GENERAL AVIATION ACCIDENT RATE: HOW GENERAL AVIATION DIFFERS FROM COMMERCIAL AIRLINE FLIGHT AND HOW TO CORRECT THE DISCREPANCY

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TABLE OF CONTENTS

INTRODUCTION ............................................. 381
I. GENERAL PILOT LICENSING .............................. 383
   A. PRIVATE VS. COMMERCIAL AIRLINE PILOT LICENSING REQUIREMENTS .................. 385
   B. PILOT MEDICAL REQUIREMENTS ...................... 386
   C. LICENSING DIFFERENCES AS A CAUSE OF PRIVATE AIRCRAFT INCIDENTS .............. 387
      1. Flight Hour Requirements ....................... 388
      2. Testing Requirements ............................. 390
      3. Pilot Medical Requirements .................... 393
II. CONTINUING EDUCATION AND THE INABILITY TO LEARN FROM PAST MISTAKES AS A CAUSE OF GENERAL AVIATION INCIDENTS ........................................ 398
III. LESS STRINGENT SAFETY REQUIREMENTS AS A CAUSE OF GENERAL AVIATION INCIDENTS .................... 401
   A. OPERATOR REGULATIONS BY OPERATION ........... 401
   B. INSPECTION AND MAINTENANCE REGULATIONS ... 404
   C. DIFFERENCES IN TECHNOLOGY ..................... 408
IV. RECOMMENDATIONS ...................................... 414

INTRODUCTION

In 2011, THERE WERE 1,466 general aviation accidents (civilian aviation incidents excluding scheduled commercial airline

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flights) in the United States. However, according to the U.S. National Transportation Safety Board (NTSB), there are very few new causes of these aviation accidents. Most of the causes of general aviation crashes each year are repeated causes of previous incidents.

Since 2000, the crash rate for commercial jetliners has dropped by 85%. Commercial airline crashes due to icing, mid-air collisions, inadvertent ground contact, and turbulence—historically, the primary causes of many commercial airline incidents—have virtually disappeared with improved technology and training. In contrast, according to the NTSB, the crash rate of private flights over the same time period has increased by 20%. In addition, the rate of deadly wrecks involving private flights has increased by 25% since 2000. For some reason, private pilots are not benefiting from increased safety knowledge and technology in the same way as commercial pilots. What is the cause of the deviation in the number of safety-related incidents in private flights compared to commercial airline flights? This comment examines several issues that might contribute to these disturbing statistical trends. First, it compares pilot licensing, training, and medical requirements for flying private and commercial passenger flights. Then, this comment discusses continuing education requirements and the disturbing trend of general aviation pilots being unable to learn from past mistakes. Next, it examines current safety regulations and technology deviations between the two different industries. Finally, this comment discusses recommendations to decrease the general aviation crash rates.

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2 Id.
3 Id.
5 Id.
6 Id.
7 Id.
8 Id.
I. GENERAL PILOT LICENSING

Overall, there are two main entities involved in the regulation of airline safety within the U.S. government. Regulation of the aerospace industry as an independent entity was first initiated by Congress in 1926 with the Air Commerce Act. This Act established the Federal Aviation Administration (FAA) to provide for the “safe and efficient use of the airspace” and was eventually placed under the U.S. Department of Transportation (DOT). The FAA is still the main entity responsible for issuing all of the regulations for U.S. aerospace systems, including regulations for the aircraft itself, as well as for pilots, aircraft inspections, airports, and commercial airline manufacturers and service providers.

The safety aspect of the aerospace industry is overseen by the NTSB, an independent agency of the federal government. The NTSB is in charge of investigating all civil aviation accidents, and it issues many of the aviation accident statistics available to the public. The NTSB also has the power to review FAA certifications and licenses through formal hearings involving the FAA and the petitioning party. Both the NTSB and the FAA play a major role in determining the aviation safety requirements necessary to adequately protect aircraft pilots, passengers, and people on the ground.

Generally, all pilots are required to be certified under Part 61 of the Federal Aviation Regulations (FARs). Part 61 prescribes the requirements for issuing pilot certificates and ratings, sets out which certifications are necessary for certain types of aircraft and flight, and sets the limitations that the certifications pro-

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14 Id.
vide. Once a pilot has passed all of the FAA-issued requirements for a license, a pilot receives a "private pilot certificate." Each certificate contains limitations on the "privilege level" at which a pilot is allowed to fly and lists which aircraft "categories" and "classes" are authorized under that privilege level. The privilege levels discussed in this comment include those for private pilots, who may fly for pleasure or personal business without compensation; commercial pilots, who are allowed to fly for basic compensation, with some limitations; and airline transport pilots, who are authorized to fly as pilots-in-command of scheduled passenger aircraft.

A pilot can also separately add an "instrument rating" to certain licenses by taking additional, intensive instrument and meteorology training and instruction beyond that required for the basic pilot certificate license. This certification gives private pilots the ability to fly using "instrument flight rules," which are used when private pilots must rely mostly upon the aircraft's instruments—rather than upon outside visual references—due to non-ideal weather conditions, such as cloudy or stormy weather.

To add a license or certificate, a pilot is usually required to complete three steps: (1) undergo training from an FAA-certified flight instructor; (2) log specific flight experience related to the license to be earned; and (3) pass a knowledge exam consisting of written, oral, and practical components carried out by an FAA inspector or a pilot examiner.

The FAA has the power to impose limitations on all of these licenses if a pilot lacks certain necessary skills to exercise the rights of that particular privilege level or aircraft category or class. Limitations can also be imposed due to medical condi-

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17 Id. § 61.1(a).
18 See id. § 61.5(a)(1).
19 See id. § 61.5(a)-(b).
20 Id. § 61.113 (private pilots); id. § 61.133 (commercial pilots); id. § 121.437(a) (airline transport pilots).
21 See id. § 61.65. But see id. § 61.153(d) (demonstrating that to be eligible for an airline transport license, an instrument rating must already be achieved during an earlier licensing level).
23 See 14 C.F.R. §§ 61.102–117, 61.151–167 (discussing the requirements that must be met for each level of pilot certification).
24 Id. § 61.13(b)–(c).
tions. While pilot licenses never expire, pilots are required to maintain regular flight experience and must undergo flight reviews with an FAA instructor every two years. Medical examinations are required at specified intervals depending on a pilot’s age, medical history, and the level of flight certification held.

A. PRIVATE VS. COMMERCIAL AIRLINE PILOT LICENSING REQUIREMENTS

The requirements of licensure for a private pilot versus a commercial airline pilot vary significantly. A majority of active pilots hold private pilot certifications. A private pilot certificate is the first step for any pilot wanting to eventually obtain an airline transport pilot license. Under FAR Part 61, a pilot hoping to obtain a basic private pilot license must: (1) be at least seventeen years old; (2) be able to speak, write, and understand English; (3) obtain at least a third-class medical certificate; (4) pass the required knowledge exam; and (5) log at least forty hours of flight time, including ten hours of solo flight time and at least three hours of night training. This certification gives a pilot the ability to fly as long as the meteorological conditions allow a pilot to see and avoid obstacles while flying. If weather conditions are such that a pilot is unable to use visual cues, such as horizon location or other nearby aircraft identification, a private pilot must have an additional instrumentation certificate to be allowed to fly.

