To: Mike O'Donnell, AVP-1 (Government Co-Chair GAJSC)
Sean Elliott, EAA, (Industry Co-Chair GAJSC)

From: Corey Stephens, AVP-220 (Government Co-Chair SAT)
Jens Hennig, GAMA (Industry Co-Chair SAT)

Date: August 21, 2017

Subject: Phase 2 Recommendations from General Aviation Joint Steering Committee (GAJSC) Safety Analysis Team (SAT) about the Federal Aviation Administration's (FAA) development of the General Aviation safety metric and goal for post-FY2018

Background
In January 2017, the GAJSC approved recommendations for the FAA's "post-2018" general aviation safety metric. These recommendations were sent to the GAJSC co-chairs on March 17, 2017 (see attached memo).

At the June 28, 2017 GAJSC meeting, the FAA requested that the GAJSC Safety Analysis Team (SAT) by mid-August provide recommendations about two remaining issues about how to structure the post-2018 metric:

- (1) the establishment of the baseline years (*i.e.*, update to initial recommendation 5), and

- (2) the proposed rate of safety improvement including the number of years over which the improvement should occur (*i.e.*, update to initial recommendation 4).

SAT Post-2018 Metric Recommendations
The SAT expects a number of factors to help influence a declining fatal accident rate for U.S. general aviation operations. In addition to cooperative safety programs such as the GAJSC and other on-going industry and agency safety activities, other trends in the industry likely will help improve the aggregate safety of general aviation.

The SAT recommends that the FAA establish a more aggressive goal for the agency based on the current rate of improvement. The SAT further recommends that the FAA balance this more aggressive goal with the adoption of a conservative baseline in combination with a longer timeline until the target rate should be achieved as discussed below.

Baseline Years for Post-2018 Metric: **The SAT recommends that the FAA establish the fatal accident rate baseline for the post-2018 metric based on the three most recent and historically safest years in general aviation for which there is flight hour exposure data as of July 2017, specifically 2014, 2015, and 2016, at an average of 1.00 fatal accidents per 100,000 flight hours.** The SAT recognizes, as stated in the prior memo, that the 2016 data is preliminary.

The SAT also notes that a baseline of 1.00 fatal accidents per 100,000 flight hours aligns with the FY18 target rate established by the FAA a decade ago. This means that the baseline years for the post-2018 metric also would use the "old" target as a starting point.

Rate of GA Safety Improvement for Post-2018 Metric: The SAT recommends that the FAA build on the success of the recent years of cooperation between the FAA and industry through various forums, including the GAJSC, to establish a more aggressive safety improvement rate compared to the past decade.

The SAT also reinforces the importance of Recommendation 3 (provided in March) that the goal should be strategic. **The SAT recommends that the safety improvement target deadline for the FAA should be 2030**; *i.e.*, a 12-year timeline from 2018 through the final target rate year.

In place of the existing 1.0% rate reduction per year between FY09 and FY18 (for a total of 11%), the SAT discussed proposing a safety improvement rate of 1.5% per year starting with the 1.00 baseline in FY18. The 1.5% per year safety improvement over 12 years (*i.e.*, 0.985^{12}) would result in a safety target of 0.83 fatal accidents per 100,000 flight hours in 2030.

The SAT, however, recommends that the FAA "round" this target to 0.80 fatal accidents per 100,000 flight hours in a manner similar to the last metric, which the FAA rounded downward by 0.01 to simplify the public message (*i.e.*, for practical purposes the annual safety improvement would be 1.8% per year and the improvement would be a 20% reduction over twelve years through 2030).

The SAT recommends that the FAA establish a safety target of a 20% safety improvement over twelve years between the FY18 target of 1.00 fatal accidents per 100,000 flight hours and a FY30 target of 0.80 fatal accidents per 100,000 flight hours. This would replace the current target of "no more than one fatal accident per 100,000 hours in 2018" with a new FAA general aviation safety target of "a 20% improvement in the fatal accident rate by the year 2030" (or "20 by 30" to simplify the public message).

Dissenting View

One member of the SAT raised concern with establishing a 20 percent reduction in the fatal accident rate over a 12-year period and stated that it is "unrealistically optimistic and unlikely to be met" and that even an additional 15 percent or 10 percent improvement over today would be a challenge.

The member noted that the cause of the post-2013 improvement in GA safety has not yet been pin-pointed and that it would not be prudent to expect similar improvements in the future.

Additional Discussion

The SAT notes that the issues identified in March, specifically the lack of final FY16 and preliminary FY17 data, are still factors, but that the FAA is not in a position to wait for this data to become final. In an attempt to manage this issue, the **SAT also recommends that the FAA commit to conducting a mid-point review of the safety metric by 2025 to ensure that the goal is still achievable and that sufficient progress is being made to reach the 2030 target.** The SAT notes that there is precedent for this type of mid-point review, because the FAA, under AAI, worked with industry to revise the 1997-2007 metric in 2002 due to fundamental changes in the FAA APO forecast following the events of September 11th.

Finally, the FAA asked the SAT whether the GA safety metric should be expanded beyond its current scope (*i.e.*, Part 91 and on-demand Part 135 operations) to also include scheduled Part 135 operations. The SAT discussed this question and does not endorse a last minute expansion of the scope of general aviation to include *de facto* airline operations.

Appendix – Phase 1 Recommendation about Post-2017 Metric

To: Mike O'Donnell, AVP-1 (Government Co-Chair GAJSC)
Sean Elliott, EAA, (Industry Co-Chair GAJSC)

From: Corey Stephens, AVP-220 (Government Co-Chair SAT)
Jens Hennig, GAMA (Industry Co-Chair SAT)

Date: March 17, 2017

Subject: Recommendations from General Aviation Joint Steering Committee (GAJSC) Safety Analysis Team (SAT) about the Federal Aviation Administration's (FAA) development of the General Aviation safety metric and goal for post-FY2018 – Approved at January 2017 GAJSC Meeting

Background

The FAA's current safety metric and goal is to have no more than 1.00 fatal general aviation accidents per 100,000 hours flown in FY2018. This metric and goal was developed by the FAA in 2008-2009 with input from industry through the GAJSC General Aviation Data Improvement Team (GADIT). (The GADIT was incorporated into the SAT in the 2011 GAJSC revitalization effort.)

The FY2018 goal is based on an annual improvement (reduction in rate) of one percent per year starting with the three safest years recorded in general aviation (FY2007, 2008, and 2009). These three "baseline years" had an average fatal accident rate of 1.12 fatal accidents per 100,000 flight hours. Based on this average, the 1.00 rounded figure was selected to – among other things – simplify messaging about the agency's GA safety goal.

It should be noted that the current GA metric and goal is the second iteration of an agency safety target for general aviation operations. The FAA, as part of Safer Skies, established a goal to "remove a single year of accidents" over the decade leading up to 2007 based on expected levels of GA flying growing 1.6 percent per year during the following 10 years. The FAA also made a commitment in the late 1990s to transition to a rate-based safety metric goal for general aviation if both the accident data and exposure data (i.e., the GA and Part 135 Activity Survey) had been improved and become accepted by not only the agency but also industry stakeholders.

In 2015, the GAJSC tasked the SAT with developing recommendations for a post-FY2018 GA safety goal by spring 2017 to allow the agency to undertake the necessary coordination before the end of FY2018. The SAT met three times during 2016 to develop its input on the post-2018 metric. This memo contains the conclusions and recommendations from the SAT's evaluation, including a recommendation for further work to occur closer to the FY2018 transition.

Conclusions and Recommendations

Recommendation 1: The SAT recommends that the FAA continue to measure GA safety as a ratio between the number of fatal general aviation accidents and total hours flown.

The group discussed whether the numerator should be modified to include more accidents (e.g., the Alaska Fatal and Serious Injury measure), but concluded that the agency's focus should remain on preventing fatal accidents. The group also discussed alternatives to the denominator being based on

total hours flown, but determined that others measures of flight exposure (e.g., number of flights, landings) would introduce greater uncertainty in the data. (Hours are based on flight time, which can be found in logbooks and aircraft equipment (e.g., hobbs meter), while landings would be based on the pilot's recollection.) Alternatives to using flight hours as the denominator likely also introduce the risk of "double counting," since the same flight could be reported by multiple pilots.

The group discussed (in a manner similar to discussions in 2007-2008) whether to introduce a confidence interval or moving average around the annual safety target, but concluded that this statistical measure would likely generate significant confusion about the GA safety metric and goal, which could undermine the effectiveness of messaging around the metric and goal.

Recommendation 2: The SAT recommends that the FAA include those fatal accidents and flight time that is under the direct authority of the agency's oversight and focus on traditional general aviation flying.

The group discussed the issue of "public aircraft" (49 U.S.C. §§ 40102(a)(41), 40125) accidents and flight time and concluded that it should not be part of the FAA's safety metric, because the agency has limited authority over these operations.

The group also discussed the inclusion of Experimental Light Sport Aircraft (E-LSA) accidents and flights. The size of the E-LSA fleet was not fully considered when the current GA safety goal was developed in 2007-2008, because these aircraft only transitioned into the N-registered fleet in 2008-2010. As a result, the annual target and associated long-term goal did not consider the 4-6 annual fatal accidents that involve E-LSA aircraft. Since then, the E-LSA fleet has been fully integrated into general aviation flying and should remain part of a post-2018 GA fatal accident metric and goal.

