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# Training Capacity of the Fixed Wing FAA Part 141 Flight Schools within the United States

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Discussions have been held in classrooms, industry forums and in the media about the looming pilot shortage. Discussion to date has primarily focused on causal factors, and forecasting industry need for pilots; there is little research on where those pilots are going to come from. A study was conducted in the Fall of 2018 to quantify the pilot training capacity in the United States, focusing on FAA Part 141 certified flight schools associated with University degree programs. This information will be used to help the FAA and industry members make informed decisions and plan for the future. In total, 33 schools participated in a survey, ranging in size from 1,700 students to 11. Findings indicated that a lack of CFI's was the most common limiting factor, followed by lack of aircraft. 14 of the 33 schools were at or above 100 percent capacity. Several other metrics were surveyed, including costs, total pilot output, training duration, and CFI attrition, in order to build a broad picture of the state of pilot training within the United States.

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Discussions have been held in classrooms, industry forums, and in the media about the looming pilot shortage. The impact of the 1,500-hour rule, the cost of training, and increasing retirements are just a few of reasons leading to the cause for the shortfall. A report released at the Paris Airshow by C.A.E. (2017), a worldwide training organization, forecasts that the industry worldwide will need an additional 255,000 pilots by 2027 to sustain its growth. The report adds that more than half of these pilots have not yet begun training. The RAND Corporation published a study that supports the hiring and industry growth trend (McGee, 2015). The RAND study has a broader scope and maps the supply chain that should be providing a steady stream of pilots to fulfill the demand.

The Airline Safety and Federal Aviation Administration Extension Act of 2010 (PL 111-216) was a significant change to the airline hiring practices and prompted a body of research to look at various impacts of the law. Smith, NewMyer, Bjerke, Niemczyk and Hamilton (2010) studied the backgrounds and training records of more than 2,100 regional airline pilots in order to identify characteristics of a successful first officer candidate. Flight programs associated with university degree programs were identified as the primary source of pilots for airlines in the United States. Smith et al. (2010) showed that: 1) pilots graduating from an Aviation Accreditation Board International (AABI) accredited program, 2) with a bachelor's degree were two of the five criteria for determining a high success rate through pilot training. Therefore, this study chose to focus primarily on those Part 141 certificated flight schools that were associated with a university degree program. An expansion of the research by Smith et al. (2017) looked at numerous other factors including the number of hours of dual flight instruction an applicant logged. These hours were compared before and after implementation of PL 111-216. Overall the amount of dual given has increased since the law passed. In maintaining a constant pipeline of pilots, attracting and maintaining a core of flight instructors is critically important. A study looking at the effects of Public Law 111-216 on collegiate aviation provided a good overview of what aviation program administrators are expecting and experiencing as a result of the law (Depperschmidt, 2013). Of the schools surveyed, 41% were AABI accredited and an additional 22 schools were looking at AABI accreditation in response to PL 111-216. Additionally, PL 111-216 was seen as detrimental to collegiate aviation programs by 67% of the survey respondents; and, 41% perceived the law to be detrimental to program enrollments (Depperschmidt, 2013). While the current study does not directly address the effects of PL 111-216, it would appear that student enrollment has not been adversely affected. In an additional study, Casebolt (2015) assessed student perceptions of PL 111-216, providing insight as to the career aspirations of students enrolled in public and private collegiate aviation programs. Of the 283 students surveyed, 65% of them aspired to be commercial pilots, 8% wanted to fly for the military, 16% corporate, and 11% selected "other." Based on the results of this survey, only 76% of the pilots training in collegiate aviation programs would funnel directly into the industry to resolve the shortage.

The question remains: where will these future pilots come from? The United States is the world leader in training pilots but does the country have the training capacity to fulfill pilot demand? The Federal Aviation Administration (FAA) (2018) issued 7,019 commercial airplane

single-engine land certificates; 6,615 commercial multi-engine land certificates; and 2,024 certificated flight instructor certificates in 2018. Are all those pilots destined for the airlines? The goal of this survey was to create a clearer picture of the flight training environment and its associated limitations. It aimed to quantify the training capacity at FAA-approved Part 141 Pilot Schools associated with university degree programs. Along with the current capacity of these schools, the survey also gathered information regarding the current output of training schools, the duration of the training, the cost of training, and an exploration of factors that limit training capacity.

## **Methodology**

An online survey was sent out in the Fall of 2018 to 108 schools identified from the Federal Aviation Administration's website listing of 14 Code of Federal Regulations (CFR) Part 141 Pilot Schools. These schools provide flight training in support of a university degree program. Participants identified from the FAA's website listing of pilot schools were called to obtain an email address for the appropriate personnel to complete the survey. Thirty-three of the 108 schools completed the survey, yielding a response rate of 31%. Each school participant was given a weblink to an online survey and presented with an electronic consent form. The participants were then presented with the online survey to gather information and provided with an opportunity to add additional comments. The researchers followed up with a phone call to the participants to ensure there were no technical glitches in the administration of the survey and increase response rate. A list of the survey questions is in Appendix A.

