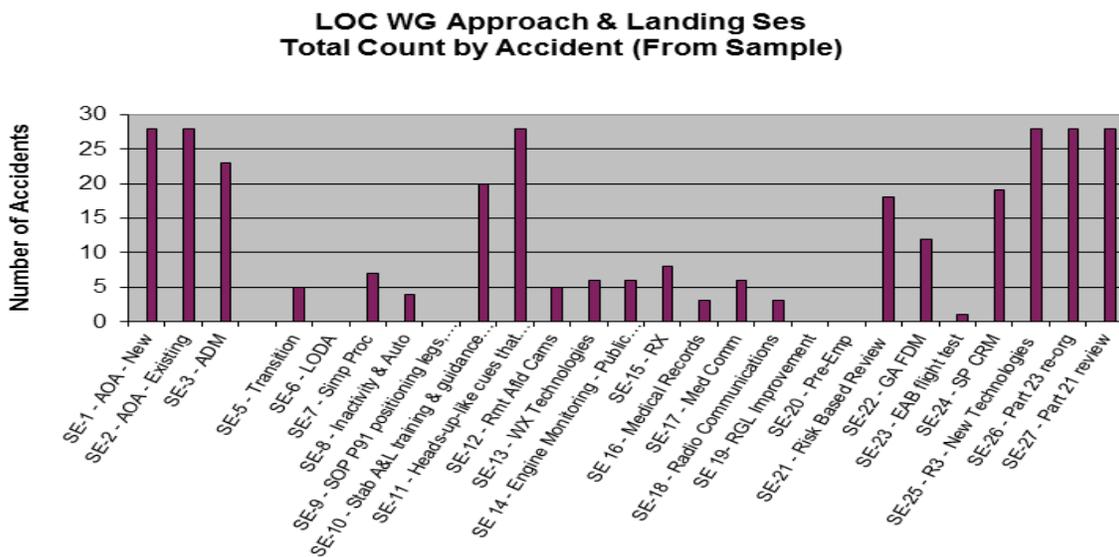


Figure 4.2 – SE Accident “Count” Against 30 Randomly Selected LOC Accidents



4.4 GAJSC Presented the Effectiveness Ratings of the SAT

At the GAJSC meetings, the SAT and working groups presented the effectiveness analysis for approval consideration.

4.5 GAJSC Approved List of SEs

The GAJSC approved 29 individual SEs with the Lead Organization for Overall Output Coordination (LOOC). Appendix 12 contains the approved SEs.

LOCWG 2.0 presented new outputs for SE-5, Transition Training and SE-25, New Safety Technologies, and SE-15, Flight after use of Medications with Sedating Effects.

5.0 Task 5

Following the GAJSC's approval of the interventions, the LOCWG 1.0 developed a detailed implementation plan (DIP) for each intervention. LOCWG 2.0 chose not to create DIPs due to the difficulty in creating and tracking the plans that contained multiple SEs.

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 12.

5.2 Methodology – Development of DIPs

The DIPs contain the following elements: SOW, 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 1.0 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 1.0 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 OE x F 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 Methodology – LOCWG 2.0 Revised Safety Enhancements

Due to the difficulty in creating and tracking a DIP which contained several SEs and multiple organizations responsible for coordination and tracking, the LOCWG 2.0 made the decision to eliminate the DIPs and focus on Safety Enhancements. To further aid in the tracking and communicating its intent, the working group revised the SE template to contain the following.

1. Summary: Clearly lays out the Lead Organization for Overall Output Coordination (LOOC) and lists the outputs contained in the SE. This is then followed by the estimated cost for SE completion, the completion goal – expressed in months or years after SE approval, and the date of SE approval.
2. Statement of Work: In order to make the intent more clear, this section was expanded to include specifics of what the SE is trying to fix. Additionally, the SE now included the intervention that generated the SE – providing justification reasoning.

3. **Outputs:** Outputs are listed in order with completion goal and LOOC clearly stated.
4. **Actions:** The list of specific actions is presented chronologically.
5. **Additional resources:** Provided to assist LOOC in accomplishing SE.
6. **Relationship to Current Aviation Community Initiatives:** Ongoing programs that are directly related to the output.
7. **Implementation Order:** Gantt chart developed to clearly show the order of output implementation, relationship to other outputs, SE approval date, and associated timelines.

5.4 Safety Enhancements

SE-1 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.

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.

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.

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-22 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 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 non-precision 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 \$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

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

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.

SE-28 Pilot Response to Unexpected Events SOW

This Safety Enhancement will be used to educate flight instructors and pilots on the need for preparing for unexpected events in the cockpit, focusing on: the importance of briefing for emergencies; positive transfer of controls; recognition and management of “startle response”. This work will also better prepare pilots for engine failure after takeoff. Work will include developing best practices, refining the takeoff pre-brief to emphasize what action will be taken dependent on current situation (altitude, airspeed, terrain, etc.) and recommend training/practicing the developed best practices on a regular basis.

SE-30 Medications List for Pilots SOW

To reduce the risk of pilot impairment or incapacitation from medications resulting in loss of control accidents, the Federal Aviation Administration (FAA) should implement programs to reduce the likelihood of the use, while flying, of prescription and over-the-counter medications that adversely affect the pilot’s ability to safely operate aircraft.

Tools to improve pilot knowledge about the safe use of many medications are available to airmen from private advocacy groups such as Aircraft Owners and Pilots Association (AOPA), but the use of these tools is available only to members and not the entire GA community. As the regulatory agency, the FAA should strive, to the fullest extent possible, to improve pilot knowledge and prevent the use of any medications that could adversely affect flight safety. To this end, the Federal Aviation Administration (FAA) in conjunction with industry groups, academia, and the medical community should develop a medication list of approved or acceptable medications along with disqualifying medications that is easily available to all pilots and available online. The online tool should provide accurate aerospace medical guidance about the most common acceptable and unacceptable medications with recommended return to duty times following the use of these medications and provide information about drug interactions. The underlying conditions which the medication treats should be highlighted.

SE-31 Test Pilot Utilization and E-AB Proficiency SOW

The goal of this Safety Enhancement, once fully implemented, is to improve amateur built flight testing safety through greater understanding of test pilot qualifications and listing of test pilots willing to work with homebuilders.

SE-32 Airman Certification Standards SOW

For many years, the aviation training community has criticized the FAA's airman testing standards and training materials as being outdated and out of touch with current technology and education/training methods. Industry also faulted the agency for piecemeal and unilateral efforts to make revisions.

To address these issues, in September 2011 the FAA chartered the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) to make recommendations on the *content, process, methodology, and priorities* for updating airman testing standards and training material. The ARC included broad representation from the aviation community, including industry associations, universities, training providers, and professional associations.

The ARC submitted its report and nine recommendations to the FAA on April 13, 2012.

The ARC's key recommendation on content called for the FAA to integrate knowledge, skills, and risk management for each major task in the current Practical Test Standards (PTS) into a single Airman Certification Standards (ACS) document. ARC members stated that this approach would improve and integrate testing and training by clearly mapping aeronautical knowledge and risk management to the flight proficiency skills as defined in the PTS.

To accomplish this task and other ARC recommendations, the FAA accepted the ARC's process and methodology recommendations to establish a stakeholder body of industry subject matter experts (SME). In August 2012, the FAA assigned this task to the Aviation Rulemaking Advisory Committee (ARAC), a formal standing committee comprised of representatives from aviation associations and industry. ARAC provides industry input in the form of information, advice and recommendations to be considered in the full range of FAA rulemaking activities, including regulatory support.

The FAA announced the ARAC's acceptance of this task through a Federal Register Notice published on September 12, 2012. This Notice described the task elements and solicited participants for the ARAC Airman Testing Standards and Training Working Group (ARAC ATST WG), which formed and began its work in November 2012. Members of the ARAC ATST WG are listed on the final page of this document.

As stated in the Notice, the FAA specifically tasked the ARAC ATST WG to provide:

- An integrated Airman Certification Standards (ACS) document that aligns the aeronautical knowledge testing standards required by 14 CFR Part 61 with the flight proficiency standards ("Areas of Operation") set out in 14 CFR Part 61 and the existing Practical Test Standards (PTS). Consistent with the ARC's recommended prioritization, the FAA asked the ARAC ATST WG to develop complete ACS documents for the private pilot and flight instructor certificates and the instrument rating.
- A detailed proposal to align and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., FAA H-series handbooks) with the integrated Airman Certification Standards documents developed in accordance with the first task. The FAA also asked the ARAC ATST WG to recommend a process for ongoing stakeholder review and revision of these materials.

- Proposed knowledge test item bank questions that are consistent with both the newly-developed Airman Certification Standards documents and the test question development principles set forth in the ARC's recommendations. In addition, the FAA asked the ARAC ATST WG to recommend methods that provide for expert outside review (“boarding”) of proposed questions while safeguarding the integrity of the testing process.

The ARAC ATST WG submitted its final report with draft documents and recommendations to the ARAC and the FAA on September 20, 2013.

Once this Safety Enhancement is fully implemented, the goal of introducing risk management into airman testing and training will be realized.

SE-33 Safety Culture SOW

In addition to the above intervention, both the first and second working groups analyzed several accidents in which the pilot exercised poor aeronautical decision making, weak safety culture, and/or poor judgment in managing risks. Additionally, several accidents involved a pilot exhibiting intentional non-compliance to the rules and regulations established to ensure a safe aviation system.

It is the goal of this safety enhancement, once fully implemented, will establish an improved safety culture for general aviation.

SE-34 Outreach SOW

Specifically, the interventions below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement. Each of this safety enhancement's five topics has three outputs associated with them. The topics are based upon the following interventions, which will result in a separate educational outreach campaign.

- #138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.
- #188 TRAINING - Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.
- #141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.
- #186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasize the need for training and currency when flying in mountainous areas.
- #157 EDUCATION - Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. . Emphasize with CFIs the importance of teaching proper PIC decision making skills. Provide suggestions on how airman can develop their own

personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change.

6.0 Task 6

The working group, as the pilot project, provided 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 working 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 working 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.

At the December, 2013 GAJSC meeting, the co-chairs of the LOCWGs presented the following lessons learned.

- No need to segment aircraft by type
- Create Safety Enhancements only
 - DIPs difficult to create and track
 - LOCWG 2.0 new SE format helped
 - Add as much specificity as possible
 - Make it clear who is going to what by when
- Worked better to not segment en-route and departure from approach and landing
 - Common problems
 - Group member's burn out – creativity lost

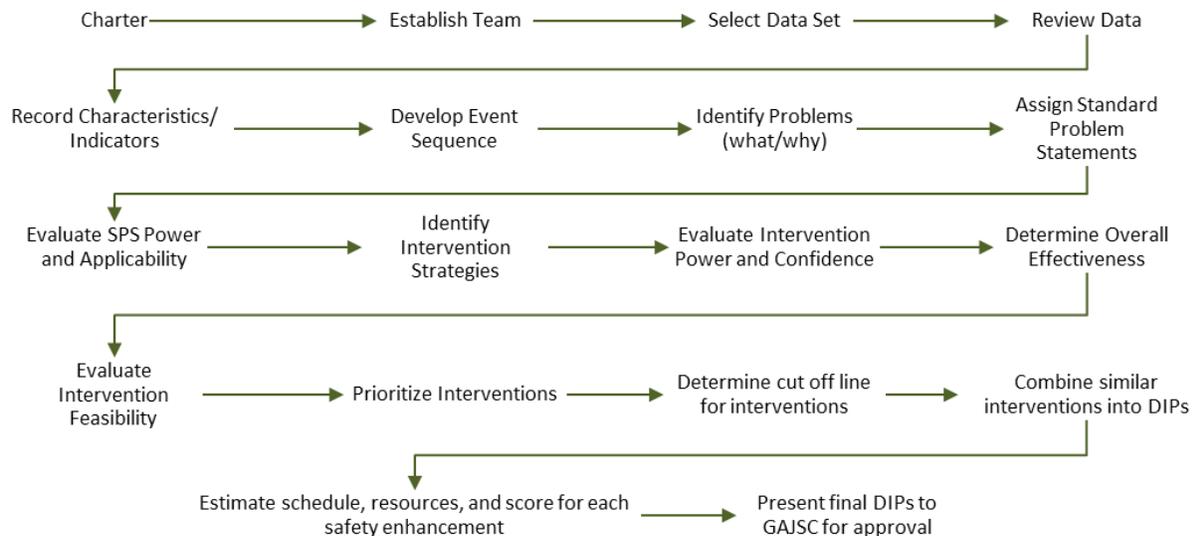
Additionally, the co-chairs included the following recommendations for subsequent working groups

- Focus on occurrence category
 - Prevent defining event = no accident
 - Multiple Interventions for unrelated issues
- Process Improvements
 - OE x F score improvements
 - Account for how many times an intervention is used
- Mix up groups to keep process fresh
 - Encourage active participation
- New group membership
 - New ideas and expertise

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

- Ensure NTSB data is pulled and available prior to start
- Quality control after initial safety enhancement approval
 - Multiple versions and changes of SEs after submission
 - Utilize sharepoint technologies

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 working 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

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

Medical Issues and Medications

The LOCWG examined the frequency with which medical issues were involved in fatal GA accidents, including the use of over the counter medications, prescription medications, 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.

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 two-place 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 experimental amateur-built aircraft typically do not conduct point to point flying, but instead conduct short flights, often in the pattern, compared to cross country 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.

Crashworthiness and Survivability

Through the analysis of the first and second working group, several accidents included information that led group members to speculate that the crash could have been survivable if better crashworthiness standards were in place. Both standard problem statements and interventions were drafted to improve aircraft crashworthiness. However, after consideration, it was decided crashworthiness and survivability were outside the scope of the working group's tasking because (1) accident investigation data did not contain information

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.

needed to determine an accident could have been survivable and (2) working group members did not have the subject matter expertise needed to conduct an analysis.

It is, however, the recommendation of the working groups that, if the GAJSC determines further study is warranted, a future working group be assembled to do a proper analysis of the accident reports to recommend improvements to crashworthiness and survivability standards for aircraft design and certification.

Appendix I — LOCWG 1.0 Charter

Working Group 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 (CICTT) 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 — LOCWG 1.0 Participants

Working Group Co-Chairs

Industry – David Oord, Aircraft Owners and Pilots Association (AOPA)

FAA – Kevin Clover, FAA General Aviation and Commercial Division (AFS-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 – Corey Stephens, Patrick Forrester, and Sean Hafner

Garmin - Bill Van Zwoll

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 1.0 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 — LOCWG 2.0 Charter

Working Group Loss of Control – En-route and Departure Accidents September 1, 2012

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 (CICTT) 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 en-route and departure phase of flight, and determine the contributing factors and intervention strategies.

B. Tasks

1. The working group will conduct an in-depth analysis and review of the LOC en-route and departure accidents provided to the working group by the SAT. The SAT has established a statistically acceptable process to reduce the 120 en-route and departure 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 en-route and departure 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 safety enhancement for each intervention.
 - 5.1 Each enhancement 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 safety enhancement to the GAJSC for review and approval.

6. The working group 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
- Safety Enhancements, 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 face-to-face meetings scheduled at the discretion of the working group government/industry co-chairs.

F. Schedule

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

- Report documenting analysis and recommendations for mitigations.
- An implementation plan including metrics for monitoring effectiveness of mitigations.

G. LOC En-route and Departure Membership

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

H. Approved

This charter was approved by the GAJSC on September 1, 2012.

Bruce Landsberg, Industry Co-Chair

Tony Fazio, Government Co-Chair

Appendix 5 — LOCWG 2.0 Participants

Working Group Co-Chairs

Industry – David Oord, Aircraft Owners and Pilots Association (AOPA)

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

Working Group Members

Aircraft Electronic Association (AEA) - Ric Peri

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

Experimental Aircraft Association (EAA) – Tom Charpentier

FAA, Flight Standards – Mike Haley, Jim Watson, and Larry Wells

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 – Corey Stephens

FAA, Office of Aerospace Medicine (AAM) – Dr. Nicholas Webster

Garmin – Chris Benson

General Aviation Manufacturers Association (GAMA) - Kate Fraser

Beechcraft Corporation - Robert Ramey

Jeppesen - Martin Plumleigh

Lancair Owners and Builders Organization (LOBO) – Jeff Edwards

National Business Aviation Association (NBAA) – Peter Korn

Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability (PEGASAS) – Stephen K. Cusick and Scott R. Winter

Society of Aviation Flight Educators (SAFE) – Doug Stewart

Appendix 6 — LOCWG 2.0 Meetings

September 11–13, 2012—Aircraft Electronics Association, Kansas City, Missouri

November 6–8, 2012—National Transportation Safety Board Training Center, Ashburn, Virginia

January 15–17, 2013—Aircraft Owners and Pilots Association, Frederick, Maryland

March 5–7, 2013—Embry-Riddle Aeronautical University, Daytona Beach, Florida

April 23-25, 2013 – Boeing, Seattle, Washington

June 18-20, 2013 – Bombardier, Dallas, Texas

August 13-15, 2013 – ATP, Brisbane, CA

Appendix 7 — Accident Selection Process

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.