Additionally, the group discussed whether there could be a consistent mechanism to exclude those accidents that involved reckless behavior by the pilot. Although these accidents are frustrating to the community, the SAT did not identify a consistent set of criteria through which reckless accidents could be excluded from the data set and acknowledged the challenges of reaching a definition universally acceptable to stakeholders. Additionally, if a recklessness definition was introduced by the FAA and the reckless accidents were excluded, the group expected that this would cause the FAA's accident data to diverge from the accident data published by the National Transportation Safety Board (NTSB), which could confuse internal and external stakeholders. The SAT may do future work to look at the scope of reckless accidents in the GA fatal accident dataset, but not as part of an official metric activity.

The group also concluded that it would significantly confuse and create a nonsensical metric if any UAS accidents (unrelated to manned aircraft accidents) were included in a GA metric. It was noted that work is underway in parallel through the FAA's Unmanned Aircraft Safety Team (UAST) to develop data and a safety goal for UAS.

Recommendation 3: The SAT recommends that the FAA establish a long-term, strategic goal to enhance general aviation safety.

Enhancing safety is a systematic effort that requires technical analysis and the ability to effect training, educational outreach, aircraft design and equipment, and the culture in the aviation community. As a result, establishing short-term goal would not be conducive to the development and implementation of safety enhancements by FAA or the aviation community. The group proposes that the FAA's new safety

goal be targeted at 2030. If the agency selects a different year, it should be on the order of a decade from its baseline.

Recommendations For Future Work

The group was unable to make final recommendations about two key components of a safety metric at this time, but instead summarizes below what the SAT has concluded and presents the recommended next steps the FAA should take as part of its work to establish a post-2018 GA safety metric and goal.

Initial Recommendation 4 in Preparation for Future Work on the Safety Improvement: The FAA should establish a GA safety metric, which is an improvement (i.e., reduction of the rate of fatal accidents) in the baseline years.

Some voices have expressed an interest in simply "maintaining safety" for general aviation in the post-2018 environment. This is not acceptable to the SAT, because the aviation industry always strives to enhance aviation safety. Further, the SAT does not believe that the lowest reasonably achievable fatal accident rate has been reached.

The FY2014, 2015, and 2016 data point to a change in GA safety in which the rate of GA fatal accidents has shifted from approximately 1.10 fatal accidents per 100,000 hours to 0.90 fatal accidents per 100,000 hours. This recent trend follows a decade during which the GA fatal accident rate had been mostly stable occurring at a rate between 1.09 and 1.17 fatal accidents per 100,000 hours. Due to this recent and notable change in GA safety, the group concluded that it is premature to make a specific recommendation to the FAA about target for GA safety improvements post-2018.

Instead, the group recommends that FAA and industry monitor the FY16, FY17, and early FY18 data to help inform a decision about the post-2018 safety target. The FAA – working through the GAJSC – should reconvene with the industry stakeholders in 2018 to update Recommendation 4, about the rate of safety improvement post-2018.

Initial Recommendation 5 in Preparation for Future Work on the Baseline Years: The FAA should establish a set of baseline years for the GA safety metric to ensure the combination of Safety Target (see Recommendation 4) and Baseline Years are congruent.

As noted above, the recent GA safety data indicates a change in the accident rate which, at the current trajectory, will make the "baselining" exercise for the post-2018 metric more difficult. The current baseline (i.e., average of FY2007, 2007, and 2008) was based on the three safest years previously recorded in general aviation, but the accident rate was also mostly stable at 1.09, 1.12, and 1.14 during these three years. The recent accident rates, however, have changed from 1.09 (final), to 0.99 (final) to 0.91 (preliminary), which poses greater variance.

The group recommends that FAA and industry monitor the FY16, FY17, and early FY18 data to help inform a decision about the post-2018 fatal accident rate baseline. The FAA – working through the GAJSC – should reconvene with industry in 2018 to update Recommendation 5 about the rate of safety improvement post-2018 and to consider whether only three years should be used for the new metric and associated goal's baseline fatal accident rate.

Other considerations: The SAT, in addition to the above five recommendations, also noted that a post-2018 goal should be easy to understand for all stakeholders, including those external to the aviation

community. As an example, the group considered a 20 percent improvement by 2030 (i.e., “20 percent by (20)30)”, which would be an annual improvement of approximately 1.5 percent compared to the past decade’s one percent per year improvement. Although the SAT did not recommend a specific goal, it did agree that one of the benefits of the current goal is the ease of communicating it (i.e., one per 100,000 hours by 2018).

The SAT also recommended that the FAA review whether other jurisdictions have safety metrics for general aviation. It was noted that exposure data about general aviation is limited outside the United States, but that the FAA may want to review safety plans from Australia, Canada, and the United Kingdom. (Note – EASA is currently in the process of developing a GA survey, but its results are not expected until late 2017.)