In contrast, a pilot-in-command of a commercial airline operation must earn the highest level of licensure for piloting ability—the airline transport pilot license. To obtain an airline transport license, a pilot must have at minimum 1,500 hours of

25 See id. § 61.23.
26 See id. § 61.56.
27 See id. § 61.23(d) (showing a table of specified medical certificate expirations).
29 See 14 C.F.R. § 61.123(h) (requiring that applicants for a commercial certification first be certified as a private pilot); id. § 61.153(d) (requiring that applicants for an airline transport pilot certification first be certified as a commercial pilot).
30 Id. §§ 61.103–109, 61.23(a)(2)–(3).
31 See id. § 91.155.
32 Id. § 61.57(c).
33 Id. § 135.243(a)(1).
flight time, including 100 hours of nighttime flying and 75
hours of instrumentation flight time.34 Other requirements in-
clude being at least twenty-three years old, passing a knowledge
examination, and obtaining a first-class medical certificate.35 Al-
though a second-in-command pilot of a scheduled commercial
airplane previously had to obtain only a commercial license, in
February 2012, the FAA issued a proposal that would require a
second-in-command pilot to also obtain an airline transport pi-
lot license.36 For second-in-command officers, this meant a
change from a minimum of 250 hours of flight time to 1,500
hours before they could obtain the necessary licensing.37

B. PILOT MEDICAL REQUIREMENTS

A private pilot has a lower medical clearance requirement
than a pilot of a commercial airliner.38 The FAA has the sole
authority to issue medical certificates and can issue a certificate
or reject certification to a pilot at any time based on medical
reasons.39 Private pilots are required to pass a third-class medical
examination.40 This examination is similar to a yearly checkup
and requires information about general health history and
mental health issues, as well as basic vision and hearing tests.41 A
third-class medical examination is valid for five years for people
under forty years of age.42 Otherwise, the examinations are re-
quired every two years.43

By contrast, a first-class medical examination is required for
pilots who are in charge of scheduled commercial airliners (i.e.,
airline transport pilots).44 These exams are much more exten-

34 Id. §§ 61.153–159.
35 Id. §§ 61.153–159, 61.23(a)(1).
36 Pilot Certification and Qualification Requirements for Air Carrier Opera-
tions, 77 Fed. Reg. 40 (Feb. 29, 2012) (to be codified at 14 C.F.R. pts. 61, 121,
135, 141, & 142).
37 Press Release, FAA, FAA Proposes to Raise Airline Pilot Qualification Stan-
dards (Feb. 27, 2012) (on file with author).
38 14 C.F.R. § 61.23; Summary of Medical Standards, FAA, http://www.faa.gov/
about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/syn-
opsis.pdf (last visited Jan. 21, 2013).
39 See 49 U.S.C. §§ 44702, 44703(a), 44709; 14 C.F.R. §§ 61.3(c), 67.4; Become a
medical/ (last visited Apr. 9, 2013).
40 See 14 C.F.R. § 61.23(a)(3).
41 Id. §§ 67.301–313.
42 Id. § 61.23(d).
43 Id.
44 Id. § 61.23(a)(1).
sive, requiring the basic exam as well as cardiovascular function testing, age-related testing, and an EKG. First-class medical examinations are valid for one year for pilots under forty years of age. Otherwise, the examinations are required every six months.47

In addition to the difference in medical examination requirements, the age specifications vary significantly between private and air transport licenses. As stated above, the minimum age at which one can receive a private pilot license is seventeen, and there is no upper age limitation as long as the medical examination requirement is met.48 For pilots in the commercial passenger airline industry, the minimum required age to obtain an air transport license is twenty-three; however, commercial airline pilots are required to retire from commercial passenger piloting at age sixty-five.49 They can continue on as private or commercial pilots, but they cannot fly scheduled commercial passenger aircraft.50

C. LICENSING DIFFERENCES AS A CAUSE OF PRIVATE AIRCRAFT INCIDENTS

Pilot error is the most common cause of plane crashes.51 Pilot judgment is needed to deal with issues relating to weather conditions, navigation, instrumentation reading, aircraft operation, and many other tasks.52 As shown above, there are many significant differences between pilots of private planes and pilots of scheduled commercial passenger aircraft.53 The number of training hours needed before licensure, the minimum required medical standards, and the age restrictions could play a part in a pilot's judgment abilities before, during, and after a private flight.

Studying current FAA regulations to determine the leading causes of private aircraft crashes is difficult given the multitude

45 Id. §§ 67.101–113.
46 Id. § 61.23(d).
47 Id.
48 Id. § 61.103(a).
49 Id. §§ 61.153(a), 121.383(e)(1).
50 Id. § 121.383(e)(1).
52 See Pilot Error, supra note 51.
53 See supra Part I.A–B.
of piloting requirements, the differences in those requirements between private pilots and scheduled commercial passenger airline pilots, and the many factors that can play a role in a deadly aircraft accident. Most of the licensure requirements for private pilots are significantly less restrictive than licensure requirements for commercial airline pilots, but this could be a reflection of the difference in difficulty between commercial passenger transport and private airplane flying. However, the fact that the number of general aviation crashes continues to rise while the number of commercial airline incidents decreases suggests that some discrepancy does exist.\footnote{See Levin, \textit{supra} note 4.}

\section{Flight Hour Requirements}

Between August 1, 2003, and April 30, 2004, the NTSB collected study data on general aviation incidents that occurred due to weather-related factors.\footnote{\textsc{NAT'L TRANSP. SAFETY BD., SAFETY STUDY NTSB/SS-05/01, RISK FACTORS ASSOCIATED WITH WEATHER-RELATED GENERAL AVIATION ACCIDENTS 21} (2005) \textit{[hereinafter NTSB SAFETY STUDY]}, available at http://www.ntsb.gov/doclib/safetystudies/SS0501.pdf.} While the study was meant to review weather-related risk factors in general,\footnote{Id. at 14.} it also gave a glimpse into the role that pilot training and experience might play in aviation safety, along with what factors might increase the successful decision-making skills of some pilots over others. Pilots involved in weather-related general aviation crashes were compared to pilots with similar flight training experience and history who had not had accidents during the same time period.\footnote{Id.} The data from the study involved only general aviation accidents—it excluded scheduled commercial passenger flights.\footnote{Id. at 14.} Pilots involved in the study ranged in age from nineteen to eighty-one, with the mean age between forty-six and fifty-three.\footnote{Id.} The average number of years of flight experience was approximately eighteen.\footnote{Id. at 14.} While the pilots in the study were operating general aviation flights, they could have held any license status available, ranging from the lower-level private pilot’s license to the highest-level airline transport certification.\footnote{Id. at 22-24.}
One of the first graphs provided by the NTSB safety study displayed the type of pilots typically involved in weather-related general aviation crashes. The graph split the pilots into "accident" and "non-accident" groups. The overall licensing distribution of the study pilots not involved in weather-related crashes was approximately 35% private licensees and 27% airline transport licensees. However, of the pilots in the study who were involved in accidents, 61% of the pilots involved in weather-related general aviation crashes held only a private pilot's license. Only 4% of the pilots involved in weather-related general aviation crashes held the highest-level airline transport license.

This data skew was similar when the study looked at the pilots generally over an eighteen-year period. Figure 7 shows that general aviation crashes were overwhelmingly (approximately 50%) more likely to occur for private pilots than all other pilots combined. Overall, as shown in Figure 7, the studies found a significant statistical difference in the types of licenses held by accident and non-accident pilots flying the same planes, with a much higher percentage of private licensees in the accident group. This data emphasizes that obtaining a higher-level license plays an important role in a pilot's knowledge and decision-making skills in aviation safety and crash avoidance.

What was most interesting was that a pilot's number of years of flight experience had little to no effect on whether the pilot would be involved in a general aviation accident. It would be a natural inference that as a pilot gains more aviation experience, the pilot's judgment and knowledge should improve, decreasing the chance of an accident. However, in the study, there was no corresponding difference in the number of years of piloting experience held by the accident and non-accident groups. Recalling from above, private pilot license holders are only required to log forty hours of flight time before receiving their private

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62 Id. at 23.
63 Id.
64 Id. at 23, 25.
65 Id. at 22–23.
66 Id.
67 Id.
68 See id. at 23.
69 See id.
70 Id. at 25.
71 Id.
pilot's certificate.\textsuperscript{72} Airline transport license holders, in comparison, are required to log 1,500 hours.\textsuperscript{73} This is a large disparity in the number of flight hours required. However, the lack of a relationship between years of flight experience and accident potential demonstrates that this discrepancy may not be to blame for the high accident rate among private pilot licensees compared to airline transport licensees, at least with regard to small, private general aviation aircraft.