Appendix 8 — Accident Set Reviewed by the LOCWG I.0

ATL07FA029 Cessna 340A Charleston, SC	DEN03FA111 RV-6A La Junta, CO
CHI01FA093 Cessna 172 Centralia, IL	LAX02LA109 RV-4 Jacumba, CA
CHI05FA260 Piper PA-32-300 Wabash, IN	LAX03LA192 Argus Aviation CA-7 Angleton, TX
CHI06FA076 Cessna 421B Whelling, IL	NYC06LA136 Lancair 360 Montgomery, NY
CHI06FA232 Piper PA-23-250 Sault Ste Marie, MI	SEA03LA118 Herrin Hornet Newberg, OR
CHI08FA053 Beech V35B Springfield, IL	IAD02LA089 Puhl Genesis Petersburg, WV
DEN03FA068 Cessna 310D Provo, UT	CHI06LA164 Zenair Cricket MC-12 Lee's Summit, MO
CHI04FA255 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	CHI07LA113 Murphy Moose SR3500 Cotter, AR
FTW04FA045 Cessna 172 Grand Saline, TX	ATL04LA158 Pitts S-1 Durham, NC
LAX01LA303 Cessna P206B Willits, CA	CHI02LA176 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 B36TC North Garden, VA	IAD05FA047 Pilatus PC-12/45 Bellefonte, PA
NYC07FA159 Mooney M20F Brooks, KY	DCA05MA037 Cessna 560 Pueblo, CO
CHI02FA094 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
CHI01FA235 Payne Giles G-202 Oshkosh, WI	IAD04FA021 Mitsubishi MU-2B-60 Ferndale, MD
CHI07LA150 Vans RV-7A Marysville, OH	LAX04FA165 Mitsubishi MU-2B-40 Napa, CA
CHI08FA224 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
ATL05LA078 Earnest Jodel D-9 Memphis, TN	IAD03FA035 Socata TBM 700 Leesburg, VA
CHI01FA244 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
CHI04LA026 BD5B Traverse City, MI	

Appendix 9 — Accident Set Reviewed by the LOCWG 2.0

FTW03FA054 Cessna 402C Lewisville, TX	MIA06LA106 Piper PA-23-250 Caribbean
FTW02LA086 Air Tractor AT-502B Extension, LA	SEA07FA012 Cessna 172M Escalante, UT
ATL06LA110 Vans RV-6 Hartselle, AL	CEN09LA512 Hooper Mustang MMII Gladwin, MI
ATL02FA160 Beech BE-55 Jacksboro, TN	LAX05LA283 Avions Robin R.2160 Avalon, CA
LAX04FA177 Piper PA-32R-301T Ukiah, CA	NYC08FA319 Piper PA-32 Atlanta, GA
CEN10FA028 Beech 100 Benavides, TX	CHI07LA238 Swanson Aventura II Lakewood, WI
LAX06FA289 Piper PA-23-160 Sana Maria, CA	CHI01FA100 Piper PA28-180 Earhard, MN
DEN05FA074 Cessna T210G Ouray, CO	CHI01LA294 Piper PA-18-150 Alice, ND
LAX01LA281 Lancair 360 Placerville, CA	DFW08FA040 Cessna 172 Marlow, OK
CHI03LA074 North American P-51D Urbana, IN	ANC06LA030 MOONEY M10 SALINAS, CA
LAX08FA068 Mooney M20C Riverside, CA	LAX01LA141 Vans RV-6A Baker, CA
CEN09FA178 Cessna 182M Albany, LA	ATL05FA086 Piper PA-18-135 Conway, SC
CHI03LA216 Cessna 172H Isle, MN	WPR09FA112 Beech A36 Avalon, CA
DFW05LA012 Huber DR 107 Fletcher, OK	LAX04FA207 Piper PA-44-180 Wittmann, AZ
MIA03FA077 Aeronca Champion 7BCM Pahokee, FL	DFW05FA145 Beech 95-B55 Jeanerette, LA
ERA09LA043 Vans RV-6 Martinsville, VA	CHI02LA166 Jacobs Rutan Vari Viggen Urbana, IL
SEA07GA142 Christen Industries A-1 Loa, UT	MIA04FA128 Cessna R182 Milton, FL
ERA10LA158 Rans S-6S Mayaguez, PR	LAX08FA256 Cessna 172K Gearhart, OR
CHI02FA215 Piper PA-30 Marble Hill, MO	CHI01FA298 Vans RV-6 Grayslake, IL
LAX08LA078 Vans RV-7A Winslow, AZ	ATL03FA136 Beech BE-55 Winder, GA
DEN06FA065 Cessna 310 Heber City, UT	NYC05FA006 Beech H50 Hartwood, VA
LAX08LA191 Cessna 172S Oceanside, CA	ATL04FA038 Beech 55 Griffin, GA
NYC05FA006 Beech H50 Hartwood, VA	CHI08FA045 Cessna 208 Columbus, OH
CEN09LA331 Gentry John K Chinook PL Bridgeport, TX	CHI03FA088 Cessna 182 North English, IA
CHI03LA117 Rans S-7 Baudette, MN	SEA07FA119 Cessna 182 Marion, MT
SEA07FA199 Cessna 182 New River, AZ	ERA09LA454 John M Nieuport 1 Brasstown, NC
LAX04FA168 Alon A2 Cameron Park, CA	ERA09FA053 Cirrus SR22 Tallahassee, FL
DEN07FA165 Cessna T210 Moriarty, NM	DEN01FA056 Beech V35B Green River, UT
DFW06FA140 Aviat A-1B Edna, TX	LAX04FA226 Piper PA-28R-180 Columbia, CA
ERA09LA019 Hargett Sky Ranger II Rock Hill, SC	LAX07FA123 Cessna 172 Page, AZ
IAD05LA083 Titan Tornado Bath, PA	DFW08FA212 Piper PA-24-250 Yuma, CO
SEA02GA053 Piper PA-31 Atlanta, ID	NYC02FA200 Mooney M20E West Creek, NJ
DEN08FA152 Gulfstr. Am. Corp AA-5A Baxter Pass, CO	CHI07FA182 North American Navion Colona, IL
MIA02FA113 Piper PA-46-310P Naples, FL	CHI07FA032 Cessna 172 Crookston, MN
MIA08LA002 Bellanca 7GCAA Toughkenamon, PA	SEA05FA201 Cessna P210 Salmon, ID
CHI08FA150 Socata TBM 700 Iowa City, IA	NYC04FA144 Cessna P210 Dunkirk, NY
CHI08FA133 Beech V35 Bristol, OH	NYC05FA001 Cessna 172 Germantown, NY
DEN03FA157 Beech 35 Belen, NM	DEN01FA044 Aero Vodochody L-39 Watkins, CO
ERA09FA169 Cirrus SR20 Deltona, FL	CHI06LA070 Cessna 172 Harrison, MI
ANC01FA084 Maule M-5-235C Bettles, AK	ANC06FA080 Piper PA-12 Cooper Landing, AK
MIA03LA146 Sonerai Sonerai IIB Lakeland, FL	CEN09FA369 Cessna 182 Dougherty, TX
SEA02FA171 Cessna 175 Arlington, WA	MIA07LA091 SNS-2 Guppy Stewartstown, PA
NYC05FA058 Grumman American AA-5	NYC02FA196 Piper PA-30 Gilford, NH
DEN06FA132 Beech 35 Telluride, CO	MIA02FA032 Cessna 152 Poplarville, MS
DEN06FA065 Cessna 310 Heber City, Utah	LAX02FA191 Piper PA-23-160 Rio Rico, AZ

Appendix 10 — Technical Briefings Provided to LOCWG 1.0

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 II — Technical Briefings Provided to LOCWG 2.0

November 6, 2012, Small Airplane Directorate, AOA Update

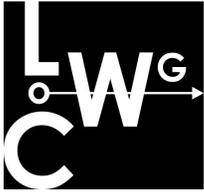
November 6, 2012, FAA, Study on what goes right vs. wrong

November 7, 2012, NTSB, TWA 800 Case Study

March 6, 2013, Diamond Aircraft, Envelope Protection Systems

June 18, 2013, Bombardier, the Training Center Perspective

Appendix 12 — GAJSC Approved Safety Enhancements



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—

General Aviation Manufacturers Association (GAMA) (Lead Organization for Overall Output Coordination (LOOC)), Aircraft Owners and Pilots Association (AOPA), 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.

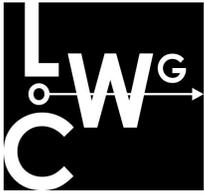
Relationship to Current Aviation Community Initiatives—

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 1.0

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 2 (SE–2)

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 (FAASafetyTeam), 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—

GAJSC SAT (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 pareto chart. 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 un-stabilized 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).

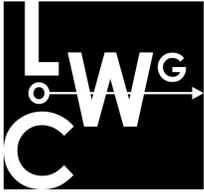
Relationship to Current Aviation Community Initiatives—

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 1.0

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.

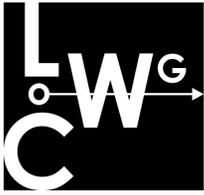
Relationship to Current Aviation Community Initiatives—

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 1.0

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.

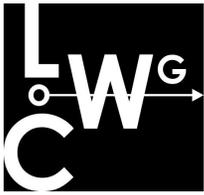
Relationship to Current Aviation Community Initiatives—

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 1.0

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—

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—

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.

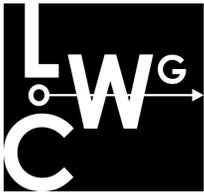
Actions—

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 1.0

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/revised procedures, if applicable.

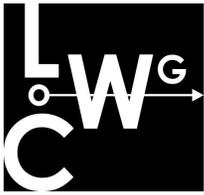
Relationship to Current Aviation Community Initiatives—

There is a developing relationship between the FFAST 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 1.0

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—

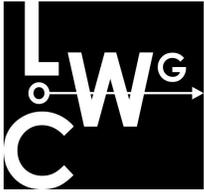
FAAST: CFI Before You Fly.

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 1.0

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.

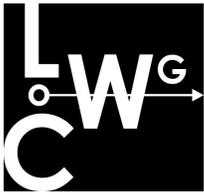
Relationship to Current Aviation Community Initiatives—

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 1.0

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.

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.

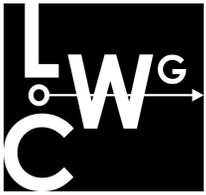
Relationship to Current Aviation Community Initiatives—

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 1.0

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 Office of Airport Safety and Standards (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—

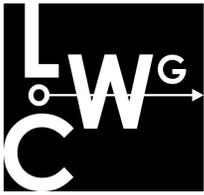
NOAA hosts the NWS Aviation Weather Center ADDS (<http://www.aviationweather.gov/adds/metars/>).

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 write and distribute articles concerning existing weather information technologies and promoting their use.



GAJSC – Loss of Control Working Group 1.0

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.

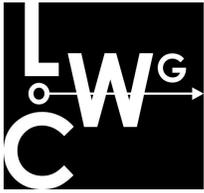
Relationship to Current Aviation Community Initiatives—

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 1.0

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 one’s 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—

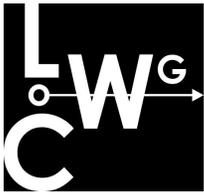
AOPA has online medication tools available for its members.

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 1.0

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(s) 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.

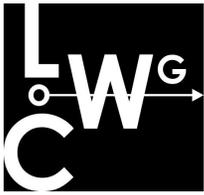
Relationship to Current Aviation Community Initiatives—

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 1.0

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.

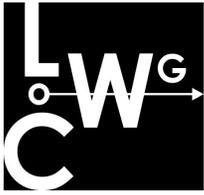
- Indicator: Data compiled.

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 1.0

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 non-punitive 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—

FAA Office of Accident Investigation and Prevention (AVP) (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.

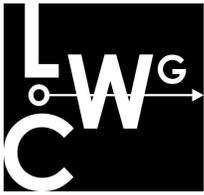
Relationship to Current Aviation Community Initiatives—

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.



GAJSC – Loss of Control Working Group 1.0

Detailed Implementation Plan

E-AB/Flight Test

SAT Version: 1.75

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.

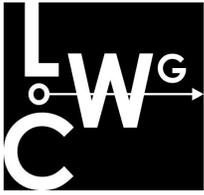
Relationship to Current Aviation Community Initiatives—

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 1.0

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 multi-crew 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.

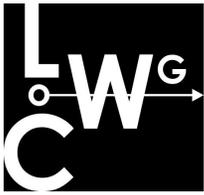
Relationship to Current Aviation Community Initiatives—

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 1.0

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 non-precision 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-certified 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.

⁹ FAA certified avionics would include added costs from the certification process, including technical standard orders, supplemental type certificates, and installation approvals.



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, non-required 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 non-required, 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.

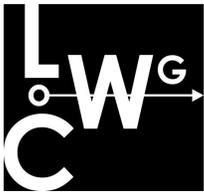
Relationship to Current Aviation Community Initiatives—

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.



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 5 (SE-05) New Output 4

Transition Training

Version 5.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 4: AVP

Estimated Cost: \$10,000

Safety Enhancement Completion Goal: 36 Months after SE Approval

Safety Enhancement Approved: August 21, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to better understand any effects low flight time in make and model has on safety.

Specifically, the intervention below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- #124 RESEARCH – Industry research the effect of low flight time in make and model on safety.

The purpose of this output is to determine whether there are any causal accident factors which may be associated with limited experience in make and model. This output will examine any correlational factors between flight experience in make/model and aircraft accidents. The effects of flight hours including recent flight time, total time, and type of flight experiences will be included. This will entail the examination of available safety datasets.

Output 4:

Output Completion Goal: 36 months after approval

Lead Organization for Overall Output Coordination (LOOC): AVP

Actions—

1. AVP will conduct a study utilizing historical accident data regarding pilot flight time in make and model and whether that flight time correlates to aircraft accidents. The study should also include a literature review and look to see if flight time in make and model is moderated by other factors such as total flight time and recent flight time.

2. Based upon the results of Action item 1, publications like GAMA Publication 5 as well as pertinent Advisory Circulars and outreach efforts, should be modified to become more congruent with the findings of Action Item 1.

Additional Resources—

NASA, GAMA, AOPA, EAA

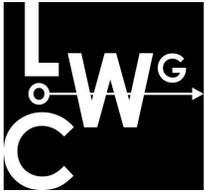
Relationship to Current Aviation Community Initiatives—

Will be determined from the literature review

Implementation Order

OUTPUT 4
36 Months

SE Approval – 8/21/14



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 15 (SE-15) New Output 5

Flight after use of Medications with Sedating Effects

Version 3.0

Summary

Lead Organization for Overall Output Coordination (LOOC):
Output 5: Aircraft Owners and Pilots Association (AOPA)
Estimated Cost: \$150,000
Safety Enhancement Completion Goal: 3 Months after SE approval
Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to provide pilots a better understanding through education on medical conditions and medications that can degrade their piloting ability.

Specifically, the interventions below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- **#155 EDUCATION** - Goal: FAA and Industry ensure that airmen understand and meet the requirements of FAR 61.53, prohibition on operations during medical deficiency. Evaluate existing products and tools from both private and government sources. Develop a variety of means to better enable airman to self-evaluate their medical fitness to fly and their aeromedical issues such as a single-point access or gateway for medical advice on fitness to fly (possibly MedExpress), anonymous email forum, toll-free voice number, online courses or web-based or smart phone applications. Outreach to airmen to make them aware of these new or existing tools.
- **#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 safely operate aircraft.

Industry, in partnership with the Federal Aviation Administration (FAA), academia, and the aerospace medical community should develop an online medical education course, available to all airmen, on how to better assess their physical fitness to fly, prior to each and every flight.

As part of the course, a medication list of approved or acceptable medications along with disqualifying medications could be one component. The online tool should provide accurate aerospace medical guidance about the most common acceptable and unacceptable medications with recommended return to duty times following the use of these medications and provide information about drug interactions. The underlying conditions which the medication treats should be highlighted and education material provided on how to better assess one's medical fitness to fly.

Output 5:

Output Completion Goal: 3 months after SE approval

Lead Organization for Overall Output Coordination (LOOC): AOPA

Actions—

1. Industry medical subject matter experts, working in partnership with the FAA Office of Aerospace Medicine develop medical education course outline – focused on pilot education and awareness.
2. Once finalized, AOPA Air Safety Institute develop an online educational course that can be used by all pilots, regardless of certification level, to better educate them how to assess their medical fitness to safely operate an aircraft on any given day.
3. Education course should cover, at a minimum –
 - a. Prescription and over the counter medications
 - i. Their effects on a pilot's ability to safely operate an aircraft
 - ii. The underlying conditions which the medication treats
 - b. General health guidelines
 - i. Preventive medicine and checkups
 - c. Existing tools to assess one's medical condition
 - i. IMSAFE, PAVE, 5P's, etc.
 - d. Altitude and Oxygen
 - e. Common medical conditions which effect one's ability to safely operate an aircraft
4. Once complete, communicate availability through Outreach SE

Additional Resources—

FAA Office of Aerospace Medicine, EAA Aeromedical Advisory Councilors

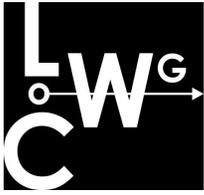
Relationship to Current Aviation Community Initiatives—

GAJSC, LOC WG 1.0 General Aviation Safety Enhancement SE-15 Output 4 - online resource designed to give guidance on wait times prior to returning to flight after the use of specific sedating medications.