## **Results**

The survey responses were divided into two groups: 1) programs with fewer than 250 students; and, 2) programs with more than 250 students. After reviewing the data there was a natural separation between larger schools and smaller school size. The division at 250 students was a decision made by the authors aimed at separating schools into two groups by size—large and small—to make better comparisons across the different flight school sizes. Eleven of the schools had more than two hundred and fifty students enrolled in the flight program and twenty-two had fewer than two hundred and fifty students enrolled in the flight program. Twenty-five of the 33 schools (76%) had minimum entry requirements for flight students. Those requirements were not defined in this survey. Eighteen of the schools (55%) had programs that were accredited by the Aviation Accreditation Board International.

The average student load for schools with more than 250 student enrollments was 589 ( $SD = 486.53$ ). The average for schools with less than 250 student enrollments was 83 students ( $SD = 41.48$ ) (see Table 1). Cumulatively, the schools surveyed were at an average of 97% of their maximum capacity. Fourteen of the 33 schools have enrollments at or above one hundred percent capacity (see Table 2). Eighty percent of these students on average were focused on the airlines as their career goal.

Table 1  
Current Student Load

School Size	M	SD	Total
All	252	365.98	8,303
250+ Students	589	486.53	6,484
<250 Students	83	41.18	1,819

Table 2  
Maximum Student Capacity

School Size	M	SD	Total	% Max Capacity
All	259	364.29	8,547	97%
250+ Students	579	500.72	6,365	102%
<250 Students	99	50.60	2,182	83%

The larger schools had a higher proportion of international students. The overall percentage of international students was 6.2%. The larger schools had an enrollment of 13.3% international students. Sixty-seven percent of the schools also provided flight training under 14 CFR Part 61, though this training made up less than 10% of the overall training (see Table 3).

Table 3  
Part 61 Training Conducted at Part 141 Pilot Schools

School Size	Conduct Part 61 Training	% of Schools Conducting Part 61 Training	% of Training under Part 61
All	22	67%	8.80%
250+ Students	9	82%	11.10%
<250 Students	13	59%	7.65%

Eighty-two percent of the schools indicated a lack of CFIs limited their ability to produce pilots. Forty-two percent of respondents suggested that a lack of aircraft adversely impacted their school’s ability to train pilots. Additional factors listed were limitations of local air traffic control, low enrollment, cost of training, lack of Airframe and Powerplant (A&P) mechanics, and ramp space. All schools reporting a CFI shortage reported needing an average of 9.2 ( $SD = 11.1$ ) flight instructors to meet demand. Schools with more than 250 students have an average of 79.5 ( $SD = 69.1$ ) instructors and schools with less than 250 students had an average of 11.8 instructors ( $SD = 5.8$ ). Results are presented in Figure 1 and Table 4.