The data above definitively shows that private pilots are less prepared than their higher-licensed counterparts when it comes to preventing weather-related general aviation crashes. The fact that gaining years of flight experience after receiving certification does not decrease accident likelihood suggests that the initial training requirements are even more important.\textsuperscript{74} The lack of a definite relationship between overall flight hours and accident potential emphasizes that classroom hours and knowledge exams at the initial stages of licensure must play a large role in accident prevention.\textsuperscript{75}

In summary, while the amount of knowledge and training needed for airline transport licensees to fly large scheduled commercial airliners is greater than that required to fly a simple, four-seat private aircraft, the data above shows that the increased training pays off when it comes to safety—even if the additional information is not essential to the actual ability to fly a small private plane. This large difference in pilot safety in weather-related, accident-prone conditions mandates that the training for private pilots be increased to better reflect the training received by their advanced-licensed, safer counterparts. However, the counterintuitive data regarding flight experience and the lack of correlation with safety risks suggest that increasing the required number of flight training hours for private pilots, while possibly beneficial, is not a complete solution.

2. Testing Requirements

Both airline transport pilots and private pilots are required to pass knowledge and practical exams before a certificate can be granted.\textsuperscript{76} All knowledge exams last two to three hours and re-

\textsuperscript{72} 14 C.F.R. § 61.109(a) (2012).
\textsuperscript{73} Id. § 61.159(a).
\textsuperscript{74} See NTSB SAFETY STUDY, supra note 55, at 25.
\textsuperscript{75} See id.
\textsuperscript{76} 14 C.F.R. §§ 61.103(e), 61.103(h), 61.153(f)-(g).
quire a score of at least 70% to pass. If a student receives a failing score on a knowledge exam, the student is required to present an endorsement from an authorized flight instructor that the required additional flight training has been completed before the test can be retaken. Practical exams involve a flight monitored by an approved instructor to determine an applicant's knowledge of aircraft flying procedure and good decision-making skills. While the FAA provides a list of guidelines to be used by the designated pilot examiners, the examiner has subjective control over whether a student passes or fails.

In the NTSB study discussed above, there was a statistical difference between accident and non-accident pilot scores on both the knowledge and practical exams. Because the pilots in the study had taken different numbers of tests (depending on whether any of the tests were retaken and depending on the licensure level received), the NTSB determined a “cumulative pass rate” score for each pilot by dividing the total number of tests passed by the total number of tests a pilot had taken. For knowledge exams, the accident pilots had a mean pass rate of 86%, while the non-accident pilots had a cumulative pass rate of 95%. For practical tests, the accident pilots had a mean pass rate of 84%, while the non-accident pilots had a cumulative pass rate of 95%. These statistics suggest that pilots’ success with the testing-based education received for pilot certification correlates with future safety risks.

As the data above demonstrates, airline transport pilots are involved in fewer crashes in private aircraft than private aviation licensees. The data also indicates that an increase in flight hours generally does not correct the safety discrepancy between the different levels of licensees. Because passing scores on knowledge- and practical-based testing are the only other learning-based requirements to earn a license besides achieving the required number of flight hours, the data trends show that these

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78 14 C.F.R. § 61.49(a).
79 Id. §§ 61.103(h), 61.107(b).
81 NTSB SAFETY STUDY, supra note 55, at 27-28, 40-41.
82 Id. at 27.
83 Id.
84 Id.
initial examinations are very important in helping prevent aviation crashes in the future.

Overall, the NTSB study shows that, on average, pilots who are prone to weather-related accidents achieved lower scores on both knowledge and practical exams than airline transport pilots. This could be due to two reasons. First, in general, pilots involved in general aviation accidents could be less intelligent or less knowledgeable when it comes to aviation overall, leading to lower scores on tests related to these topics. If this is the issue, the correction is simple. When pilots fail a general aviation knowledge exam, instead of simply requiring an additional sign-off by an instructor to retake the same exam, the FAA should require additional classroom and examination time to increase knowledge skills. Assuming that the failure to pass is due to a lack of understanding, the response should be mandated educational requirements and additional examinations. Since the safety risk is higher for these particular individuals, the increased education will work to protect the pilots themselves as well as passengers and other pilots.

Second, if pilots who are prone to weather-related accidents are more likely to be private licensees and are more likely to have failing grades on knowledge or practical examinations, then perhaps private pilot training is responsible for the correlation. To correct this problem, the FAA should increase the classroom time and number of tests required to receive a private pilot's certification. To become an airline transport pilot, practical- and knowledge-based tests must be taken at each certification level before reaching airline transport testing levels. Since airline transport pilots have to take so many tests to obtain advanced licensee status, these pilots might become better at these examinations over time, and the additional testing could eventually lead to higher passing rates as the number of tests previously taken increases. Either way, the passing rate for both types of examinations is a direct indicator of safety risk and should not be ignored by the FAA.

One additional fact that the NTSB study pointed out was that not having an “instrument rating” increased the risk that a private licensee would be involved in a weather-related general aviation accident by almost five times. An instrument rating requires additional, intensive airplane instrument and meteoro-

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85 14 C.F.R. §§ 61.153(d), (f)-(g).
86 NTSB SAFETY STUDY, supra note 55, at 34.
logical training.\textsuperscript{87} Having this rating also increases the type of weather conditions in which a licensed pilot is approved to fly.\textsuperscript{88}

This statistic reemphasizes the importance of additional classroom education requirements before obtaining a pilot's license. Additional classroom time and examinations, specifically in the areas of weather and flying an airplane in lower visibility conditions (instrument training), increase the likelihood of preventing a weather-related general aviation crash. While this seems logical—additional weather training leads to fewer weather-related crashes—it is important to remember that the pilots involved in the study were not breaking any weather-related flying regulations. Pilots who have not received instrumentation training are generally only allowed to fly in clear, visible weather conditions.\textsuperscript{89} A little less than half of the study pilots were operating in conditions that did not require the additional instrument testing and rating.\textsuperscript{90} They were, however, involved in weather-related crashes. This suggests that although risky weather conditions can occur even in good visibility, the achievement of an instrument rating decreases the risk of an accident no matter what the conditions outside appear to be. Considering that an accident is five times more likely without the instrument rating, this testing requirement should be added to the private pilot's license as a requirement, not an option. No pilot should be allowed to fly without knowing how to operate the plane in lower visibility weather conditions. Instrument training should be imperative, even with the most advanced meteorological technology, because weather can be erratic and unpredictable. In addition, being allowed to fly a plane is a privilege, not a right, and pilots should not fly without advanced knowledge of how to operate the aircraft, no matter what the situation.

3. **Pilot Medical Requirements**

Scheduled commercial passenger airline pilots are required by law to retire at age sixty-five.\textsuperscript{91} However, the retirement is a condition only for scheduled commercial airline pilots flying for income; a pilot over the age of sixty-five can continue to fly gen-

\textsuperscript{87} 14 C.F.R. § 61.65.
\textsuperscript{88} See id. § 61.57(c).
\textsuperscript{89} See id. §§ 61.57(c), 91.155, 91.205(d); see also FAA, Instrument Flying Handbook, supra note 22.
\textsuperscript{90} NTSB Safety Study, supra note 55, at 21.
\textsuperscript{91} 14 C.F.R. § 121.383(e)(1).
eral aviation for other reasons. When they reach the age of sixty-five, pilots have no more need for the airline transport license, and pilots might drop down to private licensee status (due to medical requirements or other reasons) so that they can continue to fly for pleasure. Because of this, it is logical to think that age is possibly a factor in the statistics described above. If, as the earlier NTSB study suggested, there is a significantly higher percentage of private license holders involved in general aviation accidents, then perhaps this statistic is not related to advanced licensing (and thus the extensiveness of training received), but the age of the pilot. If most of the pilots involved in the weather-related accidents are over sixty-five, this would explain the high percentage of private pilot licensees involved in crashes—pilots over sixty-five no longer have airline transport licenses!

Reviewing the data, this could partly be the case. A distribution of the study pilots by age at the time of accident showed that the over-sixty age group was overrepresented in the accident group, accounting for almost 40% of the studied accident pilots, and underrepresented in the non-accident group, accounting for only 15% to 20% of the non-accident pilots studied. Mathematical analysis of pilot age in the NTSB study showed a meaningful statistical difference in average age between the studied accident and non-accident pilots, with the average accident pilot being far older than his or her non-accident counterpart.

Over the last sixty years, the FAA has agreed that age is directly correlated to a pilot's safety risk and flying ability. The FAA's stance in numerous cases where pilots asked for exemption from the rule has been that the evidence clearly shows that the advanced age of a pilot increases the risk of an accident due to sudden incapacitation or skill deterioration, and that there is no evidence to the contrary strong enough to qualify any pilots for an exemption from the baseline rule.