Implementation Order

OUTPUT 5
3 Months

SE Approval – 7/1/2014



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 25 (SE-25) New Outputs 2 & 3

New Safety Technologies

Version 2.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 2: FAA Small Airplane Directorate (ACE-100)

Output 3: FAA Small Airplane Directorate (ACE-100)

Estimated Cost: \$150,000 (beyond what was approved in SE-25 OP-1)

Safety Enhancement Completion Goal: 48 months after SE Approval

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability. The working group recommends the following Safety Enhancement to reduce the regulatory barriers that impede the development and installation of new safety enhancing technologies. The goal of the research identified in this SE is to identify affordable solutions for safety enhancing technologies.

Specifically, the interventions below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- #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).
- #184 TECHNOLOGY- Goal: Provide "electronic parachute" type capability. Integrate electronic navigation and automatic flight management system to provide capability. Manual or automatic system that can maneuver the aircraft clear of terrain. GAMA/NBAA poll industry for current and near future capabilities, identify nefarious regulatory obstacles, recommend a course of action to achieve synergistic implementation.

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

Output 2:

Output Completion Goal: 48 months after SE approval

Lead Organization for Overall Output Coordination (LOOC): Organization ACE-100

In order to prevent future loss of control accidents, the FAA should reduce the regulatory barriers to encourage the development and installation of envelope protection.

FAA Actions—Within Completion Goal Scope

1. FAA ACE-100 review existing envelope protection systems capabilities to define intended function, operating parameters, and pilot system interface requirements.
2. Continue R&D studying energy state awareness with Ohio University. The output will be to recommend display characteristics and concepts to best communicate energy state to the pilot.
3. Enter into a 1 year R&D agreement with NASA to identify best design assurance practices for envelope protection systems. The systems NASA has tested are technologically similar to systems envisioned for use by small aircraft.
4. Award additional R&D contract to yet to be identified entities to study using derived and/or sensed Angle of Attack for loss of control prevention strategies.
5. As research findings are documented the results will be used to collaborate with appropriate industry sources and/or ASTM committees to assist in the development of standards and implementable technology solutions.

Subsequent Industry Actions—Long Term (Potentially Beyond Proposed Timeline)

1. Once ASTM standards have been developed, communicate availability to avionics and aircraft manufacturers.
2. If and when new systems have been developed using the new standards, communicate availability of the safety technology to GA community – Incorporate into Outreach SE.

Additional Resources—

EAA work to obtain field service history, if any, from experimental aircraft flying with this technology.

Relationship to Current Aviation Community Initiatives—

Part 23 Re-organization and ASTM small GA airplane standards development

Output 3:

Output Completion Goal: 48 months after SE approval

Lead Organization for Overall Output Coordination (LOOC): Organization ACE-100

In order to prevent future loss of control accidents, the FAA should reduce the regulatory barriers to encourage the development and installation of “electronic parachute” technologies; emergency landing systems.

FAA Actions— Within Completion Goal Scope

1. FAA ACE-100 review existing “electronic parachute” systems capabilities to define intended function, operating parameters, and pilot system interface requirements.
2. Enter into a 1 year R&D agreement with NASA to identify best design assurance practices for advanced flight path control “electronic parachute” systems. The systems NASA has tested are technologically similar to systems envisioned for use by small aircraft.
3. Tie in existing R&D work from CAMI (AAM-500) regarding pilot workload evaluations (and potential improvements) available from advanced displays and flight path control technology.
4. Enter into a 3 year research program, slated to start around June 2014. The goal of the research will be to use derived and/or sensed Angle of Attack for loss of control prevention strategies. The results will be used to aide in the eventual development of “electronic parachute” systems. Output is expected to funnel the results to develop ASTM standards by late 2016 or early 2017.
5. As research findings are documented the results will be used to collaborate with appropriate industry sources and/or ASTM committees to assist in the development of standards and implementable technology solutions.

Subsequent Industry Actions—Long Term (Potentially Beyond Proposed Timeline)

1. Once initial ASTM standards have been developed, communicate availability to avionics and aircraft manufacturers.
2. If and when new systems have been developed, using new standards, communicate availability of the safety technology to GA community – Incorporate into Outreach SE.

Additional Resources—

EAA work to obtain field service history, if any, from experimental aircraft flying with this technology

Relationship to Current Aviation Community Initiatives—

Part 23 Re-organization and ASTM small GA airplane standards development

Implementation Order

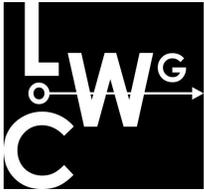
OUTPUT 2

48 Months

OUTPUT 3

48 Months

SE Approval – 7/1/2014



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 28 (SE-28)

Pilot Response to Unexpected Events

Version 5.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: FAA AFS-800

Output 2: FAA AFS-800

Output 3: FAA AFS-800

Estimated Cost: To Be Determined by SAT

Safety Enhancement Completion Goal: 36 Months after SE approval

Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to improve a pilot's response to an unexpected event.

Specifically, the interventions below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- #144 TRAINING - Industry/training providers teach proper techniques for managing unexpected events / teach how to recognize and manage startle response.
- #187 TRAINING - Goal: Improve outcome when airman are faced with sudden, unexpected events. FAA and industry emphasize the importance knowing/practicing immediate action items and pre-briefing likely emergencies before takeoff. Flight training industry needs to develop a set of standards for training and testing of emergency procedures. Review military procedures on this subject. Include as emphasis item on flight review.
- #70 - TRAINING - FAA and industry to revise private pilot training curriculum to demonstrate, at a safe altitude, a 180 degree turn during a power loss after take-off to emphasize the altitude required and other hazards to consider (aircraft control, wind).
- #194 EDUCATION - FAA and Industry to review guidance and material on emergency landing after takeoff and revise as necessary. Revisions and best practices could be incorporated into the PTS/AIM/PHAK. Emphasis should be on briefing what to do if engine failure at any time during takeoff up to an appropriate safe altitude.

- #130 POLICY- FAA Revise PTS to include emphasis on emergency procedures as part of pre-takeoff briefing.

This Safety Enhancement will be used to educate flight instructors and pilots on the need for preparing for unexpected events in the cockpit, focusing on: the importance of briefing for emergencies; positive transfer of controls; recognition and management of “startle response”. This work will also better prepare pilots for engine failure after takeoff. Work will include developing best practices, refining the takeoff pre-brief to emphasize what action will be taken dependent on current situation (altitude, airspeed, terrain, etc.) and recommend training/practicing the developed best practices on a regular basis.

Output 1:

Output Completion Goal: 18 months after date SE approval

Lead Organization for Overall Output Coordination (LOOC): FAA AFS-800 – General Aviation and Commercial Division

Actions—

1. AFS-800 to stand up a Government/Industry working group (may be established formally or informally) to study and document existing training practices for unexpected, abnormal and emergency events, including a review of military procedures and other existing guidance on the subject.
2. This working group will develop a pilot training aid in brochure/handout format suitable for posting on the web. The training aid shall focus on:
3. Best practices regarding powerplant failures during takeoff or initial climb in a single engine airplane, taking into account LOC working group findings and other relevant accident reports.
4. A component of the takeoff briefing which emphasizes an appropriate plan in the event of a powerplant failure during takeoff or initial climb in a single engine airplane.
5. The training aid should emphasize the risks associated with attempting a return to the airport, performance planning and the benefits of practical experience obtained by landing on non-paved runways to prepare for off airport landings.
6. The working group will develop a set of recommendations to train for recognition and management of startled response to unexpected, abnormal and emergency events. This set of recommendations may be included in the work product from number 2.
7. The working group will disseminate the work product from number 2&3 above by:
 - Developing an “outreach guidance document” to include products developed in item 2 and 3. This guidance document will be posted on GAJSC.ORG and FAASafety.gov for dissemination.
 - Revise the Outreach SE to include the topics in this output.

Additional Resources—

GAJSC membership, UPRTA, ICATEE, NASA, PEGASAS

Relationship to Current Aviation Community Initiatives—

AOPA Air Safety Institute online course regarding engine failures on takeoff and other type club guidance material

Output 2:

Output Completion Goal: 12 months after completion of Output 1, if applicable

Lead Organization for Overall Output Coordination (LOOC): FAA AFS-800 – General Aviation and Commercial Division

Actions—

1. Initiate a change to the appropriate PTS (or recommend a change to the appropriate ACS) to incorporate the following:
 - CFIs shall maintain due diligence, by being both mentally and physically prepared for an unexpected event, while in the training environment
 - Include in pre takeoff briefing, actions to be taken in the event of engine failure on takeoff
 - Pilots shall have a positive transfer of controls when turning over piloting responsibility to another pilot.
 - Other pertinent discussion points developed in Output #1
 - Initiate changes to testing and training materials to support changes to the PTS/ACS(s).

Additional Resources—

AFS-800, AFS-600, Aviation Rulemaking Advisory Committee's Airman Testing Standards and Training Working Group (ARAC ATSTWG) and Airman Certification System Working Group (ARAC ACS WG) memberships

Relationship to Current Aviation Community Initiatives—

Aviation Rulemaking Advisory Committee's Airman Testing Standards and Training Working Group (ARAC ATSTWG) and Airman Certification System Working Group (ARAC ACS WG)

Output 3:

Output Completion Goal: 18 months after completion of Output 1

Lead Organization for overall Output Coordination (LOOC): AFS-800

To improve outcomes when airmen are faced with sudden, unexpected events, industry/training providers need to teach proper techniques for managing unexpected events and teach how to recognize and manage startle response. FAA and industry emphasize the importance of knowing/practicing immediate action items and pre-briefing likely emergencies before takeoff.

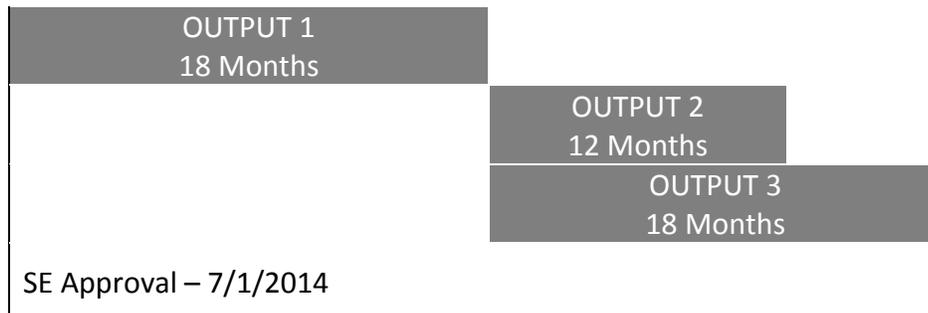
Actions—

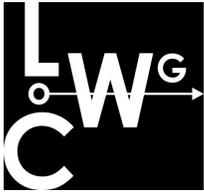
1. Create module for Flight Instructor Open Forum (FIOF) series on Emergency Procedures highlighting techniques for managing unexpected events/startle response.
2. Add FIOF module to FIOF presentation schedule.
3. Draft changes to AC 61-83 in order to emphasize this topic in Flight Instructor Refresher Courses. Action is completed when draft document is submitted for FAA-internal formal coordination.
4. Draft changes to AC 61-98 in order to emphasize this topic in Flight Reviews and Instrument Proficiency Checks. Action is completed when draft document is submitted for FAA-internal formal coordination.

Additional Resources—

GAJSC Membership organizations

Implementation Order





GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 30 (SE-30)

Medications List for Pilots

Version 2.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: FAA Aerospace Medicine

Estimated Cost: To Be Determined by AAM

Safety Enhancement Completion Goal: 24 Months after SE approval

Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to provide pilots a list of medications that can degrade their piloting ability.

Specifically, the intervention below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- #100 EDUCATION - FAA/Industry create and promote a list of medications that advises pilots of drugs that are on the "no-fly" list as well as "approved" drugs that still can degrade pilots skills. List would clearly show pilots how and for how long they can affect their piloting ability. Also includes drug interaction.

To reduce the risk of pilot impairment or incapacitation from medications resulting in loss of control accidents, the Federal Aviation Administration (FAA) should implement programs to reduce the likelihood of the use, while flying, of prescription and over-the-counter medications that adversely affect the pilot's ability to safely operate aircraft.

Tools to improve pilot knowledge about the safe use of many medications are available to airmen from private advocacy groups such as Aircraft Owners and Pilots Association (AOPA), but the use of these tools is available only to members and not the entire GA community. As the regulatory agency, the FAA should strive, to the fullest extent possible, to improve pilot knowledge and prevent the use of any medications that could adversely affect flight safety. To this end, the Federal Aviation Administration (FAA) in conjunction with industry groups, academia, and the medical community should develop a medication list of approved or acceptable medications along with disqualifying medications that is easily available to all pilots and available online. The online tool should provide accurate aerospace medical guidance about the most common acceptable and unacceptable medications with recommended return

to duty times following the use of these medications and provide information about drug interactions. The underlying conditions which the medication treats should be highlighted.

Output 1:

Output Completion Goal: 24 months after date SE approval

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

Actions—

1. Develop a comprehensive and robust list of medications using existing guidance to Aviation Medical Examiners (AMEs).
2. Once developed, publish database online for pilot community to use as an educational tool, to better self-assess their medical fitness to fly. Online portal, such as MedXpress could be utilized.
3. Once published, communicate through Outreach SE.

Additional Resources—

Aircraft Owners and Pilots Association (AOPA)

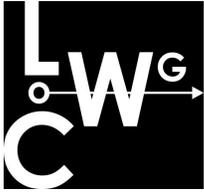
Relationship to Current Aviation Community Initiatives—

GAJSC, LOC WG 1.0 General Aviation Safety Enhancement (SE) -15 Output 4 - the planned online resource designed to give guidance on wait times prior to returning to flight after the use of specific sedating medications.

Implementation Order

OUTPUT 1
24 Months

SE Approval – 7/1/2014



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 31 (SE-31)

Test Pilot Utilization and E-AB Pilot Proficiency

Version 2.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: Experimental Aircraft Association (EAA)

Output 2: Experimental Aircraft Association (EAA)

Estimated Cost: To Be Determined by SAT

Safety Enhancement Completion Goal: Nine Months after SE approval

Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight. Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to improve the safety of amateur built flight testing.

Specifically, the intervention below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- # 179 POLICY - Goal: Improve flight test outcome. Increase industry involvement in advice or oversight of homebuilt/amateur/ultralight aircraft flight testing. FAA and EAA/Industry coordinate on how flight test pilots will be endorsed, authorized, recommended, or recognized. Promote use of AC 90-89 as revised.
- #175 EDUCATION - Goal: Reduce pilot fatalities by providing best practices and technical guidance to homebuilder/experimental aircraft operators/builders. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.

The goal of this Safety Enhancement, once fully implemented, is to improve amateur built flight testing safety through greater understanding of test pilot qualifications and listing of test pilots willing to work with homebuilders.

Output 1:

Output Completion Goal: Six months after SE approval

Lead Organization for Overall Output Coordination (LOOC): EAA

Actions—

1. In order to provide better education and outreach on what type of test pilot to seek out and when a test pilot is needed, EAA will publish a Sport Aviation article on what type of test pilot is appropriate for a given testing scenario. For example, difference between experimental/developmental test pilot and a well-established/common design aircraft test pilot.
2. EAA will revise and increase guidance in Tech Counselor/Flight Advisor program manuals on differences between test pilots.

Additional Resources—

EAA Homebuilt Advisory Council, EAA Board Safety Committee, FAA, NTSB, Aircraft Kit Industry Association, Type Club Coalition

Relationship to Current Aviation Community Initiatives—

N/A

Output 2:

Output Completion Goal: Nine months after SE approval

Lead Organization for Overall Output Coordination (LOOC): EAA

Actions—

1. In order to create standards and a list of qualified test pilots, the EAA will establish and publish suggested standards for a qualified test pilot.
2. Create an online listing of test pilots and invite interested candidates to self-refer for inclusion on list.
3. Follow-up outreach to homebuilders on test pilot utilization following the publication of the list.

Additional Resources—

Test pilot schools, SETP, EAA Homebuilt Advisory Committee, EAA Board Safety Committee

Relationship to Current Aviation Community Initiatives—

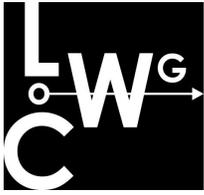
FAA/EAA work on qualified 2nd pilot during Phase I flight testing – Advisory Circular (AC) 90-APP

Implementation Order

OUTPUT 1
6 Months

OUTPUT 2
9 Months

SE Approval – 7/1/2014



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 32 (SE-32)

Airman Certification Standards

Version 3.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: Aviation Rulemaking Advisory Committee (ARAC)

Output 2: FAA: AFS-800

Output 3: FAA: AFS-800

Estimated Cost: SAT to Determine

Safety Enhancement Completion Goal: 36 Months after SE approval

Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to establish standards for pilot testing and training.