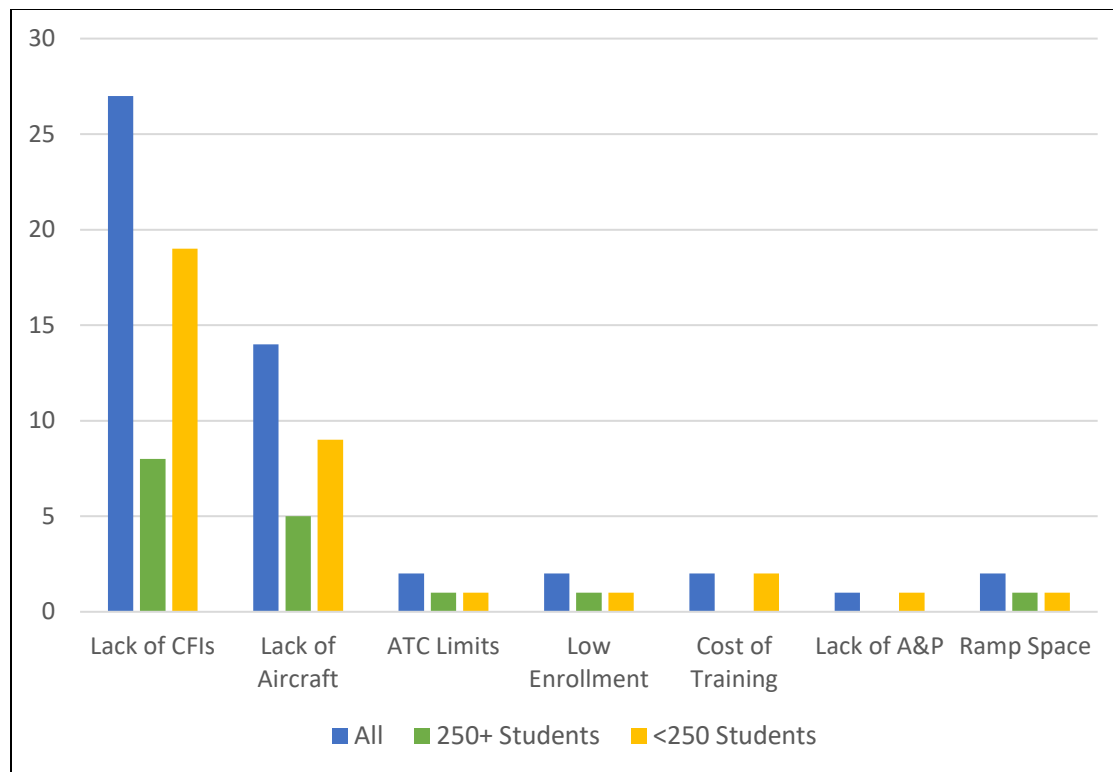


Figure 1. Limiting Factors of Part 141 Pilot Schools.

Table 4  
Current CFI Totals and Shortage

School Size	Total CFIs	CFI ( <i>M</i> )	<i>SD</i>	CFI Shortage	Shortage ( <i>M</i> )	<i>SD</i>
All	1,055	33.0	49.2	267	9.2	11.1
250+ Students	795	79.5	69.1	162	18	16.1
<250 Students	260	11.8	5.8	105	5.3	4.4

The average student output per year was broken down by certificate type (see Table 5). Commercial single engine land and commercial multi engine land averaged 45.8 (*SD* = 75.2) and 44.2 (*SD* = 75.4) respectively at all schools. CFI certificates issued annually averaged 23.8 (*SD* = 34.9) from all schools.

Table 5  
Student Output Per Year

School Size	Comm ASEL			Comm AMEL			CFI		
	Total	<i>M</i>	<i>SD</i>	Total	<i>M</i>	<i>SD</i>	Total	<i>M</i>	<i>SD</i>
All	1,144	45.8	75.2	1,104	44.2	75.4	596	23.8	34.9
250+ Students	842	105.3	114.8	877	109.6	109.8	473	59.1	44.8
<250 Students	302	17.8	11.0	227	13.4	10.1	123	7.2	6.1

The cost and duration of flight training required to achieve a Commercial Pilot multi-engine land certificate required an average of 29 months (*SD* = 7.28), at an average cost of

\$53,983.13. An Initial Flight Instructor Certificate and Instrument rating (CFII) required an average of 7.2 months ( $SD = 5.62$ ) and cost a mean of \$12,685. The mean cost of training from Private Pilot to CFII was \$66,669.08 and averaged 36.7 months to complete ( $SD = 8.16$ ). See Tables 6-8)

Table 6  
*Time and Cost of Training – Private to Commercial AMEL*

School Size	Months	SD	Cost
All	29	7.28	\$ 53,983.13
250+ Students	30	7.78	\$ 58,403.13
<250 Students	29	7.23	\$ 51,625.80

Table 7  
*Time and Cost of Training – Flight Instructor Initial and Instrument*

School Size	Months	SD	Cost
All	7.20	5.62	\$ 12,685.95
250+ Students	7.45	7.08	\$ 9,226.50
<250 Students	7.08	5.05	\$ 14,662.79

Table 8  
*Time and Cost of Training - Private to Flight Instructor Instrument*

School Size	Months	SD	Cost
All	36.7	8.16	\$ 66,669.08
250+ Students	37.9	7.65	\$ 67,629.63
<250 Students	36.1	8.51	\$ 66,288.59

CFIs work an average of 18.2 months ( $SD = 7.94$ ) from the time they graduate until they leave to other employment. See Table 9.

Table 9  
*Time for CFIs to leave after graduation*

School Size	Months	SD
All	18.2	7.94
250+ Students	15.0	7.27
<250 Students	19.8	7.99

Flight schools with greater than 250 students lose an average of 47 ( $SD = 35.57$ ) CFIs per year. Flight schools with less than 250 students lose an average of 6 ( $SD = 3.68$ ) flight instructors a year (See Table 10).

Table 10  
Number of CFIs leaving per year

School Size	M	SD
All	20	35.57
250+ Students	47	51.74
<250 Students	6	3.68

Anecdotally, survey participants pointed to other issues affecting their flight training department. One participant noted large flight training delays due to a lack of FAA Designated Pilot Examiners (DPE's) to conduct check rides. Another noted that the potential drawbacks of a pilot pathway program saying,

An additional challenge occurs when airlines hire CFIs in the middle of a semester. Delta Propel promises not to, but no other airline we work with demonstrates any sensitivity to pulling a CFI mid-semester, thereby leaving the hired instructor's students.