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92 See id. Part 121, which applies only to scheduled air carrier operations and not to private operations, is the only provision containing a mandatory retirement age. See id.

93 See NTSB SAFETY STUDY, supra note 55, at 23.

94 See id. at 24.

95 Id.

96 See Baker v. FAA, 917 F.2d 318, 319 (7th Cir. 1990); see also Yetman v. Garvey, 261 F.3d 664, 667 (7th Cir. 2001); Prof'l Pilots Fed'n v. FAA, 118 F.3d 758, 767 (D.C. Cir. 1997).
Some pilots have argued that instead of a mandatory retirement age, the medical examination requirements should change more radically as pilots age to ensure the health of older pilots. This would allow pilots to remain at work longer, as long as they are physically healthy and do not pose a safety risk. However, the FAA has been firmly opposed to this idea. The FAA explained that older pilots are much less reliable in terms of sudden health changes. While certain conditions in younger pilots can be adequately monitored and assessed, FAA doctors are “unable to determine whether an older but apparently healthy pilot will be afflicted with a dangerous condition.” In addition, doctors are “unable to predict with which of the myriad conditions that accompany advancing age an individual pilot is likely to be afflicted.” While the statute recently changed the mandatory retirement age from sixty to sixty-five to reflect the findings of the latest advanced age-related cognitive studies, the FAA has not changed its original opinion that the benefits of additional experience do not outweigh the risks of flying at an advanced age.

Considering the emphasis the FAA has put on requiring pilots over the age of sixty-five to retire from scheduled commercial airline flight, it is interesting that the rule has not been applied evenly to all pilots, including pilots flying general aviation solely for pleasure. Small aircraft are much more likely to be involved in accidents than large commercial airliners. Typically, there is only one pilot in a small general aviation aircraft. In commercial flights, there are multiple trained pilots, allowing for backup if something occurs that renders a pilot unable to fly the plane as planned. If FAA doctors are unable to predict when an advanced age pilot will become incapacitated, why are we allowing pilots over the age of sixty-five to pilot small, private aircraft alone, especially when there are innocent passengers onboard?

97 See Yetman, 261 F.3d at 667–68, 671–72; Profl Pilots Fed’n, 118 F.3d at 762, 767; Baker, 917 F.2d at 321–28.
98 Yetman, 261 F.3d at 668.
99 Id.
100 Profl Pilots Fed’n, 118 F.3d at 767.
101 Id. at 765.
102 Id.
103 See 14 C.F.R. § 121.383(e)(1)–(2) (2012) (additional restrictions are placed on pilots at age sixty and above regarding flight operations between the United States and foreign countries).
104 Levin, supra note 4.
Planes are different than other forms of transportation in that each crash has a higher likelihood of fatalities due to the height the plane is above the ground (versus a car or boat, for example). While older pilots might argue that the required retirement age for commercial aircraft should not be applied to private planes (as private flying for pleasure does not put one hundred or so passengers at risk), an older pilot flying alone is still putting innocent bystanders on the ground at risk. The FAA has repeatedly emphasized that data confirms that older pilots have a much greater risk of being involved in an aviation crash. If this is true, and if the FAA is unwilling to expand the mandatory sixty-five retirement age to flying private aircraft for personal reasons, the FAA should institute a mandate that older pilots can only fly over relatively unpopulated areas so that the safety risk they decide to take for themselves does not affect other people on the ground. While an individual has a right to make a decision involving an acceptable risk to his or herself, that individual has no right to heighten the risk to others and possibly hurt innocent bystanders by making unsafe decisions.

An important statistic that appeared in the study conducted by the NTSB was the correlation between safety risk and the average age at which a pilot obtained his or her first pilot certificate. A significant statistical difference was found between the average ages at which the accident and non-accident pilots earned their first pilot certificate, with the non-accident pilots being much more likely to have received their first license before reaching age twenty-six. Overall, pilots who achieved their initial license after age twenty-five were three to five times more likely to be involved in a weather-related general aviation accident. The NTSB explained this discrepancy by noting that pilots who begin flying at different ages have different motivations for learning to fly. Pilots that start flying early in their lives are more likely to consider aviation as a future career instead of simply as a hobby for pleasure. Because of this, the initial choices about training types and the amount of education might be more involved than an individual simply trying to get a

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105 See Yetman v. Garvey, 261 F.3d 664, 667-68, 671 (7th Cir. 2001); Prof'l Pilots Fed'n, 118 F.3d at 762, 767; Baker v. FAA, 917 F.2d 318, 321 (7th Cir. 1990).
106 NTSB SAFETY STUDY, supra note 55, at 25, 34.
107 Id.
108 Id. at 34.
109 Id. at 37–38.
110 Id.
pilot’s license later in life for only personal or recreational reasons.\textsuperscript{111} For example, individuals who want to pursue a long-term career in aviation “with the intent of becoming paid professional pilots engage in full-time flight training that typically results in a regular schedule for practicing and testing knowledge and skills, regular oversight, and an immersion in the aviation environment.”\textsuperscript{112} In addition, pilots that plan on having a career in the industry might put more emphasis on passing certification classes and tests because employers review this information as part of the pilots’ educational history before they can begin their careers.\textsuperscript{113} In contrast, pilots who choose aviation as a hobby or for personal reasons usually do not have the time to devote to full-time schooling and practical development.\textsuperscript{114} The education might be stretched over a longer, more infrequent period, and pilots are likely to strive toward simply passing the certification classes because their overall scores have no effect on their future career opportunities.\textsuperscript{115}

This information supports the previously stated conclusion that better education and training lead to an overall lower chance of weather-related general aviation crashes. However, these statistics might also just be a reflection of the fact that pilots with advanced airline transport licenses are less likely to be involved in a general aviation crash than private licensees.\textsuperscript{116} Pilots at the age of thirty-five and older are far less likely to be considering a change in career, and thus have no need for the advanced airline transport licensee status. The fact that younger certified pilots are involved in these types of crashes less often might just mean that most of the pilots that were certified at a younger age received the airline transport certificate, and thus the advanced training requirements, not age, are the reason for the skewed distribution.

Regardless, this statistic reemphasizes the importance of the classroom portion of the education required to receive a pilot certification. It is important to increase the education and knowledge required, both through classroom lessons and examinations, so that general aviation pilots fly just as safely as pilots flying scheduled commercial aircraft.

\textsuperscript{111} Id.
\textsuperscript{112} Id.
\textsuperscript{113} See id.
\textsuperscript{114} Id.
\textsuperscript{115} Id.
\textsuperscript{116} See id. at 23.
II. CONTINUING EDUCATION AND THE INABILITY TO LEARN FROM PAST MISTAKES AS A CAUSE OF GENERAL AVIATION INCIDENTS

One statistic that must be corrected is the inability of general aviation pilots to learn from past mistakes. The NTSB chairman stated that the reason why the general aviation accident rate is stubbornly stuck at the current rate—while technology improvements and corporate safety records continue to help lower the accident rates in larger commercial aircraft—is that general aviation “‘pilots are not learning from the deadly mistakes made by their brethren.’” ¹¹⁷ According to the NTSB, there are very few new causes of private aviation accidents.¹¹⁸ Most of the causes of general aviation crashes each year are simply repeated causes of previous incidents.¹¹⁹ In the NTSB weather-related safety study, statistics showed that pilots with a history of previous accidents or incidents were 3.1 times more likely to be involved in a weather-related general aviation accident.¹²⁰ This statistic is astonishing because these pilots, who have risked death and came out unscathed, are not more cautious the second time around! In addition, pilots are not learning from the mistakes of other pilots. When the NTSB issues study results, like the weather-related accident information referred to above, pilots continue to be involved in crashes for the same reasons the study was put together in the first place.¹²¹ For example, the NTSB chairman referred specifically to the weather safety study and then pointed to a May 20, 2011, small general aviation plane crash where a plane hit a mountainside, causing the death of the pilot.¹²² The reason for the accident was that the pilot did not check weather reports before flying the specified route.¹²³

Regardless of whether the pilot in the May 20th crash read the specific weather-related safety study issued by the NTSB in 2005, the need to check the weather reports before flying an airplane is a basic rule that a pilot learns in the initial education period before achieving a private pilot’s certification.¹²⁴ While checking

¹¹⁷ Levin, supra note 4.
¹¹⁸ NTSB Press Release, supra note 1 (providing safety information through an embedded video).
¹¹⁹ Id.
¹²⁰ NTSB Safety Study, supra note 55, at 34.
¹²¹ Levin, supra note 4.
¹²² Id.
¹²³ Id.
the weather report before flying is something that this pilot should have known about regardless of NTSB weather studies, relying on these released data reports with statistics and graphs to educate or remind pilots to take precautions when flying is not enough.

Pilots' licenses do not expire.\textsuperscript{125} However, general aviation pilots are required to complete a flight review within twenty-four months of piloting any aircraft.\textsuperscript{126} A flight review consists of a review of the general operating and FAA flight rules, along with a review of maneuvers and procedures followed to safely exercise the privileges of the pilot certificate.\textsuperscript{127} At a minimum, the flight review must consist of one hour of flight training and one hour of ground training.\textsuperscript{128}

The flight review requirement is regarded by some pilots and flight instructors as a "bare bones band aid to break some of the bad habits."\textsuperscript{129} Because of this, the FAA also set up an FAA Safety Team (FAASTeam) to promote flight safety through continuing education above and beyond the minimal flight review requirement.\textsuperscript{130} The FAASTeam representatives see it as a challenge to convince pilots to engage in a learning program that focuses on all types of aviation safety in an online format that can be accessed from any location in the United States.\textsuperscript{131} The group has seminars, online courses, and "hot topics" to promote safety in general aviation.\textsuperscript{132} It addresses the safety topics and recommendations issued by the NTSB and FAA in an easy-to-understand, educational format.\textsuperscript{133} The FAASTeam has removed the statistics, graphs, and legalese, and instead has provided free videos, magazine articles, and fun, educational seminars for pilots of all types.\textsuperscript{134} There is a pilot proficiency program that tracks pilots as they complete the online educational resources and attend the local presentations, and the program presents pilots with safety

\textsuperscript{125} Id. § 61.19(c).
\textsuperscript{126} Id. § 61.56(c).
\textsuperscript{127} Id. § 61.56(a).
\textsuperscript{128} Id.
\textsuperscript{130} FAA, U.S. Dep't of Transp., Advisory Circular 61-91J, WINGS—PILOT PROFICIENCY PROGRAM 1 (2011) [hereinafter ADVISORY CIRCULAR 61-91J].
\textsuperscript{132} See generally FAA Safety Team, supra note 131.
\textsuperscript{133} See id.
\textsuperscript{134} See id.
"wings" for achieving certain safety milestones. The proficiency program also requires additional flight time, preferably with an instructor that the pilot has never flown with before. The FAASTeam hosts yearly awards banquets and recognizes pilots who have achieved exceptional safety status. It enables pilots and employers to be involved in the program by nominating or presenting employees with certain awards based on training received, and it awards employers themselves when a certain number of employees meet FAASTeam safety standards. Receiving continued education through the FAA-sponsored program can also count as a more in-depth, thorough flight review that meets the requirements of 14 C.F.R. § 61.56.

The FAASTeam automated, online resource was established in 2006. It fills a need that NTSB safety studies do not—it takes the language of statisticians, engineers, and safety experts and turns it into information that is easy to understand and interesting. It also offers motivation outside the basic need to simply complete the required flight review. The awards program involving both pilots and their employers makes it fun for the pilots, but adds the additional incentive of employer awareness, lending to its creditability outside simply meeting FAA-required standards for license upkeep. The education is fresh and current, more so than a two-hour flight review with an instructor who has been certifying for twenty years. It also works to correct the statistic of pilots not learning from past mistakes, as the educational requirements specifically address this issue.

The FAASTeam continuing education program should be taken a step further. The remedy of teaching pilots how to learn from past mistakes has already been implemented by this tool, and it should now become a requirement for all pilots. Engineers, lawyers, hairdressers, and numerous other professions are required to take continuing education every year to improve knowledge and proficiency, and to keep safety at the forefront of their profession. The general aviation industry, led by the

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135 Advisory Circular 61-91J, supra note 130, at 2.
136 Id. at 1.
137 See FAA Safety Team, supra note 131.
138 See generally id.
139 See Advisory Circular 61-91J, supra note 130, at 2.
FAA, should do the same by mandating that pilots take these courses and attend these seminars every year to keep their pilots' licenses current. The FAA should include these requirements with the other general aviation requirements in Title 14 of the Code of Federal Regulations, and should prohibit pilots from leaving the ground unless their continued education is up-to-date.

III. LESS STRINGENT SAFETY REQUIREMENTS AS A CAUSE OF GENERAL AVIATION INCIDENTS

Public aviation on commercial airliners is the most visible and accessible type of air travel for a majority of Americans. Because of the increased percentage of citizens participating in commercial flight, along with the high visibility of the industry, commercial airline travel is the beneficiary of a high number of requirements and government standards for regulation. When safety standards lapse during a commercial flight, the response from the public is often loud and immediate, calling for responsive action from both the industry and the government to ensure that the issue never occurs again. With the high scrutiny surrounding this area, the regulations are always current and enforced by public opinion, large commercial airline manufacturers, and the FAA. General aviation, however, is lacking this intense media visibility and public outcry. Because of this lack of visibility, standards in the general aviation industry could fall below those of the commercial airline industry, resulting in the discrepancies in accident rates and safety risk discussed above.142

Some of these regulation deficiencies between commercial and general aviation aircraft include the areas of operator management, aircraft maintenance and inspection, and technology improvement.

A. OPERATOR REGULATIONS BY OPERATION

Along with regulating pilots by licensee status, the FAA also regulates pilot operations by type. The FAA has three main tiers of aviation oversight regulations: (1) private owner operations—smaller aircraft that are not for hire; (2) small commercial operations—smaller aircraft configured for thirty passengers or less
that typically fly for hire and on demand; and (3) large commercial operations—larger aircraft with scheduled commercial flights for major airlines. While licensees for the third category are strictly required to be airline transport certification holders, the first and second categories of operations can have many types of pilot licensees.

Recently, the DOT issued a report regarding the FAA's oversight of on-demand aircraft operations. The on-demand aircraft category makes up a part of the overall general aviation group and has experienced the increase in accidents common to this type of aviation. On-demand aircraft conduct on-demand passenger or cargo operations and can range in size from a single-pilot, small, two-seat aircraft to a larger plane with ten or more seats. On-demand aircraft operations include airplanes flying unscheduled passenger service, medical transport, rescue, commercial sightseeing, and smaller cargo transport. While private aviation has the least restrictive regulations and receives the least FAA oversight in general, on-demand aviation is the second-least regulated operation category and does not receive nearly the level of oversight the FAA provides for large scheduled commercial aircraft.

The DOT found many significant differences in the FAA's regulation of on-demand general aviation aircraft versus their commercial airline counterparts. For example, on-demand operators are generally subject to more risk due to the nature of the work but are subject to fewer FAA regulations. On-demand operators fly shorter, more frequent flights and therefore


144 Kevin M. Reynolds, Part 91 and 135 Operations: An Important Difference, Whitfield & Eddy, PLC, available at http://www.whitfieldlaw.com/wp-content/uploads/2011/06/Part_91_v_1172184043843.pdf (demonstrating that a “flight” is defined by “flight operation,” not pilot license type, and that pilot license types can be used to fly several different types of flight operations).

145 FAA REPORT, supra note 143, at 1.


147 See FAA REPORT, supra note 143, at 2.

148 Id.

149 Id.

150 Id. at 5–16.

151 Id. at 3.
are required to perform more takeoffs and landings, which are historically the most dangerous part of an airplane’s flight. These takeoffs and landings can also be in more remote locations than the major airports required by commercial airliners, and can involve places that are less likely to have helpful air traffic control towers and available emergency equipment. Data shows that in 2007 and 2008, there were no commercial air carrier passenger deaths. Contrastingly, over the same time period, on-demand accidents resulted in 109 deaths even though the total number of hours flown by these operators was much lower.

In addition, commercial airliners are required to have an FAA-licensed dispatcher available and checking in throughout the entire flight, serving as a second set of eyes on weather reports and ensuring that the commercial airliner is flying safely as planned. In contrast, on-demand flights are missing this second set of eyes even though the flight plans for these trips might change at the last minute—depending on emergency or other needs—and the destination airports might be unfamiliar to the on-demand operator.

After analyzing the data above, the DOT found that the FAA’s regulation of general aviation operators, unlike that of commercial aviation operators, is not risk-based. On-demand operators have higher risks than many commercial pilots; however, the regulations overseeing these operators are much less substantive. The FAA needs to reanalyze its method of regulating general aviation and change it to reflect the ways in which commercial aviation is managed. The decrease in the commercial aviation accident rate shows that the safety regulations and management techniques implemented are working. These same ideas should be used to revamp regulations for all general aviation aircraft as a risk-dependent management system, versus strictly a basic inspection-type system.

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152 Id. at 4.
153 Id.
154 Id.
155 Id.
156 Id. at 7.
157 See id.
158 See id. at 14–15.
B. INSPECTION AND MAINTENANCE REGULATIONS

Aircraft must be manufactured to meet rigid FAA design criteria and performance specifications. Each year, all aircraft are required to have an extensive inspection conducted by an FAA-certified inspector to ensure continued compliance with FAA regulations and standards. Aircraft for hire have an extra requirement: an inspection must be done every 100 flight hours, which could be as often as once a month. The goal of these inspections is to spot damage, corrosion, or other possible issues long before the result is aircraft failure.

There are definite differences between maintenance and inspection requirements for private aircraft versus airline or commercial operators. When a new aircraft is being designed, groups are formed to study those planes and "determine the frequency and scope of aircraft inspections to be performed." These "maintenance steering groups" (MSGs) and "industry steering committees" (ISCs) combine the regulation knowledge of an aviation authority, the engineering and construction knowledge of the plane manufacturer, and the expertise of other selected industry participants with knowledge of how the airline industry generally works. These groups provide information to another group, the maintenance review board (MRB), which makes final recommendations to the manufacturer on how the aircraft should be maintained. The maintenance planning recommendations are then given to the customer by the manufacturer. Small, private aircraft owners use this information to correctly maintain and inspect the airplane to make sure it continues to meet the safety standards it was originally designed for. However, for scheduled commercial airlines, there is another step in the process.

For commercial airliners, the recommendations given by the MRB are taken and incorporated into a set of FAA requirements.

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159 See 14 C.F.R. §§ 43.15(c), 91.409 (2012).
160 Id. § 91.409(b).
162 See id.
163 Id.
164 Id.
165 Id.
166 Id.
167 Id.
168 See id.
known as the Continuous Airworthiness Maintenance Program (CAMP).\textsuperscript{169} CAMP involves both routine and detailed inspections.\textsuperscript{170} In turn, the detailed inspections can involve differing levels of detail depending on the flight hours and time elapsed.\textsuperscript{171} For example, the “A check” (the least detailed inspection) is performed approximately every 500 flight hours and usually requires an overnight process to complete.\textsuperscript{172} The “B check” (the next level of detail inspection) involves a slightly more detailed inspection process but does not include “detailed disassembly or removal of components.”\textsuperscript{173} The “C check” is performed every twelve to eighteen months and puts the aircraft out of service for three to five days for extensive retooling and testing.\textsuperscript{174} The most comprehensive inspection is the “D check,” which occurs every four to five years.\textsuperscript{175} During the D check, the entire airplane is more or less taken apart for inspection and overhaul.\textsuperscript{176} “[E]very fastener, nut, wire, hinge, and component” is inspected, repaired, and, if needed, replaced.\textsuperscript{177} This intense inspection looks for evidence of corrosion, structural deformation, cracking, deterioration, stress, and all other issues that can arise during the normal use of an airplane.\textsuperscript{178} A large commercial airliner goes through all of these checks as they become due,\textsuperscript{179} in addition to the routine required base inspections needed for all types of aircraft. For an example of the difference between commercial and private plane inspections, one on-demand operator in the DOT study above was subject to FAA inspection eight times in 2008.\textsuperscript{180} In contrast, a commercial airline operator overseen by the same FAA oversight office received 199 maintenance inspections during the same time period.\textsuperscript{181}
In addition, special aging aircraft inspections are needed for certain aircraft.\textsuperscript{182} The Aging Airplane Safety Rule requires that all commercial planes and some multi-engine general aviation aircraft undergo specific inspections for aging after their fourteenth year in service.\textsuperscript{183} "[H]igh aircraft time, severe operation, inactivity, outside storage, modifications, or poor maintenance" are all issues that can be found in aging aircraft, and the aging aircraft inspections focus on issues outside of the normal required inspections for general aviation aircraft.\textsuperscript{184} These aging inspections focus on specific maintenance requirements that are highly sensitive to age and failure over time.\textsuperscript{185} The aging inspections also include a records review of the aircraft, which highlights any time of inactivity or missed maintenance inspections over an extended period that might lead to additional problems not noticed by the basic annual inspection.\textsuperscript{186} The Aging Airplane Safety Rule prohibits pilots from operating an aging plane under FAR Parts 121, 129, or 135 until the airplane has undergone the aging review process.\textsuperscript{187}

Small planes are typically not inspected beyond the basic annual review required by 14 C.F.R. § 43.15 and the additional 100-flight-hour inspection required for single-engine airplanes operated for hire.\textsuperscript{188} However, the general aviation accident rate is far worse than the rate for scheduled commercial aircraft.\textsuperscript{189} It cannot be a coincidence that safety is far better when inspections are more frequent. Additionally, the general aviation fleet is old.\textsuperscript{190} In 2009, the average age of a single-engine plane used in the United States was thirty-nine years.\textsuperscript{191} In comparison, the current average age of a commercial plane is approximately


\textsuperscript{183} FAA, U.S. DEP’T OF TRANSP., ADVISORY CIRCULAR 120-84, AGING AIRCRAFT INSPECTIONS AND RECORDS REVIEWS 2 (2009) [hereinafter Advisory Circular 120-84].

\textsuperscript{184} Best Practices Guide, supra note 182, at 7; see also 14 C.F.R. §§ 43.15(a), 91.409 (2012).

\textsuperscript{185} Best Practices Guide, supra note 182, at 7–8, 13–22.

\textsuperscript{186} Id. at 3–6.

\textsuperscript{187} Advisory Circular 120-84, supra note 183, at 3.

\textsuperscript{188} Best Practices Guide, supra note 182, at 2.


\textsuperscript{190} Best Practices Guide, supra note 182, at 1.

\textsuperscript{191} Kevin Thomas, A Glance at the 2009 General Aviation Statistical Databook and Industry Outlook, Examiner.com (Mar. 19, 2012), http://www.examiner.com/arti-
eleven years. However, the commercial aircraft are the ones subject to the extensive aging inspection requirements, not the general aviation fleet.

The age of the commercial fleet might be a direct reflection of the fact that as an aircraft ages, it becomes a safety risk; the increased number of aging inspections are identifying aging issues and allowing carriers to remove these planes from their fleets before accidents occur. The age of the commercial fleet could also be much younger due to the additional inspections, time, money, and maintenance required by an aging plane versus a newer one. Either way, the aging inspections are working correctly in identifying issues requiring the repair or disabling of aircraft before they become a safety risk.

Many older aircraft that have been correctly maintained and inspected are “still capable of safe and useful operation in today’s [aviation] environment.” Because many plane technology upgrades are affordable, a general aviation pilot is able to upgrade components without having to purchase a new aircraft. With few new, cost-competitive airplane models available on the market, thorough inspections and maintenance could allow existing planes to remain in the sky much longer than the original expected lifetime. Better inspections could lead to lower overall costs for plane owners, as well as result in an increase in safety.

As of the year 2000, mechanical and maintenance issues were the cause of only 16% of general aviation accidents across the United States. So currently, there are far bigger issues to worry about than correcting a problem that does not seem to be as significant. However, as time goes on, this percentage will continue to increase. By 2020, the average age of the general

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193 See ADVISORY CIRCULAR 120-84, supra note 183, at 3.

194 See BEST PRACTICES GUIDE, supra note 182, at 2.

195 Id. at 1.

196 Id.

197 Id.

198 Darryl Trcka, President, Greater Hous. Assoc. of Flight Instructors, Presentation at the Flight Instructor Recertification Clinic: General Aviation Accident Analysis (Jan. 2000).
aviation fleet could approach fifty years. At some point, the mechanical and maintenance issues that surround small, aging, and inadequately inspected aircraft will rise, leading the general aviation accident rate to increase over time. The expected trend of aging general aviation aircraft needs to be taken care of immediately—repairing and replacing an aging general aviation fleet that consists of 90% of the civil aircraft registered in the United States will take many years.

Overall, the annual inspection for general aviation aircraft needs to be much more in-depth, and the inspection details need to be included as part of the FARs. The annual inspection should also include a research history—combining knowledge of a plane’s past usage with inspection—to customize each individual inspection toward the particular areas of an aircraft that might need additional attention. In addition, aging inspections should be mandated across the board for all aircraft, as this is an issue no matter what type of plane is used. While this might result in additional costs for general aviation pilots, over time the costs will be less because the inspections will allow aircraft to continue to fly well beyond the original intended number of flight hours. These inspections will not only keep general aviation pilots safer in the sky, but will also help renew the current fleet by forcing owners with planes that should no longer be flying to replace them with newer, safer technology. If these suggestions are implemented, the general aviation fleet will be able to change over time and will not require a large overhaul when all of the current planes reach their expiration date ten or twenty years from now.

C. Differences in Technology

The technology possessed by scheduled commercial airlines can be much more advanced than the technology in general aviation aircraft. While this discrepancy is logical considering commercial airlines are much more advanced, fly for longer distances, and carry more people than general aviation aircraft,
the safety technology in general aviation aircraft is lagging behind even that of the automobile industry.\footnote{See, e.g., Andy Pasztor, \textit{Study Recommends Installing Air Bags on Private Planes}, \textit{Wall St. J.} (Jan. 10, 2011), http://online.wsj.com/article/SB10001424052748704458204576074270205924638.html.}

For example, the U.S. National Highway Safety Bureau first required automobile manufacturers to install shoulder belts for front seats in 1968.\footnote{\textit{Getting America to Buckle Up}, TRAFFIC SAFETY CTR. (Dec. 2002), http://safetrec.berkeley.edu/newsletter/Dec02/Seatbelts.html.} However, the FAA has required shoulder belts on all seats for newly manufactured airplanes since only 1986.\footnote{\textit{NTSB Calls for Lap/Shoulder Belts on Small Planes}, \textit{Chi. Breaking Bus.} (Jan. 11, 2011, 2:00 PM), http://archive.chicagobreakingbusiness.com/2011/01/ntsb-calls-for-lapshoulder-belts-on-small-planes.html.} In addition, the FAA still does not require older planes to be retrofitted with shoulder belts.\footnote{Id.} This is a problem considering the average age of a general aviation plane is forty years old.\footnote{Id.} While small planes can be retrofitted with shoulder belts for a cost of around $150 to $300 per seat, the NTSB still estimates that up to 26\% of all small planes still do not have shoulder belts.\footnote{Id.} A study released by the NTSB in 2011 determined that serious injuries or fatalities are 50\% more likely to occur when the plane occupants are wearing only a lap belt but not a shoulder harness.\footnote{Id.} In 2011, the NTSB finally recommended that the FAA require older aircraft to be retrofitted with shoulder harnesses.\footnote{Id.} The NTSB found that the shoulder seat belt was the "cheapest and simplest" way of decreasing the fatality rate in crashes.\footnote{Id.} Of course, the automobile industry has known this since the mid-1900s.\footnote{See \textit{Getting America to Buckle Up}, supra note 202.}

While air bags have been required in cars for over a decade, there is still no air bag requirement for general aviation aircraft.\footnote{NTSB Calls for Lap/Shoulder Belts on Small Planes, supra note 203.} Currently, only 7,000 out of the 224,000 general aviation aircraft are equipped with air bags.\footnote{Id.} This is less than 5\% of
all registered general aviation aircraft. However, while recognizing the fact that air bags have been directly attributed to saving lives in general aviation accidents, the NTSB recommendations do not call for a federal mandate requiring air bag installation because out of the 7,000 planes equipped with air bags, too few of these planes have crashed to make an overall determination of whether the safety risk has decreased because of the installation of air bags. In summary, since hardly any general aviation planes have air bags, the NTSB has few accidents to study where air bags have deployed, so it hesitates to require air bags in general aviation planes. Instead, the NTSB has only asked manufacturers to install the devices in new aircraft.

Although lagging behind automobile manufacturers, the commercial airline industry, which includes aviation regulators, is aware of the benefits of air bags in public aircraft. Existing federal rules require passengers in scheduled commercial aircraft to be protected from injury sustained by hitting either the seat in front of them or the inside walls of the aircraft. Because of this requirement, certain seats in airliners are already protected by air bags, including seats located near bulkheads and premium seats that lie down or turn sideways. Federal safety regulations mandate extra crash protection for these particular seats, and air bags are seen as an easy way to offer this protection.

Thankfully, more than thirty general aviation manufacturers have already stepped in where the NTSB and FAA have failed by offering air bags as either standard or optional equipment. Cessna and Cirrus, two of the larger general aviation manufacturers, voluntarily began offering air bags as standard features on all new planes manufactured after 2004. In addition, older

213 Pasztor, supra note 201.
214 Heller, supra note 212.
215 Id.
217 See id.
218 See Pasztor, supra note 201.
219 See Kolpack, supra note 216.
220 See NTSB Calls for Lap/Shoulder Belts on Small Planes, supra note 203.
221 See id.
planes can be retrofitted with air bags for around $1,000 per air bag.\footnote{222}

A consequence of the differing technology between commercial and general aviation planes—as well as the differences within a general aviation fleet composed of planes that range in age from brand new to over fifty years old—is that planes can be very different depending on which one a pilot is currently flying. Aviation technology has changed quite a bit over time, and many older pilots might not be equipped to handle some of the newer instrumentation in modern aircraft. Similarly, younger pilots might have trouble flying older aircraft that lack the modern technologies they usually rely upon when flying.

Pilots of scheduled commercial aircraft typically have extensive flight experience in many types of aircraft of various complexities.\footnote{223} In addition, these pilots have specialized training to “operate whatever specific airplane model the individual was hired to fly.”\footnote{224} In contrast, many general aviation pilots fly solely for personal reasons and thus no training or instruction is required for a specific plane model before they can be pilot-in-command of a solo flight.\footnote{225} The only instructions for operation, maintenance, and inspection are recommendations from the manufacturer of the small aircraft they are piloting.\footnote{226} However, manufacturers have no liability in this area because they typically have no duty to adequately train or specifically warn pilots that purchase or use their aircraft.\footnote{227} While manufacturers have a duty to provide “legally adequate” instructions, that is the extent of their duty.\footnote{228} To be legally adequate, the instructions must (1) “attract the attention of those that the product could harm; (2) explain the mechanism and mode of injury; and (3) provide instructions on ways to safely use the product to avoid injury.”\footnote{229} Unfortunately, many general aviation pilots must

\footnote{222 See Heller, supra note 212.}
\footnote{224 Id.}
\footnote{225 See Glorvigen v. Cirrus Design Corp., 796 N.W.2d 541, 544 (Minn. Ct. App. 2011) (noting that while a two-day “transition training” was provided in the purchase price of the plane in Glorvigen, FAA regulations do not require manufacturers to offer any training).}
\footnote{227 See, e.g., Glorvigen, 796 N.W.2d at 551–52.}
\footnote{228 Id. at 550.}
\footnote{229 Id.}
learn the information on their own; and much of this learning will take place overhead in the skies as pilots get accustomed to flying a new aircraft.

It is important for the general aviation industry, including the FAA, to increase mandates for proven safety equipment in all general aviation aircraft, old or new. While there is a monetary cost associated with installing this equipment, the amount is small compared to other costs related to general aviation planes, and it will pay off when the fatality rate in general aviation accidents decreases over time. In addition, as these safety technologies become industry standard, costs will decrease as more and more manufacturers offer the required equipment. Considering that earning the right to fly involves one of the most in-depth training processes in the transportation industry, the FAA needs to lead the way and apply the same scrutiny to safety requirements after pilots earn a license.

In addition, as the general aviation fleet ages and new planes and technologies are introduced, the FAA needs to revamp the regulations surrounding airplane purchase and transfer. Many pilots should be required to incorporate new, safer technologies into aircraft as new regulations come onboard, and adequate training for these technologies should be required so that a pilot does not have to learn how to use them by actually flying the plane. Manufacturers should be required to provide, and pilots should be required to attend, educational training seminars for pilots purchasing a general aviation aircraft from the company, and on-demand carriers should not be allowed to let their pilots fly a plane they have no experience flying until they fly with a copilot who has operated that plane before. Unlike drivers of cars, pilots do not have a “parking lot” to drive around in to figure out the new instrumentation locations, warning systems, and updated technologies until they are high in the air. The best method for a pilot to learn how these technologies function is with another pilot who is already comfortable operating the airplane model; the experienced pilot can focus on safety, and the newer pilot can focus on learning the format of the new plane.

230 Compare NTSB Calls for Lap/Shoulder Belts on Small Planes, supra note 203 (noting that the cost of a shoulder belt ranges from $150 to $300 per seat), and Pasztor, supra note 201 (noting that the installation of air bags on the two front seats of a general aviation aircraft costs approximately $2,000), with GRA, Inc., Economic Values for FAA Investment and Regulatory Decisions, a Guide 4-17-4-18 (2007) (describing aircraft operating and fixed costs).
In 2011, the FAA asked the General Aviation Joint Steering Committee (Steering Committee) to investigate the increase in general aviation accidents.\textsuperscript{231} The Steering Committee found that the largest category of general aviation accidents encompasses those that occur when pilots lose control during flight.\textsuperscript{232} However, this type of accident rarely occurs in commercial flight because current technology warns pilots when the danger exists.\textsuperscript{233} This technology is standard on all commercial aircraft, and it warns pilots when wings are in danger of losing lift, which can lead to a loss of control.\textsuperscript{234} The Steering Committee even recommended that the FAA work with manufacturers of small planes to make it cheaper to install these types of devices on general aviation planes.\textsuperscript{235}

While the recommendation has not been acted upon, it is a perfect solution to a typical problem. Part of the issue with installing additional technologies on private aircraft is that these aircraft are often owned by individuals or small companies, not large commercial airliners. A lack of money can prevent many of these owners from being able to include these technologies on planes, whether recommended or not. The FAA needs to step in and correct this issue. The provision of government funding to research organizations willing to develop these technologies on a cheaper scale for general aviation flight would move the industry closer to the technology standards by which the rest of the transportation industry abides.\textsuperscript{236} Just as the government helps other underfunded industries,\textsuperscript{237} the FAA should help general aviation owners by creating competition, establishing grants, and providing funding to graduate students at universities to incentivize the development of new technologies in the general aviation field. Not only would these monetary motivations make aviation safer overall, but the results would also save lives.

\textsuperscript{231} Levin, \textit{supra} note 4.
\textsuperscript{232} Id.
\textsuperscript{233} \textit{See id.} ("Since the 1990s, commercial-airline crashes due to icing, inadvertently hitting the ground, mid-air collisions, wind shear and other causes have been almost wiped out with improved technology and pilot training . . . .")
\textsuperscript{234} Id.
\textsuperscript{235} Id.
\textsuperscript{236} \textit{See notes} 201–16 and accompanying text.
IV. RECOMMENDATIONS

Since 2000, the crash rate for commercial jetliners has dropped by 85%; in contrast, according to the NTSB, the crash rate for private flights has increased by 20% over the same time period. In addition, the rate of deadly wrecks in private flights has increased by 25% since 2000. The general aviation fleet makes up 90% of registered, active aircraft and includes the vast majority of pilots in the skies. These divergent safety numbers are correctable, and implementing the recommendations given in this comment will help decrease the accident rate and make general aviation safer for those in the sky as well as those on the ground.

First, private pilots are less prepared than their higher-licensed counterparts. Initial training and education are extremely important in ensuring that the safety risk for general aviation pilots remains low over time. Years of flight experience do not typically decrease the risk for pilots, which makes the initial training even more important. Classroom hours and knowledge exams should be emphasized and ramped up to be more robust, even for basic private pilot certification. Training pays off when it comes to safety, and increasing the training requirement is the initial step to correcting the overall accident rate.

Second, scores on both pilot knowledge and practical exams are a direct reflection of the safety risks a pilot will take in the future. When pilots fail an examination required for licensure, additional classroom study, along with additional examination time, should be mandatory. The safety risk is higher for these individuals, and adding these requirements will help keep them safer once the initial license is earned.

Third, an instrument rating certificate should be necessary to receive a private pilot's license. While many pilots will never have a need for the additional certificate because they only fly in good weather conditions and during the day, the certificate will be an added protection if the weather suddenly changes or a last-minute change in flight plan causes the pilot to run into unexpected weather conditions. Weather-related accidents account for many of the general aviation incidents because a general aviation pilot is five times more likely to be in an accident if

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238 Id.
239 Id.
240 AIRCRAFT OWNERS & PILOTS ASS'N FOUND., supra note 200, at 1.
he or she does not obtain an instrument rating. These crashes are easily prevented with the additional meteorology and instrument training required to achieve this certification.

Fourth, the age of sixty-five should be a mandatory retirement age for all pilots, not just pilots of scheduled commercial airliners. In many ways, general aviation pilots are more at risk than pilots of scheduled commercial flights because many general aviation pilots fly solo and are not in continuous contact with FAA dispatchers. While general aviation planes generally do not carry the number of passengers that larger planes carry, the pilot, his or her passengers, and innocent bystanders on the ground can still be harmed if a general aviation plane goes down because of pilot incapacitation. If the FAA is unwilling to expand the mandatory retirement age, then the FAA should add restrictions based on the areas older pilots fly over or add a requirement that older pilots fly with another trained pilot when they fly longer distances.

Fifth, the continuing education for current pilots needs to be revamped and improved. Expecting current pilots to read NTSB notices or look at statistical safety studies is not realistic. The continuing education should include free, interactive classroom training and local seminars to give pilots a user-friendly method of receiving up-to-date aviation safety information. The FAA-S Team proficiency program is an optional continuing education program that the FAA already has in place that meets the above requirements. This program should become mandatory for all pilots, no matter what license, to keep them informed about other pilots’ mistakes in order to prevent the same mistakes from happening again. Especially because pilot licenses do not expire, continuing education should be a regular, expected part of being a pilot and possessing the privilege to fly.

Sixth, the FAA needs to ensure that the regulations it enacts are risk-based depending on the type of flying involved. Longer flights should have more stringent operator requirements than shorter ones, and pilots who regularly take off and land in new environments should be trained to meet this particular risk. Regulations should be individualized by flight risks, license status, and type of plane to improve safety across the board.

Seventh, aircraft inspections for general aviation aircraft need to be more in-depth and should include a research history re-

\[241\] See NTSB SAFETY STUDY, supra note 55, at 34.

\[242\] See FAA Safety Team, supra note 131.
port with each annual inspection performed. In addition, with general aviation airplanes getting older, aging inspections should be mandated for all aircraft to identify and fix problems before they occur and encourage the slow renewal of an aging general aviation fleet.

Eighth, mandates for proven safety equipment, including shoulder seat belts and air bags, should be incorporated in all aircraft, both old and new. Manufacturers should be required to provide short, educational teaching seminars on flying particular plane models as a requirement for pilots before they purchase a new aircraft. Pilots should not be able to fly new airplane models until they have flown in that airplane, not as the primary pilot, but as a co-pilot.

Lastly, government funding and FAA-sponsored university projects would go far in helping increase the safety technologies in general aviation aircraft. Many of the technologies in scheduled commercial aircraft would be extremely helpful to general aviation pilots if they were installed in private planes. University research and grant programs can help bridge the gap and find ways to take the same technologies and make them cheaper, lighter, and standard installations on all private aircraft. General aviation does not have the large industry-based research funding enjoyed by the scheduled commercial airline industry, and it is up to the FAA to help general aviation meet the safety standards set by the commercial airline industry.