Specifically, the intervention below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- **#172 TRAINING** - Goal: Introduce risk-based decision making at the earliest point practical in airman training. Training providers integrate risk-based decision making into web based pilot training, pilot training syllabi, knowledge testing and practical testing standards and programs; scenario based training. FAA review and revise standards as necessary. Encourage scenario-based training and testing in the context of standards. Incorporate into periodic DPE and CFI training.

For many years, the aviation training community has criticized the FAA's airman testing standards and training materials as being outdated and out of touch with current technology and education/training methods. Industry also faulted the agency for piecemeal and unilateral efforts to make revisions.

To address these issues, in September 2011 the FAA chartered the Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) to make recommendations on the *content, process, methodology, and priorities* for updating airman testing standards and training material. The ARC included broad representation from the aviation community, including industry associations, universities, training providers, and professional associations.

The ARC submitted its report and nine recommendations to the FAA on April 13, 2012.

The ARC's key recommendation on content called for the FAA to integrate knowledge, skills, and risk management for each major task in the current Practical Test Standards (PTS) into a single Airman Certification Standards (ACS) document. ARC members stated that this approach would improve and integrate testing and training by clearly mapping aeronautical knowledge and risk management to the flight proficiency skills as defined in the PTS.

To accomplish this task and other ARC recommendations, the FAA accepted the ARC's process and methodology recommendations to establish a stakeholder body of industry subject matter experts (SME). In August 2012, the FAA assigned this task to the Aviation Rulemaking Advisory Committee (ARAC), a formal standing committee comprised of representatives from aviation associations and industry. ARAC provides industry input in the form of information, advice and recommendations to be considered in the full range of FAA rulemaking activities, including regulatory support.

The FAA announced the ARAC's acceptance of this task through a Federal Register Notice published on September 12, 2012. This Notice described the task elements and solicited participants for the ARAC Airman Testing Standards and Training Working Group (ARAC ATST WG), which formed and began its work in November 2012. Members of the ARAC ATST WG are listed on the final page of this document.

As stated in the Notice, the FAA specifically tasked the ARAC ATST WG to provide:

- An integrated Airman Certification Standards (ACS) document that aligns the aeronautical knowledge testing standards required by 14 CFR Part 61 with the flight proficiency standards ("Areas of Operation") set out in 14 CFR Part 61 and the existing Practical Test Standards (PTS). Consistent with the ARC's recommended prioritization, the FAA asked the ARAC ATST WG to develop complete ACS documents for the private pilot and flight instructor certificates and the instrument rating.
- A detailed proposal to align and, as appropriate, streamline and consolidate existing FAA guidance material (e.g., FAA H-series handbooks) with the integrated Airman Certification Standards documents developed in accordance with the first task. The FAA also asked the ARAC ATST WG to recommend a process for ongoing stakeholder review and revision of these materials.
- Proposed knowledge test item bank questions that are consistent with both the newly- developed Airman Certification Standards documents and the test question development principles set forth in the ARC's recommendations. In addition, the FAA asked the ARAC ATST WG to recommend methods that provide for expert outside review ("boarding") of proposed questions while safeguarding the integrity of the testing process.

The ARAC ATST WG submitted its final report with draft documents and recommendations to the ARAC and the FAA on September 20, 2013.

Once this Safety Enhancement is fully implemented, the goal of introducing risk management into airman testing and training will be realized.

Output 1:

Output Completion Goal: Six months after SE approval

Lead Organization for Overall Output Coordination (LOOC): Aviation Rulemaking Advisory Committee (ARAC)

Actions—

1. The Aviation Rulemaking Advisory Committee (ARAC) accepts the recommendations of the Airman Testing Standards and Training Working Group (ATST WG) which incorporates risk management into both airman testing and training.

Additional Resources—

Government and Industry members of the ATST ARC, and ARAC ATST WG

Relationship to Current Aviation Community Initiatives—

Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) and Aviation Rulemaking Advisory Committee Airman Testing Standards and Training Working Group (ARAC ATSTWG), Aviation Rulemaking Advisory Committee Airman Certification System Working Group (ACS WG)

Output 2:

Output Completion Goal: 18 months after Output 1 completion.

Lead Organization for Overall Output Coordination (LOOC): FAA: AFS-800

Actions—

1. The FAA Flight Standards Service, along with industry partners on an Airman Certification System Working Group, finalize Airman Certification Standards (ACS) for the Private Pilot Certificate, Instrument Rating, and Authorized Instructor Certificate.
2. Publish Airman Certification Standards (ACS) for the Private Pilot Certificate in the Federal Register with future effective date.

Additional Resources—

AFS-600

Relationship to Current Aviation Community Initiatives—

Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) and Aviation Rulemaking Advisory Committee Airman Testing Standards and Training Working Group

(ARAC ATSTWG), Aviation Rulemaking Advisory Committee Airman Certification System Working Group (ACS WG)

Output 3:

Output Completion Goal: 12 months after Output 2 completion.

Lead Organization for Overall Output Coordination (LOOC): FAA: AFS-800

The FAA Flight Standards Service begins transition from Practical Test Standards (PTS) to integrated Airman Certification Standard (ACS) for airman testing and training on completed and approved ACS document(s).

Actions—

1. Federal Register Notice, informing community of switch.

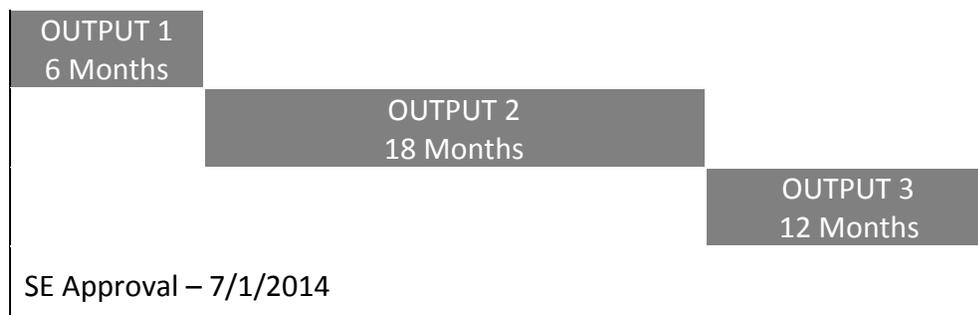
Additional Resources—

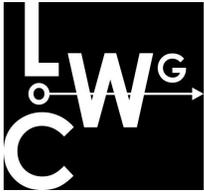
AFS-600

Relationship to Current Aviation Community Initiatives—

Airman Testing Standards and Training Aviation Rulemaking Committee (ARC) and Aviation Rulemaking Advisory Committee Airman Testing Standards and Training Working Group (ARAC ATSTWG), Aviation Rulemaking Advisory Committee Airman Certification System Working Group (ACS WG)

Implementation Order





GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 33 (SE-33)

Safety Culture

Version 2.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: GAJSC Safety Analysis Team (SAT)

Output 2: GAJSC Safety Analysis Team (SAT)

Estimated Cost: \$50,000 for industry meetings

Safety Enhancement Completion Goal: 24 Months after SE approval

Safety Enhancement Approved: July 1, 2014

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement to improve the safety culture of general aviation.

Specifically, the intervention below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement.

- #117 EDUCATION - Industry Promote local flying clubs and pilot associations to help foster an environment of education and mentoring for pilots.

In addition to the above intervention, both the first and second working groups analyzed several accidents in which the pilot exercised poor aeronautical decision making, weak safety culture, and/or poor judgment in managing risks. Additionally, several accidents involved a pilot exhibiting intentional non-compliance to the rules and regulations established to ensure a safe aviation system.

It is the goal of this safety enhancement, once fully implemented, will establish an improve safety culture for general aviation.

Output 1:

Output Completion Goal: 24 months after SE approval
Lead Organization for Overall Output
Lead Organization for Overall Output Coordination (LOOC): GAJSC SAT

Actions—

1. To achieve the goal of improving mentoring in the aviation community, the FAA expands and updates the “Best Practices for Mentoring in Aviation Education” and include all levels of flight activity
2. Establish framework of existing aviation networks, efforts, etc. that can be used to establish a mentor program.
3. Use established framework to facilitate mentoring and sharing of best practices through an established mentor program that increases safety by promoting best practices, shared aeronautical knowledge and better their airmanship as detailed in “Best Practices for Mentoring in Aviation Education.”

Additional Resources—

Government and Industry members of the GAJSC, including but not limited to AOPA, EAA, FAASTeam, IMC Club, Ninety Nines, NIFA, FBOs, NATA, ALPA, SAFE, Type Clubs.

Relationship to Current Aviation Community Initiatives—

AOPA Flying Club initiative

Output 2:

Output Completion Goal: Beginning no later than one year after SE approval

Lead Organization for Overall Output Coordination (LOOC): GAJSC SAT

Actions—

1. Establish a group under the GAJSC SAT that would be responsible for communicating the safety culture message. Leverage the Outreach and Communications group.
2. Establish guidelines for the frequency, format, content, etc. of the communications.
3. Draft periodic communications that meet the established guidelines.
4. Disseminate the targeted communications to the pre-identified groups to distribute.

Additional Resources—

GAJSC, SAT, and Working Groups membership, members of the trade press (See Outreach SE)

Relationship to Current Aviation Community Initiatives—

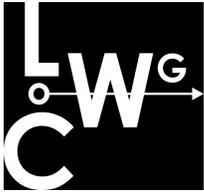
Aeronautical Decision Making (ADM) Safety Enhancement

Implementation Order

OUTPUT 1
24 Months

OUTPUT 2
12 Months

SE Approval – 7/1/2014



GAJSC – Loss of Control Working Group 2.0

Safety Enhancement 34 (SE-34)

Outreach

Version 5.0

Summary

Lead Organization for Overall Output Coordination (LOOC):

Output 1: GA JSC SAT

Output 2: GA JSC SAT

Output 3: AVP

Estimated Cost: \$100,000

Estimated Man Hours: 6 Hours for each literature review of topic, 250 hours for outreach material development and research

Safety Enhancement Completion Goal: March, 2018

Statement of Work

The General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working group analyzed a random sample of 90 fatal general aviation accidents which occurred between 2001 and 2011. The accidents took place during the en-route or departure phase of flight.

Through the data driven process of building an event sequence, identifying problems which occurred, creating interventions which, once fully implemented, could prevent those problems from occurring in the future, and scoring all parameters for power, confidence, and applicability, the working group recommends the following Safety Enhancement for new, improved, and effective communication to the pilot community.

Specifically, the interventions below had an overall effectiveness and average feasibility score that justified the working group's development of this Safety Enhancement. Each of this safety enhancement's five topics has three outputs associated with them. The topics are based upon the following interventions, which will result in a separate educational outreach campaign.

- #138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.
- #188 TRAINING - Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.
- #141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.
- #186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasize the need for training and currency when flying in mountainous areas.

- #157 EDUCATION - Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. . Emphasize with CFIs the importance of teaching proper PIC decision making skills. Provide suggestions on how airman can develop their own personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change.

Topic #1 – Aircraft Performance and Limitations

Applicable Intervention —

- #138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.

Topic #1 - Output 1:

Output Completion Goal: 3/1/2015

Lead Organization for Overall Output Coordination (LOOC): FAA AVP

Actions —

1. Review current materials (literature review) on topic – Individual topics will be researched by an entity selected by FAA (such as an educational institution or Center of Excellence)
2. The entity identified above will generate a resource list of currently available materials on each topic and deliver to the GA JSC Safety Analysis Team (SAT)
3. The SAT will develop an “Outreach Guidance” document that includes:
 - a. Why the topic is important and how it relates to loss of control (LOC)
 - b. Specific teaching points that should be included in any outreach on this topic
 - c. A tracking tool where outreach organizations can log completed outreach
 - d. Recommendations on how frequently outreach on this topic should be accomplished
4. The SAT will recommend changes to the following FAA guidance documents:
 - e. Applicable Practical Test Standard (PTS)/Airman Certification Standard (ACS)
 - f. Flight Review
 - g. FAA Order 8900.1
 - h. Flying Handbooks
5. The SAT will recommend new materials to be developed (if any)

6. The SAT will document the procedures and process to do this work
7. The entity will develop a metric to measure the effectiveness of outreach on each topic
8. Material and recommendations will be distributed to the SAT for review, 60 days prior to release for use in Output 2

Additional Resources —

SAT, FAASTeam, PEGASAS, Other university research

Relationship to Current Aviation Community Initiatives —

Outreach for LOC Working Group 1

Topic #1 - Output 2:

Output Completion Goal: 9/1/2015

Lead Organization for Overall Output Coordination (LOOC): GAJSC Safety Analysis Team (SAT)

Actions—

1. Develop an Outreach Program based on Outreach Guidance Document from Output 1.
 - a. Initial outreach – possible channels:
 - i. Magazines
 - ii. Websites
 - iii. Emails
 - iv. Newsletters
 - b. Develop calendar for ongoing outreach – possible outreach options:
 - i. Flight Review Special Emphasis List
 - ii. Include in WINGS required course
 - iii. Include in SSD for the year
 - iv. Develop Safety Stream

Additional Resources—

FAASTeam, AOPA, EAA, NBAA, HAI

Relationship to Current Aviation Community Initiatives—

None

Topic #1 - Output 3:

Output Completion Goal: 3/1/2016

Lead Organization for Overall Output Coordination (LOOC): AVP Identified Organization (such as a university or Center of Excellence)

Actions—

1. Report on metrics for how effective the outreach on each topic has been
 - a) Determine if changes in the system may have caused a need to change the outreach
 - b) Review and recommend changes to intervals when training needs to be reemphasized on each topic

Additional Resources—

PEGASAS, other university research

Relationship to Current Aviation Community Initiatives—

None

Topic #2 – Aviate/Navigate/Communicate

Applicable Intervention —

- #188 TRAINING - Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.

Topic #2 - Output 1:

Output Completion Goal: 9/1/2015

Lead Organization for Overall Output Coordination (LOOC): FAA AVP

Actions—

1. Review current materials (literature review) on topic – Individual topics will be researched by an entity selected by FAA (such as an educational institution or Center of Excellence)
2. The entity identified above will generate a resource list of currently available materials on each topic and deliver to the GA JSC Safety Analysis Team (SAT)
3. The SAT will develop an “Outreach Guidance” document that includes:
 - a. Why the topic is important and how it relates to loss of control (LOC)

- b. Specific teaching points that should be included in any outreach on this topic
 - c. A tracking tool where outreach organizations can log completed outreach
 - d. Recommendations on how frequently outreach on this topic should be accomplished
4. The SAT will recommend changes to the following FAA guidance documents:
 - e. Applicable Practical Test Standard (PTS)/Airman Certification Standard (ACS)
 - f. Flight Review
 - g. FAA Order 8900.1
 - h. Flying Handbooks
 5. The SAT will recommend new materials to be developed (if any)
 6. The SAT will document the procedures and process to do this work
 7. The entity will develop a metric to measure the effectiveness of outreach on each topic
 8. Material and recommendations will be distributed to the SAT for review, 60 days prior to release for use in Output 2

Additional Resources—

SAT, FAASTeam, PEGASAS, Other university research

Relationship to Current Aviation Community Initiatives—

Outreach for LOC Working Group 1

Topic #2 - Output 2:

Output Completion Goal: 3/1/2016

Lead Organization for Overall Output Coordination (LOOC): GAJSC Safety Analysis Team (SAT)

Actions—

1. Develop an Outreach Program based on Outreach Guidance Document from Output 1.
 - a. Initial outreach – possible channels:
 - i. Magazines
 - ii. Websites
 - iii. Emails
 - iv. Newsletters
 - b. Develop calendar for ongoing outreach – possible outreach options:
 - i. Flight Review Special Emphasis List

- ii. Include in WINGS required course
- iii. Include in SSD for the year
- iv. Develop Safety Stream

Additional Resources—

FAASTeam, AOPA, EAA, NBAA, HAI

Relationship to Current Aviation Community Initiatives—

None

Topic #2 - Output 3:

Output Completion Goal: 9/1/2016

Lead Organization for Overall Output Coordination (LOOC): AVP Identified Organization (such as a university or Center of Excellence)

Actions—

1. Report on metrics for how effective the outreach on each topic has been
 - a) Determine if changes in the system may have caused a need to change the outreach
 - b) Review and recommend changes to intervals when training needs to be reemphasized on each topic

Additional Resources—

PEGASAS, other university research

Relationship to Current Aviation Community Initiatives—

None

Topic #3 – Spatial Disorientation

Applicable Intervention —

- #141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.

Topic #3 - Output 1:

Output Completion Goal: 3/1/2016

Lead Organization for Overall Output Coordination (LOOC): FAA AVP

Actions—

1. Review current materials (literature review) on topic – Individual topics will be researched by an entity selected by FAA (such as an educational institution or Center of Excellence)
2. The entity identified above will generate a resource list of currently available materials on each topic and deliver to the GA JSC Safety Analysis Team (SAT)
3. The SAT will develop an “Outreach Guidance” document that includes:
 - a. Why the topic is important and how it relates to loss of control (LOC)
 - b. Specific teaching points that should be included in any outreach on this topic
 - c. A tracking tool where outreach organizations can log completed outreach
 - d. Recommendations on how frequently outreach on this topic should be accomplished
4. The SAT will recommend changes to the following FAA guidance documents:
 - e. Applicable Practical Test Standard (PTS)/Airman Certification Standard (ACS)
 - f. Flight Review
 - g. FAA Order 8900.1
 - h. Flying Handbooks
5. The SAT will recommend new materials to be developed (if any)
6. The SAT will document the procedures and process to do this work
7. The entity will develop a metric to measure the effectiveness of outreach on each topic
8. Material and recommendations will be distributed to the SAT for review, 60 days prior to release for use in Output 2

Additional Resources—

SAT, FAASTeam, PEGASAS, Other university research

Relationship to Current Aviation Community Initiatives—

Outreach for LOC Working Group 1

Topic #3 - Output 2:

Output Completion Goal: 9/1/2016

Lead Organization for Overall Output Coordination (LOOC): GAJSC Safety Analysis Team (SAT)

Actions—

1. Develop an Outreach Program based on Outreach Guidance Document from Output 1.
 - a. Initial outreach – possible channels:
 - i. Magazines
 - ii. Websites
 - iii. Emails
 - iv. Newsletters
 - b. Develop calendar for ongoing outreach – possible outreach options:
 - i. Flight Review Special Emphasis List
 - ii. Include in WINGS required course
 - iii. Include in SSD for the year
 - iv. Develop Safety Stream

Additional Resources—

FAASTeam, AOPA, EAA, NBAA, HAI

Relationship to Current Aviation Community Initiatives—

None

Topic #3 - Output 3:

Output Completion Goal: 3/1/2017

Lead Organization for Overall Output Coordination (LOOC): AVP Identified Organization (such as a university or Center of Excellence)

Actions—

1. Report on metrics for how effective the outreach on each topic has been
 - a) Determine if changes in the system may have caused a need to change the outreach
 - b) Review and recommend changes to intervals when training needs to be reemphasized on each topic

Additional Resources—

PEGASAS, other university research

Relationship to Current Aviation Community Initiatives—

None

Topic #4 – Mountain Flying

Applicable Intervention —

- #186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasize the need for training and currency when flying in mountainous areas.

Topic #4 - Output 1:

Output Completion Goal: 9/1/2016

Lead Organization for Overall Output Coordination (LOOC): FAA AVP

Actions—

1. Review current materials (literature review) on topic – Individual topics will be researched by an entity selected by FAA (such as an educational institution or Center of Excellence)
2. The entity identified above will generate a resource list of currently available materials on each topic and deliver to the GA JSC Safety Analysis Team (SAT)
3. The SAT will develop an “Outreach Guidance” document that includes:
 - a. why the topic is important and how it relates to loss of control (LOC)
 - b. Specific teaching points that should be included in any outreach on this topic
 - c. A tracking tool where outreach organizations can log completed outreach
 - d. Recommendations on how frequently outreach on this topic should be accomplished
4. The SAT will recommend changes to the following FAA guidance documents:
 - e. Applicable Practical Test Standard (PTS)/Airman Certification Standard (ACS)
 - f. Flight Review
 - g. FAA Order 8900.1
 - h. Flying Handbooks
5. The SAT will recommend new materials to be developed (if any)
6. The SAT will document the procedures and process to do this work
7. The entity will develop a metric to measure the effectiveness of outreach on each topic
8. Material and recommendations will be distributed to the SAT for review, 60 days prior to release for use in Output 2

Additional Resources—

SAT, FAASTeam, PEGASAS, Other university research

Relationship to Current Aviation Community Initiatives—

Outreach for LOC Working Group 1.

Topic #4 - Output 2:

Output Completion Goal: 3/1/2017

Lead Organization for Overall Output Coordination (LOOC): GAJSC Safety Analysis Team (SAT)

Actions—

1. Develop an Outreach Program based on Outreach Guidance Document from Output 1.
 - a. Initial outreach – possible channels:
 - i. Magazines
 - ii. Websites
 - iii. Emails
 - iv. Newsletters
 - b. Develop calendar for ongoing outreach – possible outreach options:
 - i. Flight Review Special Emphasis List
 - ii. Include in WINGS required course
 - iii. Include in SSD for the year
 - iv. Develop Safety Stream

Additional Resources—

FAASTeam, AOPA, EAA, NBAA, HAI

Relationship to Current Aviation Community Initiatives—

None

Topic #4 - Output 3:

Output Completion Goal: 9/1/2017

Lead Organization for Overall Output Coordination (LOOC): AVP Identified Organization (such as a university or Center of Excellence)

Actions—

1. Report on metrics for how effective the outreach on each topic has been
 - a) Determine if changes in the system may have caused a need to change the outreach
 - b) Review and recommend changes to intervals when training needs to be reemphasized on each topic

Additional Resources—

PEGASAS, other university research

Relationship to Current Aviation Community Initiatives—

None

Topic #5 – Personal Minimums

Applicable Intervention —

- #157 EDUCATION - Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. Emphasize with CFIs the importance of teaching proper PIC decision making skills. Provide suggestions on how airman can develop their own personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change.

Topic #5 - Output 1:

Output Completion Goal: 3/1/2017

Lead Organization for Overall Output Coordination (LOOC): FAA AVP

Actions—

1. Review current materials (literature review) on topic – Individual topics will be researched by an entity selected by FAA (such as an educational institution or Center of Excellence)
2. The entity identified above will generate a resource list of currently available materials on each topic and deliver to the GA JSC Safety Analysis Team (SAT)
3. The SAT will develop an “Outreach Guidance” document that includes:
 - a. Why the topic is important and how it relates to loss of control (LOC)
 - b. Specific teaching points that should be included in any outreach on this topic
 - c. A tracking tool where outreach organizations can log completed outreach

- d. Recommendations on how frequently outreach on this topic should be accomplished
4. The SAT will recommend changes to the following FAA guidance documents:
 - e. Applicable Practical Test Standard (PTS)/Airman Certification Standard (ACS)
 - f. Flight Review
 - g. FAA Order 8900.1
 - h. Flying Handbooks
5. The SAT will recommend new materials to be developed (if any)
6. The SAT will document the procedures and process to do this work
7. The entity will develop a metric to measure the effectiveness of outreach on each topic
8. Material and recommendations will be distributed to the SAT for review, 60 days prior to release for use in Output 2

Additional Resources—

SAT, FAASTeam, PEGASAS, Other university research

Relationship to Current Aviation Community Initiatives—

Outreach for LOC Working Group 1

Topic #5 - Output 2:

Output Completion Goal: 9/1/2017

Lead Organization for Overall Output Coordination (LOOC): GAJSC Safety Analysis Team (SAT)

Actions—

1. Develop an Outreach Program based on Outreach Guidance Document from Output 1.
 - a. Initial outreach – possible channels:
 - i. Magazines
 - ii. Websites
 - iii. Emails
 - iv. Newsletters
 - b. Develop calendar for ongoing outreach – possible outreach options:
 - i. Flight Review Special Emphasis List
 - ii. Include in WINGS required course
 - iii. Include in SSD for the year

iv. Develop Safety Stream

Additional Resources—

FAASTeam, AOPA, EAA, NBAA, HAI

Relationship to Current Aviation Community Initiatives—

None

Topic #5 - Output 3:

Output Completion Goal: 3/1/2018

Lead Organization for Overall Output Coordination (LOOC): AVP Identified Organization (such as a university or Center of Excellence)

Actions—

1. Report on metrics for how effective the outreach on each topic has been
 - a) Determine if changes in the system may have caused a need to change the outreach
 - b) Review and recommend changes to intervals when training needs to be reemphasized on each topic

Additional Resources—

PEGASAS, other university research

Relationship to Current Aviation Community Initiatives—

None

Implementation Order

3/1/15	9/1/15	3/1/16	9/1/16	3/1/17	9/1/17	3/1/18
Topic 1 Output 1	Topic 1 Output 2	Topic 1 Output 3				
	Topic 2 Output 1	Topic 2 Output 2	Topic 2 Output 3			
		Topic 3 Output 1	Topic 3 Output 2	Topic 3 Output 3		
			Topic 4 Output 1	Topic 4 Output 2	Topic 4 Output 3	
				Topic 5 Output 1	Topic 5 Output 2	Topic 5 Output 3

SE Approval – 8/21/2014

- Topic 1 – Aircraft Performance and Limitations
- Topic 2 – Aviate/Navigate/Communicate
- Topic 3 – Spatial Disorientation
- Topic 4 – Mountain Flying
- Topic 5 – Personal Minimums

Appendix I3 — Standard Problem Statements

 Standard Problem Statements	
1	PILOT - Low pilot time in make and model (A5)
2	PILOT - Recency of experience/proficiency (A4)
3	PILOT - Distraction/Divided attention (A3)
4	PILOT - Aerodynamic stall - failure to recognize and execute corrective action (A5)
5	PILOT - Aerodynamic Stall/Spin (A4)
6	AIR TRAFFIC SYSTEM - Failure of air traffic control to provide instructions/information/clearances using standard and unambiguous phraseology in accordance with appropriate regulatory directives (A3)
7	PILOT - Aeronautical Decision Making- Poor Judgement (A4)
8	AIR TRAFFIC SYSTEM – Air traffic system procedures that may compromise safety or increase flight crew workload (e.g. noise abatement procedures, slam dunk approaches, inappropriate taxi routes during low visibility operations, etc.) (A2)
9	PILOT - Lack of knowledge of aircraft systems and limitations (A3)
10	PILOT - Lateral imbalance (A1)
11	PILOT - Failure to acknowledge traffic and maintain separation (A3)
12	PILOT - Different types of operations in close proximity (A2)
13	PILOT - Failure of third party to voice concerns (A3)
14	PILOT - Evasive maneuver when low and/or slow (A1)
15	PILOT - Wake turbulence (A2)
16	PILOT - Flight testing at low altitude (A3)
17	AIRCRAFT - Loss of engine power (A2)
18	PILOT - Failure to maintain airspeed (A3)
19	PILOT - Operated aircraft while under influence of illegal drugs (A3)
20	PILOT - Improper traffic pattern procedures (A4)
21	PILOT - Not feeling well (A1)
22	PILOT - Improper preflight planning (A3)
23	PILOT - Recency of night experience (A5)
24	PILOT - Lack of aeronautical knowledge (A2)
25	PILOT - Aircraft improperly configured for specific operation (A2)
26	PILOT - Inadequate/missing transition training (A4)
27	WEATHER SERVICE - Inaccurate forecast (A3)
28	ENVIRONMENTAL - Weather deterioration (A4)
29	PILOT - Overload (A4)
30	PILOT - Lack of assertiveness/command with ATC (A2)
31	PILOT - Use of over-the-counter drugs and/or their effects on pilot performance (A3)
32	PILOT - Lack of piloting ability (A4)
33	PILOT - Loss of situational awareness (A4)
34	PILOT - Failure to verify information (A2)
35	PILOT - Inadequate/improper training (A4)
36	PILOT - Failure to follow procedure (A3)
37	AIRCRAFT - Powerplant control malfunction (A2)

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38	PILOT - Fatigue (A2)
39	PILOT - Poor safety culture (A3)
40	PILOT - Failure of instructor to intervene (A5)
41	AIRCRAFT - System component failure - non powerplant (A3)
42	PILOT - Failure to test/inspect aircraft after maintenance (A3)
43	AIRCRAFT - Improperly maintained / repaired (A2)
44	PILOT - Lack of CRM (A1)
45	WEATHER - Significant weather (SIGMET) (A3)
46	INFRASTRUCTURE/NAVAID - Out of service and/or malfunctioning (A3)
47	PILOT - Operated aircraft while under influence of unauthorized prescription drugs (A3)
48	PILOT - Low pilot time in complex / high performance (A5)
49	PILOT - Improper Go Around (A5)
50	PILOT - Failure fly a stabilized approach (A5)
51	PILOT - runway incursion (A5)
52	PILOT - Intentional non-compliance (A4)
53	PILOT - Unstabilized approach (A4)
54	AIRCRAFT - Unsafe flying characteristics (A3)
55	PILOT - Attention Allocation (A3)
56	AIRCRAFT - No Stall Warning System installed (A3)
57	ORGANIZATION - No or poor safety culture (A3)
58	FAA - ASI lack of knowledge of type of aircraft and certification requirements (A2)
59	BUILDER- Lack of knowledge of aircraft systems and limitations (A2)
60	Pilot - Spatial disorientation (A4)
61	PILOT - failed to monitor fuel level (A4)
62	AIR TRAFFIC SERVICE - High workload in congested airspace (A4)
63	PILOT - operating aircraft while under the influence of alcohol (A1.5)
64	Pilot - medical incapacitation (A1)
65	PILOT - Pressure to reach destination (A2)
66	AIRCRAFT - No shoulder harness installed (A1.5)
67	AIRCRAFT - Unstable aircraft (A1)
68	PILOT - Improper stall recovery (A3.5)
69	PILOT- Inadvertent VFR into IMC (A2.5)
70	PILOT- Not completing a familiarization flight prior to operating new aircraft (A1)
71	PILOT - Departure from controlled flight, not stall/spin (A1.5)
72	PILOT - Degraded medical/psychological condition (A3.5)
73	PILOT- G Induced Loss of Consciousness (G-LOC) (A1)
74	PILOT - Use of beta blockers during aerobatic flight/high G maneuvers (A0.75)

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75	PILOT - Reckless behavior (A2.5)
76	ENVIRONMENTAL - conditions exceeded pilot skills (A2.5)
77	TRAINING - incorrect spin recovery technique (A1)
78	PILOT - Maintaining flight currency but not proficiency (A4)
79	TRAINING - Lack of refresher training and/or limitations of known mission specific hazards (A2)
80	PILOT - CFI or DPE failed to insure that required training was completed prior to check ride (A1)
81	RESERVED -
82	PILOT- Aerodynamic Stall, unable to correct (A1.5)
83	PILOT - Inability to manage sudden control force changes associated with a configuration change (A1.5)
84	AIRCRAFT- Powerplant malfunction (A1)
85	PILOT - Continued flight after aircraft sustained substantial damage (A1)
86	AIRCRAFT - Required maintenance inspections not performed (A2.5)
87	PILOT - Pilot lack of experience for flight conditions (A2)
88	RESERVED -
89	RESERVED -
90	RESERVED -
91	RESERVED -
92	RESERVED -
93	PILOT - Failure to determine airworthiness of aircraft (A2.75)
94	PILOT - Aircraft operated outside CG envelope (A1.5)
95	RESERVED -
96	RESERVED -
97	PILOT - Improper response to unexpected event - "Surprise/Startle" (A-2)
98	PILOT - Inadequate preflight inspection (A3)
99	RESERVED -
100	MAINTENANCE - Improper maintenance (A1.5)
101	RESERVED -
102	RESERVED -
103	WEATHER- Locality of weather information (A1.5)
104	PILOT - Lack of experience outside of a structured training environment (A2)
105	PILOT - Failure to follow regulations (A5)
106	RESERVED -
107	CFI - low time/experience in aircraft (A2.5)
108	Aircraft - Not Certificated (A1)
109	RESERVED -
110	ATC -- Ambiguous guidance/language (A2)
111	PILOT - Failure to conduct proper medical self assessment (A3)
112	PILOT - Flight instructor's inadequate supervision (A1)
113	AIRCRAFT - System component failure - non powerplant (A3)

Appendix 14 — LOCWG 1.0 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 in order. #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 an 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 / FAAST 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 operation.
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 15 — LOCWG 2.0 Prioritized Interventions

 Prioritized Interventions				
Overall Effectiveness	Average Feasibility	OE x F	Intervention No.	INTERVENTIONS
3.0	2.8	8.4	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
3.5	2.3	8.1	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.
2.8	2.8	7.8	123	#123 RESEARCH - FAA research and compile existing research on factors of aging in pilots. How do age, disease, cognitive and psychomotor skills affect flying/decision making ability relate to accidents.
2.8	2.8	7.8	124	#124 RESEARCH - Industry research the effect of low flight time in make and model on safety.
2.7	2.7	7.3	111	#111 POLICY - FAA to provide greater oversight of DPEs to insure that all pilots meet the applicable requirements of aeronautical experience and proficiency for each certificate and/or rating. Brief these topics to DPEs at annual meeting and CFIs at FIRC's.
2.8	2.3	6.4	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).
3.4	1.7	5.8	184	#184 TECHNOLOGY- iCAS. Goal: Provide "electronic parachute" type capability. Integrate electronic navigation and automatic flight management system to provide capability. Manual or automatic iCAS system that can maneuver the aircraft clear of terrain. GAMA/NBAA poll industry for current and near future capabilities, identify nefarious regulatory obstacles, recommend a course of action to achieve synergistic implementation.
1.9	3.0	5.7	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
1.9	3.0	5.7	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.
1.9	3.0	5.7	138	#138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.
2.8	2.0	5.6	75	#75 TECHNOLOGY- FAA/industry to provide cost effective measures to install AOA/envelope protection technologies for the GA community
2.2	2.5	5.5	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).

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2.5	2.2	5.5	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	5.4	96	#96 TRAINING -- Introduction to risk based decision-making for GA pilots (FAA Risk Management Handbook); integrate into pilot training programs; scenario based training
1.8	3.0	5.4	117	#117 EDUCATION - Industry Promote local flying clubs and pilot associations to help foster an environment of education and mentoring for pilots.
1.9	2.7	5.1	100	#100 EDUCATION - FAA/Industry create and promote an App that advises pilots of drugs that are on the "no-fly" list as well as "approved" drugs that still can degrade pilots skills. App would clearly show pilots how and for how long they can affect their piloting ability. Also includes drug interaction.
1.7	3.0	5.1	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	3.0	5.1	188	#188 TRAINING - Goal: Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.
2.2	2.2	4.8	179	#179 POLICY - Goal: Improve flight test outcome. Increase industry involvement in advice or oversight of homebuilt/amateur/ultralight aircraft flight testing. FAA and EAA/Industry coordinate on how flight test pilots will be endorsed, authorized, recommended, or recognized. Promote use of AC 90-89 as revised.
2.0	2.3	4.6	147	#147 POLICY - Industry adopt the recommendations from NTSB SIR-08/01 Special investigation on the safety of parachute jump operations.
1.7	2.7	4.6	141	#141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.
1.5	3.0	4.5	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.
1.5	3.0	4.5	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.
1.5	3.0	4.5	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.
1.5	3.0	4.5	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.).
1.8	2.5	4.5	154	#154 POLICY - FAA/Industry review and edit as necessary PHAK to include upset prevention and recovery techniques
1.5	3.0	4.5	186	#186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasise the need for training and currency when flying in mountainous areas.
1.5	3.0	4.5	194	#194 EDUCATION - FAA and Industry to review guidance and material on emergency landing after takeoff and revise as necessary. Revisions and best practices could be incorporated into the PTS/AIM/PHAK. Emphasis should be on briefing what to do if engine failure at any time during takeoff up to an appropriate safe altitude.

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1.6	2.8	4.5	175	#175 EDUCATION - Goal: Reduce pilot fatalities by providing best practices and technical guidance to homebuilder/experimental aircraft operators/builders. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.
1.9	2.3	4.4	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).
1.9	2.3	4.4	144	#144 TRAINING - Industry/training providers teach proper techniques for managing unexpected events / teach how to recognize and manage startle response (if becomes a DIP, check proper term)
1.5	2.8	4.2	121	#121 EDUCATION- Industry establish an educational campaign on use of Personal Minimums.
1.9	2.2	4.2	157	#157 EDUCATION - Goal: Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. Review existing materials and, if applicable, add a section to the PHAK and Flight Instructor handbooks on developing PIC decision making skills. Emphasize with CFIs the importance of teaching proper PIC decision making skills. If changes are needed to the PHAK, Flight Instructor handbooks and AC 61-98B (dated Apr 30, 2012) they should be coordinated with the ARAC. Add section to FIRC to teach CFI where to find and how to provide guidance to airmen during Flight Review on how the airman can develop their own personal minimums. Revise AC 61-98B to provide guidance on how to develop a set of personal minimums during the flight review together with the CFI. Review available products and materials and develop a product or products such as a personal minimums card or a web-based/smart phone application in support of an educational outreach campaign on use of personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change. Remove outdated print and electronic material on this subject.
1.9	2.2	4.2	182	#182 RESEARCH - Goal: Reduce accidents in twin engine aircraft which do not possess autofeather capability through automation. FAA aircraft certification (ACE-100) Examine potential retro-fit possibilities.
1.5	2.7	4.1	130	#130 POLICY- FAA Revise PTS to include emphasis on emergency procedures as part of pre-takeoff briefing.
1.5	2.7	4.1	187	#187 TRAINING - Goal: Improve outcome when airman are faced with sudden, unexpected events. FAA and industry emphasize the importance knowing/practicing immediate action items and pre-briefing likely emergencies before takeoff. Flight training industry needs to develop a set of standards for training and testing of emergency procedures. Review military procedures on this subject. Include as emphasis item on flight review.
1.6	2.5	4.0	172	#172 TRAINING - Goal: Introduce risk-based decision making at the earliest point practical in airman training. Training providers integrate risk-based decision making into web based pilot training, pilot training syllabi, knowledge testing and practical testing standards and programs; scenario based training. FAA review and revise PTS as necessary. Encourage scenario-based training and testing in the context of PTS. Incorporate into periodic DPE and CFI training.
CUT-OFF LINE				
1.7	2.3	3.9	118	#118 EDUCATION - FAA and Industry stress the importance of reviewing emergency procedures thoroughly before and after maintenance test flights. Encourage owners, operators and mechanics to establish specific procedures for flights surrounding maintenance that includes having the most proficient pilot (if applicable) operate the aircraft after maintenance. Also include procedures that enforce use of checklists and seatbelts.
1.7	2.3	3.9	167	#167 EDUCATION - FAA and Industry encourage training using any available standby and/or back up equipment (certified or not) in event of equipment failure.
1.3	3.0	3.9	54	#54 - Training - FAA and industry emphasize the importance of ADM concerning missed approaches and go-arounds.
1.5	2.5	3.8	106	#106 EDUCATION - FAA emphasize with CFIs the importance of teaching proper PIC decision making skills with reference to go arounds (at the application and correlation levels) in the special emphasis areas of the PTS. Focus on the decision to go around when not on speed, not on course or incorrectly aligned for landing.
1.7	2.2	3.7	162	#162 RESEARCH - Goal: Determine the qualitative difference between training methodology employed by various sources such as University 141, 141 Schools, and Part 61 Schools and their respective testing and the relationship to accident experience. Research should recommend a method for CFIs to record decision making and flight skills of pilot similar to part 141 training jackets. Information should be sufficient to convey training history to ASI and DPEs to aid in the evaluation of the pilot during certification.
1.6	2.3	3.7	143	#143 TRAINING - Industry/training providers teach pilots threat-error management

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1.3	2.8	3.6	126	#126 EDUCATION - Encourage pilots to have pre-purchase inspection done by a certificated A&P mechanic to ensure aircraft has no unknown outstanding discrepancies.
1.4	2.6	3.6	135	#135 TECHNOLOGY- Encourage industry to create installation of a takeoff configuration annunciator warning system to include door latch. Potential inclusion in new/glass avionics designs.
1.4	2.5	3.5	133	#133 RESEARCH- Industry and academia research the feasibility of IMC detection systems (IDS) and possible implementation. Systems could be made available to mobile devices, EFBs, etc.
1.2	2.8	3.4	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.
1.1	3.0	3.3	142	#142 EDUCATION - FAA/Industry reinforce the use of aircraft flight control assist systems such as trim and autopilot in dealing with aircraft flight emergencies
1.3	2.5	3.3	105	#105 EDUCATION - FAA/Industry educate CFIs to better assess the limits of their abilities and encourage them to utilize mentorship programs with more experienced CFIs if they are recently certified or not current. Assessment can include the FRAT concept.
1.3	2.5	3.3	150	#150 EDUCATION - Manufacturers develop an improved run up procedure for pre-takeoff that evaluates proper engine performance based on static RPM
1.2	2.7	3.2	107	#107 POLICY - FAA Encourage flight schools (61 and 141) to implement annual or semi-annual proficiency checks on CFIs
1.6	2.0	3.2	120	#120 TECHNOLOGY - Industry develop inexpensive aural/tactical/visual alert for altitude awareness during aerobatic maneuvers.
1.8	1.7	3.1	98	#98 POLICY- FAA require drug tests to be administered during the issuance or reissuance of each pilot's medical.
1.0	3.0	3.0	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).
1.3	2.3	3.0	51	#51 TRAINING - FAA and industry to review existing single pilot CRM practices and develop best practices for dissemination to the GA community.
1.1	2.7	3.0	185	#185 TRAINING - Goal: Improve pre-flight aeronautical decision making regarding feasibility of IFR/IMC/Night flight. Flight Risk Analysis Tools (FRAT) could be used for both pre-flight and enroute operations to assess risks associated with higher risk flight segments. FAA and Training Industry incorporate into training, checking and testing.
1.7	1.7	2.9	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.
1.3	2.2	2.9	63	#63 TRAINING - FAA and Industry to develop and incorporate use of AOA education and training.
1.3	2.2	2.9	128	#128 POLICY - FAA review PTS on the requirement to test pilot initiated decision to go around. Develop revision as necessary.

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1.3	2.2	2.9	155	#155 EDUCATION - Goal: FAA and Industry ensure that airmen understand and meet the requirements of FAR 61.53, prohibition on operations during medical deficiency. Evaluate existing products and tools from both private and government sources. Develop a variety of means to better enable airmen to self-evaluate their medical fitness to fly and their aeromedical issues such as a single-point access or gateway for medical advice on fitness to fly (possibly MedExpress), anonymous email forum, toll-free voice number, online courses or web-based or smart phone applications. Outreach to airmen to make them aware of these new or existing tools.
1.3	2.2	2.9	174	#174 POLICY - Goal: Reduce pilot fatalities during flight testing amateur-built aircraft. FAA / EAA outreach campaign to promote the use of qualified test pilot or qualified second pilot during all or part of Phase 1 testing. EAA to establish qualifications for qualified test pilot and qualified second pilot. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.
1.0	2.8	2.8	125	#125 EDUCATION - FAA emphasize the importance of resolving maintenance discrepancies prior to flight
1.0	2.8	2.8	129	#129 EDUCATION - Encourage pilots to utilize AC 90-89a (flight testing handbook) on every homebuilt/amateur/ultralight aircraft test flight
1.0	2.8	2.8	190	#190 TRAINING - Goal: Remind pilots that they may not be able to make all flights safely. FAA and Industry continue to educate airmen on the benefits and risks of general aviation. (address get-there-itis)
1.1	2.5	2.8	114	#114 EDUCATION - FAA and Industry develop education program on the limitations of on-board weather radar, XM weather and ATC weather capabilities.
0.9	3.0	2.7	131	#131 PROCEDURES - GAMA encourage manufacturers to provide improved guidance in the POH in the event of a door inadvertently opening in flight.
1.2	2.2	2.6	103	#103 EDUCATION - FAA/Industry develop an outreach program that includes GA stakeholders (family, friends, other pilots) to "see something, say something" regarding pilot's mentality, decision making and pre-flight behavior. This program would also educate pilots on the effects that hazardous decision making can ultimately have.
1.1	2.2	2.4	102	#102 EDUCATION - FAA/Industry to develop a comprehensive CFI CRM program that would expand on corrective actions and training of repeated flight maneuver discrepancies.
1.1	2.2	2.4	159	#159 EDUCATION - Goal: Improve the quality, consistency and standardization of training presented by Part 61 CFIs. Use of industry standard, quality flight training products/syllabi such as King/Cessna, Jeppesen, Gleim products can support delivery and achievement of a superior flight training experience. Part 61 are not required to use such products but train in accordance with the regulation (Part 61) and the PTS. Develop an outreach program to educate the Part 61 CFIs on the products available and the benefits of their use.
0.8	3.0	2.4	46	#46 - Training - FAA and industry develop training and educational materials concerning decision making in emergency situations.
0.8	3.0	2.4	116	#116 EDUCATION - FAA/industry to expand the use and distribution of real life articles such as AOPA "never again" and Flying's "I learned about flying from that".
0.9	2.5	2.3	108	#108 EDUCATION -FAA/Industry encourage instrument rated pilots with low to no actual IMC time to fly with safety pilots, CFIs or "mentors" prior to single pilot IMC or unfamiliar operations.
1.0	2.2	2.2	8	#8 - POLICY - Kit manufacturers should develop and implement a flight safety program in order to aid with the decision making decisions.
0.7	3.0	2.1	92	#92 TRAINING - AOPA ASI webinar / FAAST Outreach and education on the importance of abiding by limitations; ie. weight and within CG limits
0.9	2.2	2.0	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.

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0.9	2.2	2.0	146	#146 POLICY - FAA and industry to refine the process of incorporating the manufacturer supplied flight supplements into aircraft manuals and checklists. Provide supplements in a way that is easy to access by the owners/operators (online database/central repository) GOAL: Ensure aircraft owners/operators have current supplements to AFM and POH.
0.8	2.5	2.0	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.
0.8	2.3	1.8	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.
0.8	2.2	1.8	160	#160 EDUCATION - Goal: reduce accidents with CFI on board through providing CFI with guidance and best practices in tailoring training events based on student's demonstrated abilities and event-based risk tolerance. Review, adapt and use applicable portions of military instructor pilot ADM programs for civil application. Develop an ADM program for CFIs that will train CFIs to better assess the limits of a learner's skill level as well as their own and set CFI personal minimums. Encourage industry sponsorship (SAFE, NAFI) for review, preparation and dissemination of the program and incorporate into FIRC when appropriate.
0.7	2.5	1.8	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.
0.7	2.5	1.8	115	#115 EDUCATION - FAA and Industry outreach campaign on when to declare an emergency
0.8	2.0	1.6	163	#163 POLICY - Goal: Prevent IMC related accidents because of lack of pilot experience and/or ability in IMC. Establish a voluntary graduated instrument experience recommendation for both instrument rated pilots and instrument CFI. Incorporate into Instrument Proficiency Check process and Flight Review. Review effectiveness for incorporation into regulatory structure. Consider integration into FIRC and increased use of simulation. Provide for checking of hand-flying instrument skills and other fail-down instrument pilot capabilities in PTS. Explore methods for documenting sub-standard performance and remediation under Part 61/Part 91.
0.7	2.2	1.5	113	#113 POLICY - FAA Develop and implement training for FAA ASIs on oversight of public use aircraft.
0.7	2.2	1.5	140	#140 TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture within companies, type clubs, and family/friends of pilots. Similar to a safety management system.
1.0	1.5	1.5	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.
0.6	2.5	1.5	84	#84 - TECHNOLOGY - Industry to develop a visual and aural indicator of low fuel quantity
0.5	2.7	1.4	127	#127 POLICY - FAA encourage DPEs to improve narrative on unsatisfactory checkride items so subsequent examiner can more effectively re-examine applicant.
0.6	2.2	1.3	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)
0.4	3.0	1.2	68	#68 - Training - FAA and industry to develop training and educational materials promoting professional decision making
0.4	2.8	1.1	109	#109 POLICY - FAA/ Industry encourage insurance industry to consider actual IMC time prior to insuring an instrument rated pilot
0.4	2.8	1.1	170	#170 EDUCATION - Goal: Eliminate accidents that result from failure to follow regulations or procedures. FAA and Industry educate pilots on the risks associated with not following regulations and/or procedures. Combine into approach to improving safety culture.

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0.7	1.5	1.1	178	#178 POLICY - Goal: Ensure passenger safety by requiring a maintenance check flight after major maintenance and prior to carrying passengers. FAA create a policy on aircraft return to service regulations after major maintenance.
0.5	2.0	1.0	183	#183 TECHNOLOGY- Goal: Improve owner access to aircraft maintenance history. Create similar system to "car fax." A central electronic maintenance repository. FAA research feasibility.
0.3	3.0	0.9	80	#80 - TRAINING - FAA FAASTeam to raise awareness of the importance of relevant Advisory Circulars when preparing aircraft flight test.
0.4	2.2	0.9	112	#112 EDUCATION - FAA/Industry Special mission operators to develop and incorporate training and awareness of unique risk associated with the type of operation. (i.e. Banner towing, wildlife surveillance, etc.)
0.4	2.2	0.9	156	#156 TRAINING - FAA/CAMI, EAA, AOPA, Type Clubs, etc. Goal: prevent airmen from becoming hypoxic by recognizing hypoxia so they can take timely corrective action. Evaluate existing products and tools from both private and government sources. Develop training and informational aids relating to the nature of hypoxia onset, recognition and intervention. Emphasis in training on FAA rules for operation of non-pressurized A/C and O2 usage. Facilitate airman participation in hypoxia demonstration programs. Outreach to airmen focused on encouraging airman participation in the hypoxia demonstration programs. Augment FAA Regional Medical Flight Surgeon capabilities with additional physiological technical resources or contract with Industry. For example, CAMI has a portable altitude chamber and physiological technicians.
0.3	2.7	0.8	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.
0.6	1.3	0.8	99	#99 POLICY- FAA develop database that catalogs prescribed drugs, drug use and criminal convictions that can be accessed by an AME at the time a pilot comes in to receive or renew a medical certificate.
0.3	2.5	0.8	169	#169 EDUCATION - Goal: Improve airman understanding of Maneuvering Airspeed (Va). FAA review and revise PHAK as necessary. See Bonanza Pilot Proficiency Program (BPPP) training program manual. Outreach.
0.4	1.8	0.7	158	#158 POLICY - Goal: Develop a multi-tiered approach to identify pilots at increased risk for accidents or incidents and interventions to reduce the risk. 1. Data-driven (e.g., WINGS participation) - Develop a product for pilots to input demographic information about their proposed flight and personal minimums or other planning factors such as fatigue, medication or stress (pilot and equipment profile) and have it evaluated about likelihood for involvement in an accident or incident and the probable cause of likely accidents. The product would offer strategies for risk mitigation and the effect of implementing the various proposed risk mitigation strategies. Consider connecting the product to DUATS or similar product to incorporate near real time weather and terrain effects on the proposed flight. (AVP or SAT) 2. Peer-review approaches (non-Federal/local airport safety committee and Special Interest Group/Chapter advisory committee) promoted by FAA, Academic, Industry and Special Interest Groups. Peer-review approaches are envisioned as grass-roots or ground up approaches to build local pilot advisory and action groups that can identify, design interventions and implement interventions to reduce or prevent pilots from engaging in or continuing to engage in risky pilot behaviors. (FAST with support from all GAJSC members.) These airport safety committees would also be used for outreach and dissemination from other safety enhancements.
0.4	1.7	0.7	101	#101 POLICY- FAA create a program that requires random drug testing for active pilots.
0.3	2.2	0.7	49	#49 TRAINING - EAA and industry to develop and disseminate experimental maintenance best practices and resources to the experimental amateur built community.
0.5	1.3	0.7	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.
0.2	3.0	0.6	76	#76 - TRAINING - FAA and industry to promote flying the airplane first through email campaign.
0.2	3.0	0.6	136	#136 TECHNOLOGY- Industry promote installation of enhanced ground proximity warning system for light aircraft to calculate density altitude, climb rate, terrain, etc. (light end version of EGPWS/enhanced TAWS)
0.2	2.8	0.6	134	#134 TECHNOLOGY - GAMA, AOPA and EAA encourage pilots and manufacturers to install envelope protection systems that activate at high altitudes to take over in the event the pilot becomes hypoxic. (see: auto "emergency" land/ESP)

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0.2	2.8	0.6	137	#137 EDUCATION - Industry (type clubs/EAA) encourage all experimental aircraft to install and use stall warning systems.
0.2	2.7	0.5	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.
0.2	2.7	0.5	145	#145 EDUCATION- FAA and Industry encourage flight training providers to include training and/or operations which incorporate the differences of operating in a less structured environment. GOAL: 141 and 61 operations with a structured environment (dispatch, etc.) should provide guidance to pilots and CFIs on what to expect when operating, renting and utilizing other aircraft that are not typically flown under structured guidance (syllabus, available maintenance records, SOPs, etc.)
0.2	2.5	0.5	3	#3- MEDICAL - CAMI, CGAR, and other aero-medical associations as identified, perform a study to determine barriers to open an honest communication between AME and the pilot community and recommend enhancements to pilot medical program in order to improve open communication.
0.2	2.2	0.4	177	#177 POLICY - Goal: Improve FAA oversight of pilot checking programs. FAA and industry review how well training and checking programs perform to ensure safe flight. Evaluate and recommend courses of action. Possible integration with SMS.
0.1	3.0	0.3	64	#64 - TRAINING - FAA and Industry to emphasize proper use of fuel management software (if equipped) on every flight.
0.2	1.5	0.3	110	#110 POLICY - FAA mandate actual time in IMC prior to receiving instrument rating (level C or D simulator may replace actual IMC time in aircraft) B. Encourage research and development of more affordable simulators that equate to level C/D simulators
0.1	2.8	0.3	149	#149 EDUCATION - FAA/Industry develop and implement educational campaign on the dangers of flying intoxicated and impaired
0.1	2.8	0.3	168	#168 EDUCATION - FAA, Industry and manufacturers reemphasize importance of standardizing preflight inspections regardless of weather conditions and flight mission.
0.1	2.7	0.3	151	#151 EDUCATION - FAA/Industry encourage the pilot community to openly communicate with the other pilots they fly with regarding their certification, currency, medical, etc.
0.1	2.7	0.3	176	#176 PILOT - Goal: Improve pre-flight planning through the use of technology and software. Faa and Industry to promote using flight risk analysis tools (FRAT) and other software tools to influence aeronautical decision making before and during flight.
0.1	2.3	0.2	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.

Appendix 16 — 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 enhancing technologies. 9(c) Regulatory- 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 disseminate 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	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	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	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	2.2
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	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	3	2.5
84	#84 - TECHNOLOGY - Industry to develop a visual and aural indicator of low fuel quantity	2	3	3	1	3	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	2.2

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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

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99	#99 POLICY- FAA develop database that catalogs prescribed drugs, drug use and criminal convictions that can be accessed by an AME at the time a pilot comes in to receive or renew a medical certificate.	1	2	1	2	1	1	1.3
100	#100 EDUCATION - FAA/Industry create and promote an App that advises pilots of drugs that are on the "no-fly" list as well as "approved" drugs that still can degrade pilots skills. App would clearly show pilots how and for how long they can affect their piloting ability. Also includes drug interaction.	2	3	3	3	2	3	2.7
101	#101 POLICY- FAA create a program that requires random drug testing for active pilots.	3	3	1	1	1	1	1.7
102	#102 EDUCATION - FAA/Industry to develop a comprehensive CFI CRM program that would expand on corrective actions and training of repeated flight maneuver discrepancies.	2	3	2	2	2	2	2.2
103	#103 EDUCATION - FAA/Industry develop an outreach program that includes GA stakeholders (family, friends, other pilots) to "see something, say something" regarding pilot's mentality, decision making and pre-flight behavior. This program would also educate pilots on the effects that hazardous decision making can ultimately have.	2	3	2	2	2	2	2.2
105	#105 EDUCATION - FAA/Industry educate CFIs to better assess the limits of their abilities and encourage them to utilize mentorship programs with more experienced CFIs if they are recently certified or not current. Assessment can include the FRAT concept.	2	3	3	3	2	2	2.5
106	#106 EDUCATION - FAA emphasize with CFIs the importance of teaching proper PIC decision making skills with reference to go arounds (at the application and correlation levels) in the special emphasis areas of the PTS. Focus on the decision to go around when not on speed, not on course or incorrectly aligned for landing.	2	3	3	3	2	2	2.5
107	#107 POLICY - FAA Encourage flight schools (61 and 141) to implement annual or semi-annual proficiency checks on CFIs	3	3	3	3	2	2	2.7

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108	#108 EDUCATION -FAA/Industry encourage instrument rated pilots with low to no actual IMC time to fly with safety pilots, CFIs or "mentors" prior to single pilot IMC or unfamiliar operations.	2	3	2	3	3	2	2.5
109	#109 POLICY - FAA/ Industry encourage insurance industry to consider actual IMC time prior to insuring an instrument rated pilot	3	3	3	3	3	2	2.8
110	#110 POLICY - FAA mandate actual time in IMC prior to receiving instrument rating (level C or D simulator may replace actual IMC time in aircraft) B. Encourage research and development of more affordable simulators that equate to level C/D simulators	2	3	1	1	1	1	1.5
111	#111 POLICY - FAA to provide greater oversight of DPEs to insure that all pilots meet the applicable requirements of aeronautical experience and proficiency for each certificate and/or rating. Brief these topics to DPEs at annual meeting and CFIs at FIRCS.	3	3	3	3	2	2	2.7
112	#112 EDUCATION - FAA/Industry Special mission operators to develop and incorporate training and awareness of unique risk associated with the type of operation. (i.e. Banner towing, wildlife surveillance, etc.)	2	3	2	2	2	2	2.2
113	#113 POLICY - FAA Develop and implement training for FAA ASIs on oversight of public use aircraft.	2	3	2	3	1	2	2.2
114	#114 EDUCATION - FAA and Industry develop education program on the limitations of on-board weather radar, XM weather and ATC weather capabilities.	2	3	2	3	2	3	2.5
115	#115 EDUCATION - FAA and Industry outreach campaign on when to declare an emergency	2	3	2	3	2	3	2.5

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116	#116 EDUCATION - FAA/industry to expand the use and distribution of real life articles such as AOPA "never again" and Flying's "I learned about flying from that".	3	3	3	3	3	3	3
117	#117 EDUCATION - Industry Promote local flying clubs and pilot associations to help foster an environment of education and mentoring for pilots.	3	3	3	3	3	3	3
118	#118 EDUCATION - FAA and Industry stress the importance of reviewing emergency procedures thoroughly before and after maintenance test flights. Encourage owners, operators and mechanics to establish specific procedures for flights surrounding maintenance that includes having the most proficient pilot (if applicable) operate the aircraft after maintenance. Also include procedures that enforce use of checklists and seatbelts.	2	3	2	3	2	2	2.3
120	#120 TECHNOLOGY - Industry develop inexpensive aural/tactical/visual alert for altitude awareness during aerobatic maneuvers.	1	3	2	2	2	2	2
121	#121 EDUCATION- Industry establish an educational campaign on use of Personal Minimums.	3	3	3	3	3	2	2.8
123	#123 RESEARCH - FAA research and compile existing research on factors of aging in pilots. How do age, disease, cognitive and psychomotor skills affect flying/decision making ability relate to accidents.	3	3	3	3	3	2	2.8
124	#124 RESEARCH- Industry research the effect of low flight time in make and model on safety.	3	3	3	3	3	2	2.8
125	#125 EDUCATION - FAA emphasize the importance of resolving maintenance discrepancies prior to flight	3	3	3	3	3	2	2.8

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126	#126 EDUCATION - Encourage pilots to have pre-purchase inspection done by a certificated A&P mechanic to ensure aircraft has no unknown outstanding discrepancies.	3	3	3	3	3	2	2.8
127	#127 POLICY - FAA encourage DPEs to improve narrative on unsatisfactory checkride items so subsequent examiner can more effectively re-examine applicant.	3	3	3	3	2	2	2.7
128	#128 POLICY - FAA review PTS on the requirement to test pilot initiated decision to go around. Develop revision as necessary.	2	3	2	2	2	2	2.2
129	#129 EDUCATION - Encourage pilots to utilize AC 90-89a (flight testing handbook) on every homebuilt/amateur/ultralight aircraft test flight	3	3	3	3	3	2	2.8
130	#130 POLICY- FAA Revise PTS to include emphasis on emergency procedures as part of pre-takeoff briefing.	3	3	3	3	2	2	2.7
131	#131 PROCEDURES - GAMA encourage manufacturers to provide improved guidance in the POH in the event of a door inadvertently opening in flight.	3	3	3	3	3	3	3
133	#133 RESEARCH- Industry and academia research the feasibility of IMC detection systems (IDS) and possible implementation. Systems could be made available to mobile devices, EFBS, etc.	2	3	3	2	3	2	2.5
134	#134 TECHNOLOGY - GAMA, AOPA and EAA encourage pilots and manufacturers to install envelope protection systems that activate at high altitudes to take over in the event the pilot becomes hypoxic. (see: auto "emergency" land/ESP)	3	3	3	3	3	2	2.8

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135	#135 TECHNOLOGY- Encourage industry to create installation of a takeoff configuration annunciator warning system to include door latch. Potential inclusion in new/glass avionics designs.	3	3	3	3	3	2	2.8
136	#136 TECHNOLOGY- Industry promote installation of enhanced ground proximity warning system for light aircraft to calculate density altitude, climb rate, terrain, etc. (light end version of EGPWS/enhanced TAWS)	3	3	3	3	3	3	3
137	#137 EDUCATION - Industry (type clubs/EAA) encourage all experimental aircraft to install and use stall warning systems.	3	3	2	3	3	3	2.8
138	#138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.	3	3	3	3	3	3	3
139	#139 TRAINING - encourage companies to provide altitude chamber and/or normobaric training and pilots to receive altitude and/or normobaric training.	3	3	2	3	3	3	2.8
140	#140 TRAINING - FAA and industry to develop training and educational materials promoting positive safety culture within companies, type clubs, and family/friends of pilots. Similar to a safety management system.	2	3	2	2	2	2	2.2
141	#141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.	3	3	3	3	2	2	2.7
142	#142 EDUCATION - FAA/Industry reinforce the use of aircraft flight control assist systems such as trim and autopilot in dealing with aircraft flight emergencies	3	3	3	3	3	3	3

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143	#143 TRAINING - Industry/training providers teach pilots threat-error management	3	3	2	2	2	2	2.3
144	#144 TRAINING - Industry/training providers teach proper techniques for managing unexpected events / teach how to recognize and manage startle response (if becomes a DIP, check proper term)	2	3	2	3	2	2	2.3
145	#145 EDUCATION- FAA and Industry encourage flight training providers to include training and/or operations which incorporate the differences of operating in a less structured environment. GOAL: 141 and 61 operations with a structured environment (dispatch, etc.) should provide guidance to pilots and CFIs on what to expect when operating, renting and utilizing other aircraft that are not typically flown under structured guidance (syllabus, available maintenance records, SOPs, etc.)	3	3	2	3	2	3	2.7
146	#146 POLICY - FAA and industry to refine the process of incorporating the manufacturer supplied flight supplements into aircraft manuals and checklists. Provide supplements in a way that is easy to access by the owners/operators (online database/central repository) GOAL: Ensure aircraft owners/operators have current supplements to AFM and POH.	2	3	2	2	2	2	2.2
147	#147 POLICY - Industry adopt the recommendations from NTSB SIR-08/01 Special investigation on the safety of parachute jump operations.	3	3	2	2	2	2	2.3
148	#148 POLICY - FAA/Industry encourage flight schools (61 and 141) to adopt MEL programs	3	3	2	3	3	2	2.7
149	#149 EDUCATION - FAA/Industry develop and implement educational campaign on the dangers of flying intoxicated and impaired	3	3	3	3	3	2	2.8
150	#150 EDUCATION - Manufacturers develop an improved run up procedure for pre-takeoff that evaluates proper engine performance based on static RPM	3	3	2	3	2	2	2.5

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151	#151 EDUCATION - FAA/Industry encourage the pilot community to openly communicate with the other pilots they fly with regarding their certification, currency, medical, etc.	3	3	2	3	3	2	2.7
153	#153 EDUCATION - Promote use of EAA technical counselors and Flight Advisors.	3	3	2	3	3	2	2.7
154	#154 POLICY - FAA/Industry review and edit as necessary PHAK to include upset prevention and recovery techniques	3	3	2	3	2	2	2.5
155	#155 EDUCATION - Goal: FAA and Industry ensure that airmen understand and meet the requirements of FAR 61.53, prohibition on operations during medical deficiency. Evaluate existing products and tools from both private and government sources. Develop a variety of means to better enable airman to self-evaluate their medical fitness to fly and their aeromedical issues such as a single-point access or gateway for medical advice on fitness to fly (possibly MedExpress), anonymous email forum, toll-free voice number, online courses or web-based or smart phone applications. Outreach to airmen to make them aware of these new or existing tools.	2	3	2	2	2	2	2.2
156	#156 TRAINING - FAA/CAMI, EAA, AOPA, Type Clubs, etc. Goal: prevent airmen from becoming hypoxic by recognizing hypoxia so they can take timely corrective action. Evaluate existing products and tools from both private and government sources. Develop training and informational aids relating to the nature of hypoxia onset, recognition and intervention. Emphasis in training on FAA rules for operation of non-pressurized A/C and O2 usage. Facilitate airman participation in hypoxia demonstration programs. Outreach to airmen focused on encouraging airman participation in the hypoxia demonstration programs. Augment FAA Regional Medical Flight Surgeon capabilities with additional physiological technical resources or contract with Industry. For example, CAMI has a portable altitude chamber and physiological technicians.	2	3	2	2	2	2	2.2
157	#157 EDUCATION - Goal: Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. Review existing materials and, if applicable, add a section to the PHAK and Flight Instructor handbooks on developing PIC decision making skills. Emphasise with CFIs the importance of teaching proper PIC decision making skills. If changes are needed to the PHAK, Flight Instructor handbooks and AC 61-98B (dated Apr 30, 2012) they should be coordinated with the ARAC. Add section to FIRC to teach CFI where to find and how to provide guidance to airmen during Flight Review on how the airman can develop their own personal minimums. Revise AC 61-98B to provide guidance on how to develop a set of personal minimums during the flight review together with the CFI. Review available products and materials and develop a product or products such as a personal minimums card or a web-based/smart phone application in support of an educational outreach campaign on use of personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change. Remove outdated print and electronic material on this subject.	2	3	2	2	2	2	2.2

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158	#158 POLICY - Goal: Develop a multi-tiered approach to identify pilots at increased risk for accidents or incidents and interventions to reduce the risk. 1. Data-driven (e.g., WINGS participation) - Develop a product for pilots to input demographic information about their proposed flight and personal minimums or other planning factors such as fatigue, medication or stress (pilot and equipment profile) and have it evaluated about likelihood for involvement in an accident or incident and the probable cause of likely accidents. The product would offer strategies for risk mitigation and the effect of implementing the various proposed risk mitigation strategies. Consider connecting the product to DUATS or similar product to incorporate near real time weather and terrain effects on the proposed flight. (AVP or SAT) 2. Peer-review approaches (non-Federal/local airport safety committee and Special Interest Group/Chapter advisory committee) promoted by FAA, Academic, Industry and Special Interest Groups. Peer-review approaches are envisioned as grass-roots or ground up approaches to build local pilot advisory and action groups that can identify, design interventions and implement interventions to reduce or prevent pilots from engaging in or continuing to engage in risky pilot behaviors. (FAST with support from all GAJSC members.) These airport safety committees would also be used for outreach and dissemination from other safety enhancements.	2	2	2	2	2	1	1.8
159	#159 EDUCATION - Goal: Improve the quality, consistency and standardization of training presented by Part 61 CFIs. Use of industry standard, quality flight training products/syllabi such as King/Cessna, Jeppesen, Gleim products can support delivery and achievement of a superior flight training experience. Part 61 are not required to use such products but train in accordance with the regulation (Part 61) and the PTS. Develop an outreach program to educate the Part 61 CFIs on the products available and the benefits of their use.	2	3	2	2	3	1	2.2
160	#160 EDUCATION - Goal: reduce accidents with CFI on board through providing CFI with guidance and best practices in tailoring training events based on student's demonstrated abilities and event-based risk tolerance. Review, adapt and use applicable portions of military instructor pilot ADM programs for civil application. Develop an ADM program for CFIs that will train CFIs to better assess the limits of an learner's skill level as well as their own and set CFI personal minimums. Encourage industry sponsorship (SAFE, NAFI) for review, preparation and dissemination of the program and incorporate into FIRC's when appropriate.	2	3	2	2	2	2	2.2
161	#161 EDUCATION - Goal: Improve the quality, consistency and standardization of training presented by Part 61 CFIs. Use of industry standard, quality flight training products/syllabi such as King/Cessna, Jeppesen, Gleim products can support delivery and achievement of a superior flight training experience. Part 61 are not required to use such products but train in accordance with the regulation (Part 61) and the PTS. Develop an outreach program to educate the Part 61 CFIs on the products available and the benefits of their use. (SAFE/NAFI)	3	3	2	2	2	2	2.3
162	#162 RESEARCH - Goal: Determine the qualitative difference between training methodology employed by various sources such as University 141, 141 Schools, and Part 61 Schools and their respective testing and the relationship to accident experience. Research should recommend a method for CFIs to record decision making and flight skills of pilot similar to part 141 training jackets. Information should be sufficient to convey training history to ASI and DPEs to aid in the evaluation of the pilot during certification.	2	3	2	2	3	1	2.2
163	#163 POLICY - Goal: Prevent IMC related accidents because of lack of pilot experience and/or ability in IMC. Establish a voluntary graduated instrument experience recommendation for both instrument rated pilots and instrument CFI. Incorporate into Instrument Proficiency Check process and Flight Review. Review effectiveness for incorporation into regulatory structure. Consider integration into FIRC and increased use of simulation. Provide for checking of hand-flying instrument skills and other fail-down instrument pilot capabilities in PTS. Explore methods for documenting sub-standard performance and remediation under Part 61/Part 91.	2	3	2	2	2	1	2
167	#167 EDUCATION - FAA and Industry encourage training using any available standby and/or back up equipment (certified or not) in event of equipment failure.	3	3	2	2	2	2	2.3

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168	#168 EDUCATION - FAA, Industry and manufacturers reemphasize importance of standardizing preflight inspections regardless of weather conditions and flight mission.	3	3	3	3	3	2	2.8
169	#169 EDUCATION - Goal: Improve airman understanding of Maneuvering Airspeed (Va). FAA review and revise PHAK as necessary. See Bonanza Pilot Proficiency Program (BPPP) training program manual. Outreach.	3	3	2	3	2	2	2.5
170	#170 EDUCATION - Goal: Eliminate accidents that result from failure to follow regulations or procedures. FAA and Industry educate pilots on the risks associated with not following regulations and/or procedures. Combine into approach to improving safety culture.	3	3	3	3	3	2	2.8
171	#171 RESERVED							
172	#172 TRAINING - Goal: Introduce risk-based decision making at the earliest point practical in airman training. Training providers integrate risk-based decision making into web based pilot training, pilot training syllabi, knowledge testing and practical testing standards and programs; scenario based training. FAA review and revise PTS as necessary. Encourage scenario-based training and testing in the context of PTS. Incorporate into periodic DPE and CFI training.	3	3	2	3	2	2	2.5
174	#174 POLICY - Goal: Reduce pilot fatalities during flight testing amateur-built aircraft. FAA / EAA outreach campaign to promote the use of qualified test pilot or qualified second pilot during all or part of Phase 1 testing. EAA to establish qualifications for qualified test pilot and qualified second pilot. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.	2	3	2	2	2	2	2.2
175	#175 EDUCATION - Goal: Reduce pilot fatalities by providing best practices and technical guidance to homebuilder/experimental aircraft operators/builders. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.	3	3	3	3	3	2	2.8
176	#176 PILOT - Goal: Improve pre-flight planning through the use of technology and software. Faa and Industry to promote using flight risk analysis tools (FRAT) and other software tools to influence aeronautical decision making before and during flight.	3	3	2	3	3	2	2.7

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177	#177 POLICY - Goal: Improve FAA oversight of pilot checking programs. FAA and industry review how well training and checking programs perform to ensure safe flight. Evaluate and recommend courses of action. Possible integration with SMS.	2	3	2	2	2	2	2.2
178	#178 POLICY - Goal: Ensure passenger safety by requiring a maintenance check flight after major maintenance and prior to carrying passengers. FAA create a policy on aircraft return to service regulations after major maintenance.	2	2	1	1	1	2	1.5
179	#179 POLICY - Goal: Improve flight test outcome. Increase industry involvement in advice or oversight of homebuilt/amateur/ultralight aircraft flight testing. FAA and EAA/Industry coordinate on how flight test pilots will be endorsed, authorized, recommended, or recognized. Promote use of AC 90-89 as revised.	2	3	2	2	2	2	2.2
182	#182 RESEARCH - Goal: Reduce accidents in twin engine aircraft which do not possess autofeather capability through automation. FAA aircraft certification (ACE-100) Examine potential retro-fit possibilities.	1	3	2	2	3	2	2.2
183	#183 TECHNOLOGY- Goal: Improve owner access to aircraft maintenance history. Create similar system to "car fax." A central electronic maintenance repository. FAA research feasibility.	2	2	2	2	2	2	2
184	#184 TECHNOLOGY- iCAS. Goal: Provide "electronic parachute" type capability. Integrate electronic navigation and automatic flight management system to provide capability. Manual or automatic iCAS system that can maneuver the aircraft clear of terrain. GAMA/NBAA poll industry for current and near future capabilities, identify neferious regulatory obstacles, recommend a course of action to achieve synergistic implementation.	1	2	2	1	2	2	1.7
185	#185 TRAINING - Goal: Improve pre-flight aeronautical decision making regarding feasibility of IFR/IMC/Night flight. Flight Risk Analysis Tools (FRAT) could be used for both pre-flight and enroute operations to assess risks associated with higher risk flight segments. FAA and Training Industry incorporate into training, checking and testing.	3	3	2	3	3	2	2.7
186	#186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasise the need for training and currency when flying in montainous areas.	3	3	3	3	3	3	3

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187	#187 TRAINING - Goal: Improve outcome when airman are faced with sudden, unexpected events. FAA and industry emphasize the importance knowing/practicing immediate action items and pre-briefing likely emergencies before takeoff. Flight training industry needs to develop a set of standards for training and testing of emergency procedures. Review military procedures on this subject. Include as emphasis item on flight review.	3	3	2	3	3	2	2.7
188	#188 TRAINING - Goal: Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.	3	3	3	3	3	3	3
190	#190 TRAINING - Goal: Remind pilots that they may not be able to make all flights safely. FAA and Industry continue to educate airmen on the benefits and risks of general aviation. (address get-there-itis)	3	3	3	3	3	2	2.8
194	#194 EDUCATION - FAA and Industry to review guidance and material on emergency landing after takeoff and revise as necessary. Revisions and best practices could be incorporated into the PTS/AIM/PHAK. Emphasis should be on briefing what to do if engine failure at any time during takeoff up to an appropriate safe altitude.	3	3	3	3	3	3	3
195	#POLICY - FAA ensure DPEs and all examiners understand and adhere to the standards	3	3	3	3	3	3	3

Appendix 17 — LOCWG 1.0 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 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, 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 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 FFASTeam 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).

Appendix 18 — LOCWG 2.0 Bucketed Interventions

 Prioritized Interventions					
Overall Effectiveness	Average Feasibility	OE x F	Intervention No.	INTERVENTIONS	BUCKET
3.0	2.8	8.4	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	SE-1 AOA
3.5	2.3	8.1	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.	SE-27 R ³
2.8	2.8	7.8	123	#123 RESEARCH - FAA research and compile existing research on factors of aging in pilots. How do age, disease, cognitive and psychomotor skills affect flying/decision making ability relate to accidents.	Research - Human Factors
2.8	2.8	7.8	124	#124 RESEARCH - Industry research the effect of low flight time in make and model on safety.	SE-5 Transition Training?
2.7	2.7	7.3	111	#111 POLICY - FAA to provide greater oversight of DPEs to insure that all pilots meet the applicable requirements of aeronautical experience and proficiency for each certificate and/or rating. Brief these topics to DPEs at annual meeting and CFIs at FIRCs.	FAA Oversight of Designees
1.5	2.7	4.1	148	#148 POLICY - FAA/Industry encourage flight schools (61 and 141) to adopt MEL programs	Flight School SMS
2.8	2.3	6.4	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).	SE-27 R ³

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3.4	1.7	5.8	184	#184 TECHNOLOGY- iCAS. Goal: Provide "electronic parachute" type capability. Integrate electronic navigation and automatic flight management system to provide capability. Manual or automatic iCAS system that can maneuver the aircraft clear of terrain. GAMA/NBAA poll industry for current and near future capabilities, indentify neferious regulatory obstacles, recommend a course of action to achieve synergistic implementation.	SE-27 R ³
1.9	3.0	5.7	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	CFI
1.9	3.0	5.7	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.	SE-21 Risk Based Flight Review
1.9	3.0	5.7	138	#138 EDUCATION - FAA/ Industry promote education/outreach to include training on the importance of abiding by limitations and knowledge of aircraft performance when operating on edge of CG/weight envelope especially for specific aircraft. Also focus on take-off configuration and utilizing systems like an AOA indicator.	Outreach
2.8	2.0	5.6	75	#75 TECHNOLOGY- FAA/industry to provide cost effective measures to install AOA/envelope protection technologies for the GA community	SE-2 AOA
2.2	2.5	5.5	70	#70 - TRAINING - FAA and industry to revise private pilot training ciriculum 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).	SCF-PP - Takeoff
2.5	2.2	5.5	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.	SE-22 FDM
1.8	3.0	5.4	96	#96 TRAINING -- Introduction to risk based decision-making for GA pilots (FAA Risk Management Handbook); integrate into pilot training programs; scenario based training	SE-3 ADM
1.8	3.0	5.4	117	#117 EDUCATION - Industry Promote local flying clubs and pilot associations to help foster an environment of education and mentoring for pilots.	Culture

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1.9	2.7	5.1	100	#100 EDUCATION - FAA/Industry create and promote an App that advises pilots of drugs that are on the "no-fly" list as well as "approved" drugs that still can degrade pilots skills. App would clearly show pilots how and for how long they can affect their piloting ability. Also includes drug interaction.	SE - 15 Impairing Medications
1.7	3.0	5.1	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.	SE-3 ADM
1.7	3.0	5.1	188	#188 TRAINING - Goal: Reduce accidents by reminding pilots that their primary duty is to fly the aircraft. FAA/Industry produce an outreach campaign to remind pilots of the importance of Aviate/Navigate/Communicate.	Outreach
2.2	2.2	4.8	179	#179 POLICY - Goal: Improve flight test outcome. Increase industry involvement in advice or oversight of homebuilt/amateur/ultralight aircraft flight testing. FAA and EAA/Industry coordinate on how flight test pilots will be endorsed, authorized, recommended, or recognized. Promote use of AC 90-89 as revised.	SE-23 E-AB
2.0	2.3	4.6	147	#147 POLICY - Industry adopt the recommendations from NTSB SIR-08/01 Special investigation on the safety of parachute jump operations.	NTSB
1.7	2.7	4.6	141	#141 TRAINING - FAA/ Industry encourage further scenario based training requirements for handling spatial disorientation. Spatial disorientation introduction/training will simulate the scenarios in which a pilot might encounter spatial disorientation.	Outreach
1.5	3.0	4.5	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.	SE-10 Stabilized Approach & Landing
1.5	3.0	4.5	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.	SE-3 ADM
1.5	3.0	4.5	73	#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 updated to reflect this. #73B TRAINING - Industry promotion of training aids already available regarding weight and balance.	SE-10 Stabilized Approach & Landing

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1.5	3.0	4.5	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.).	SE-10 Stabilized Approach & Landing
1.8	2.5	4.5	154	#154 POLICY - FAA/Industry review and edit as necessary PHAK to include upset prevention and recovery techniques	UPRT
1.5	3.0	4.5	186	#186 TRAINING - Goal: Reduce mountain flying accidents. FAA and associations work to emphasise the need for training and currency when flying in montainous areas.	Outreach
1.5	3.0	4.5	194	#194 EDUCATION - FAA and Industry to review guidance and material on emergency landing after takeoff and revise as necessary. Revisions and best practices could be incorporated into the PTS/AIM/PHAK. Emphasis should be on briefing what to do if engine failure at any time during takeoff up to an appropriate safe altitude.	SCF-PP - Takeoff
1.6	2.8	4.5	175	#175 EDUCATION - Goal: Reduce pilot fatalities by providing best practices and technical guidance to homebuilder/experiemental aircraft operators/builders. FAA/EAA outreach to EAA chapters, kit manufacturers, type club organizations.	SE-23 E-AB
1.9	2.3	4.4	25	#25A POLICY - FAA and industry to review the adequacy of the existing guidance and advisory material (including PTS) on stablized approach and go-around concepts in order. #25B TRAINING - FAA and industry to promote and emphasis the use of the stablized approach concepts (#25A) for use by the GA community (including type clubs).	SE-10 Stabilized Approach & Landing
1.9	2.3	4.4	144	#144 TRAINING - Industry/training providers teach proper techniques for managing unexpected events / teach how to recognize and manage startle response (if becomes a DIP, check proper term)	CFI
1.5	2.8	4.2	121	#121 EDUCATION- Industry establish an educational campaign on use of Personal Minimums.	Outreach

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1.9	2.2	4.2	157	#157 EDUCATION - Goal: Encourage CFIs and airmen to establish, maintain and adhere to personal minimums. Review existing materials and, if applicable, add a section to the PHAK and Flight Instructor handbooks on developing PIC decision making skills. Emphasise with CFIs the importance of teaching proper PIC decision making skills. If changes are needed to the PHAK, Flight Instructor handbooks and AC 61-98B (dated Apr 30, 2012) they should be coordinated with the ARAC. Add section to FIRC to teach CFI where to find and how to provide guidance to airmen during Flight Review on how the airman can develop their own personal minimums. Revise AC 61-98B to provide guidance on how to develop a set of personal minimums during the flight review together with the CFI. Review available products and materials and develop a product or products such as a personal minimums card or a web-based/smart phone application in support of an educational outreach campaign on use of personal minimums. Develop outreach campaign to promote the identification and use of products and materials for the establishment, periodic review, and revision or modification of personal minimums as personal circumstances and needs change. Remove outdated print and electronic material on this subject.	Outreach
1.9	2.2	4.2	182	#182 RESEARCH - Goal: Reduce accidents in twin engine aircraft which do not possess autofeather capability through automation. FAA aircraft certification (ACE-100) Examine potential retro-fit possibilities.	SE-27 R ³
1.5	2.7	4.1	130	#130 POLICY- FAA Revise PTS to include emphasis on emergency procedures as part of pre-takeoff briefing.	Standards
1.5	2.7	4.1	187	#187 TRAINING - Goal: Improve outcome when airman are faced with sudden, unexpected events. FAA and industry emphasize the importance knowing/practicing immediate action items and pre-briefing likely emergencies before takeoff. Flight training industry needs to develop a set of standards for training and testing of emergency procedures. Review military procedures on this subject. Include as emphasis item on flight review.	CFI
1.6	2.5	4.0	172	#172 TRAINING - Goal: Introduce risk-based decision making at the earliest point practical in airman training. Training providers integrate risk-based decision making into web based pilot training, pilot training syllabi, knowledge testing and practical testing standards and programs; scenario based training. FAA review and revise PTS as necessary. Encourage scenario-based training and testing in the context of PTS. Incorporate into periodic DPE and CFI training.	Standards

Appendix 19 — LOCWG 1.0 Example of Event Sequence

LOCWG 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												

Appendix 20 — LOCWG 2.0 Example of Event Sequence

LOCWG Sub Group #2													
Sort	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
MIA06LA106 Piper PA-23-250 Caribbean													
1	Pilot expressed trepidation towards piloting accident aircraft prior to accident flight	Lack of familiarity with aircraft type		26	PILOT - Inadequate/missing transition training (A4)			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 futher refine specifice transition training needs.	2.5	1	3.1	0.3
	Pilot departed TIST on a VFR flightplan at end of civil twilight												
	The remainder of the recorded radar data indicates that the heading and altitude changed numerous times, with the lowest recorded altitude being 300 feet and the highest 2,600 feet	Pilot did not maintain altitude		26	PILOT - Inadequate/missing transition training (A4)			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 futher refine specifice transition training needs.	2.5	1	3.1	0.3
				32	PILOT - Lack of piloting ability (A4)			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).	4	2	3.4	0.8
	Pilot stated he was "losing his bearing" to ATC	Pilot poorly communicated with ATC		30	PILOT - Lack of assertiveness/command with ATC (A2)			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)	3	1	2.4	0.1