While 82% of all schools stated that the CFI shortage was affecting their ability to train, one survey participant pointed out that even having enough CFI's does not solve the problem,

The biggest challenge that we see is the lack of CFIs . If you do not produce the CFI yourself then it is almost impossible to find. Once we do have the CFI then they are working multiple jobs because of the health care / part time employee rules [can only work an average of 29 hours per week].

One participant summed up their perspective,

As an industry, we need to motivate all pilots to want to be CFI's to start their careers. That is the big issue in our program. We have good manpower right this minute, but it is fragile—and we don't want to hire just anyone to be a CFI because they are one. We still need to be selective.

### **Limitations**

The relatively low response rate limited data reliability. The current study has limitations, the first being a low response rate. While several of the larger pilot schools participated in the study, having a greater level of participation would help increase the overall accuracy of the data. Additionally, some responses were derived from estimates from the schools. Additionally, some collected data would benefit from further clarification. For example, when discussing the CFIs, the survey did not ask if the flight instructors were full time or part time employees. While this survey focused on 14 CFR Part 141 Pilot Schools, there are other avenues for flight training like the military and Part 61 flight instruction that are not included in the data.

## **Conclusion**

The 33 schools that completed the survey trained a total of 1,144 commercial single engine pilots and 1,104 commercial multi engine pilots. These certificate issuances represent 16% and 17% of *all* of these respective airmen class certifications issued in 2018. The participating schools trained 596 certificated flight instructors this is 29% of the total number of flight instructor certificates issued to pilots between the ages of 18 and 25 in 2018. While flight schools are training a significant percentage of the total number of flight instructors, these pilots are averaging 18 months of service as a flight instructor. The average total cost of flight training for a new student to earn a CFII certificate was \$66,669.08, with an average completion time of 36.7 months. The survey results confirm what is already known by many flight school administrators. Airline hiring is generating a lot of interest in aviation careers. Flight schools are at or over capacity. Primary factors limiting the ability to train more pilots is the lack of available CFIs and training aircraft.

## **Recommendations for Future Research**

Future research could repeat and expand on this survey in an effort to analyze trends in the training industry and gather data from more participants. It is hoped this information will be used to help the FAA, flight school administrators, and industry members make informed decisions and plan for the future.



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## Appendix A

### Research Questions

1. Name of Pilot School
2. If yes, please specify the college or university Name of point of contact
3. Email address for point of contact
4. Phone number for point of contact

Note that items 1, 2, 3, and 4 will only be used for follow-up questions and will not be used in any report or presentation of the data.

5. Is your flight program affiliated with an accredited college or university?
  - a. Yes
  - b. No
6. Does your college or university aviation/flight degree program possess AABI accreditation?
  - a. Yes
  - b. No
7. Do you have any screening or minimum requirements for pilot school applicants?
  - a. Yes
  - b. No
8. What is the current number of flight students enrolled in your FAA approved 141 pilot school?
9. What percentage of your flight students are international students?
10. Do you complete any flight training under Part 61?
  - a. Yes
  - b. No
11. If yes, what percentage of your training is completed under Part 61
12. What is the maximum number of flight students you able to train concurrently at your FAA approved 141 pilot school?
13. What is the limiting resource/factor(s) that limit your ability to reach maximum student output (select all that apply)?
  - a. Lack of CFIs
  - b. Lack of Aircraft Availability
  - c. Low student enrollment
  - d. ATC/Airspace saturation
  - e. Other (please specify)
14. How many CFIs do you currently employ?
15. If you are short of CFIs, how many more would you need?
16. What is your current annual output of Commercial ASEL students?
17. What is your current annual output of Commercial AMEL students?
18. What is your current annual output of Flight Instructor -Initial students?
19. What is the mean time (in months) to complete your program from Private through Commercial ASEL & AMEL)
20. What is the mean cost (flight cost only, not tuition or fees) to complete your program (from Private through Commerical ASEL & AMEL?
21. What is the mean time (in months) to complete your program's Flight Instructor ASE and Flight Instructor Instrument-Airplane?

22. What is the mean cost (flight cost only, not tuition or fees) to complete your program's Flight Instructor ASE and Flight Instructor Instrument-Airplane?
23. What is the mean time (in months) your graduates stay employed at your flight school before leaving for an airline first officer job?
24. Do you have any flow through programs or airline hiring agreements?
  - a. Yes
  - b. No
25. How many airlines do you have agreements with?
26. How many of your students are enrolled in flow through programs?
27. What percentage of your graduates are focused on an airline career path?
28. On average, how many flight instructors leave your flight school for an airline first officer position per year?
29. Open Comments: