

## Creating the Next Generation of Aviation Professionals: Creating Diversity in the Next Generation

Jason T. Lorenzon  
Kent State University, jloren10@kent.edu

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# ***Creating the Next Generation of Aviation Professionals: Creating Diversity in the Next Generation***

**Jason T. Lorenzon, JD, ATP**

**NTAS #1545**

**Monday October 24, 2022**

**Embry-Riddle University**

**Daytona Beach, Florida**



# Training the Next Generations of Professionals

How many people does it take to get a plane off the ground into the National Airspace?

Any Guesses?

Let's think about it for a second....

Is it just the crew?

ATC?

Ground Crew?

Flight Crew? Cabin Crew?

Maintenance Technicians?

Industry Manufacturers?

**ABOUT 1000 PEOPLE PER FLIGHT**



# Shortage of Pilots: How Did We Get Here?

Not so long ago....February 12, 2009

Colgan 3407 Buffalo

- Lead to the 1500 Rule ATP
- R-ATP 1000 Hours, 1250 Hours
- What happened before 2013?
  
- The Airline Safety and Federal Aviation Administrative Extension Act of 2010 (Public Law 111–216)



# Quantity or Quality

- In 2007, 250 hour pilots going immediately to a Commuter (now called Regional)
- That changed after 2013 with the R-ATP Rule
- 14 CFR Part 141; Requirements of 30 hours plus flight training 1250
- 14 CFR Part 141; Requirements of 60 hours plus flight training 1000
- Accredited University or College
- FAA Approved and Monitored by the local FSDO
- Positive or Negative Consequences- Increase in salary



# Worldwide Trends

- **Pilot Shortage; not limited to pilots, Mechanics, Regulators, ATC, Flight Attendants**
- **Mandatory Retirement Age for Pilots “BQOE” (65- year old rule)**
- **Electronic PRIA**
- **Cost of Entry (Educational Costs)**
- **Not so much a pilot shortage as a salary shortfall**
- **Ab Initio Training in Europe vs. Stick and Rudder Skills of the U.S.**
- **Attrition**
- **“Youthful Dream”**



# **BOEING & AIRBUS FORECAST 2021-2040**

- **Age requirements, COVID-19, economic downturn, has created an opportunity for younger pilots but a supply issue of qualified professionals to fill the necessary roles**
- **Creating that Pipeline; How is this done?**



# PILOT AND TECHNICIAN OUTLOOK BY REGION

PILOT AND TECHNICIAN OUTLOOK  
2021–2040

## New Personnel Demand



Commercial Aviation  
**2,124,000**  
New Personnel



\*Does not include China





# OUTLOOK ON A PAGE

## PILOT AND TECHNICIAN OUTLOOK 2021-2040

Region	Asia-Pacific Detail						North America	Europe	Middle East	Latin America	Russia and Central Asia	Africa	World
	Asia-Pacific	China	Southeast Asia	South Asia	Northeast Asia	Oceania							
Economic Growth (GDP)	3.7%	4.4%	3.9%	4.9%	1.0%	2.3%	2.1%	1.4%	2.8%	2.4%	2.1%	3.0%	2.7%
Airline Traffic Growth (RPK)	5.0%	5.4%	5.5%	6.9%	1.7%	3.0%	2.7%	3.1%	4.1%	4.8%	2.9%	5.4%	4.0%
Airline Fleet Growth	4.2%	4.4%	5.0%	6.6%	1.2%	1.9%	1.7%	2.7%	4.1%	3.4%	2.5%	3.6%	3.1%
<b>PERSONNEL DEMAND</b>													
Pilots	231,000	123,000	43,000	36,000	19,000	10,000	130,000	115,000	54,000	38,000	25,000	19,000	612,000
Technicians	249,000	127,000	55,000	33,000	23,000	11,000	132,000	112,000	51,000	37,000	25,000	20,000	626,000
Cabin Crew	339,000	161,000	77,000	44,000	40,000	17,000	170,000	178,000	91,000	51,000	33,000	24,000	886,000
<b>Total</b>	<b>819,000</b>	<b>411,000</b>	<b>175,000</b>	<b>113,000</b>	<b>82,000</b>	<b>38,000</b>	<b>432,000</b>	<b>405,000</b>	<b>196,000</b>	<b>126,000</b>	<b>83,000</b>	<b>63,000</b>	<b>2,124,000</b>

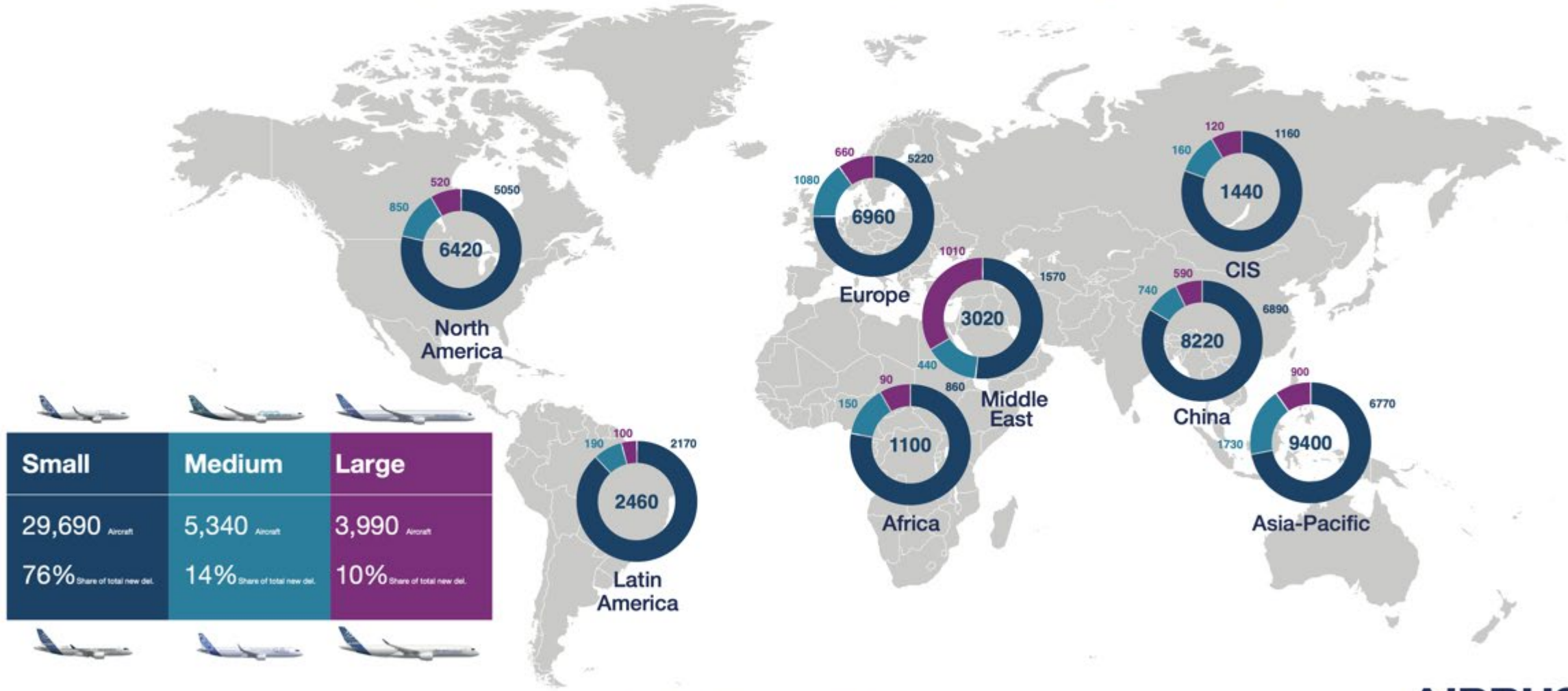


These photos were taken before Boeing implemented COVID-19 pandemic safeguards.



# Commercial Aircraft demand 2021-2040

Asia-Pacific, China, Europe and US continue to be major drivers for growth & replacement



Source: Airbus Market Forecast 2021-2040



# How to Create the Next Generation

- I firmly believe it is the older generation's responsibility to pass on that knowledge
- Assisting in finding Sources of Funding
- Aviation training begins at a young age
- Aviation is expensive
- Protection of life, avoiding injury to persons or property
- Avoid the concept of “Easier to go do something else”
- Each one of us has a duty to the next generation



# Kent State Efforts



- I started teaching on the Aeronautics faculty at KSU in 2015
- Involved with a For Profit Flight School outside at the 3G3 Wadsworth Airport since 2013
- Encouraged students to receive Private Pilot Certificate under 49 USC 44703; 14 CFR 61 before entering University
- Worked out/working out well for all of those students
- Students matriculate faster and quicker through the program
- Positive correlation between mathematics grades and success in the program



# Be the Example

- Find pilots in areas where you may not think to find them
- Encourage future pilots from Kindergarten
- Oshkosh, Sun’N’Fun, Air Shows
- Video Games
- UAV’s, UAS
- Simulators
- NASA Space Camps
- **STEAM not STEM 49 USC 40102 (a) (1) Definition of “Aeronautics” is the :Science and Art of Flight Art”**



# Kent State Efforts



- **Online Degree Programs**
- **AVML- Aviation Management Degree- Graduate**
- **Aviation Maintenance Management Degree- Undergraduate- Online**
- **UAS Operations Degree- FAA UAS-CTI School**
- **Aviation Law and Policy Minor**
- **UAS Minor**
- **4 other minor and 6 Undergraduate Degree Programs**
- **College of Aeronautics and Engineering- Synergy of Aeronautics and Engineering**



# Sources of Funding



Creative sources  
Research and look  
Problem: Is there support once the scholarship is granted?  
Mentorship...completion....limited funds  
Traditional: Work and Pay



# Kent State Efforts

- **Developing the relationship with local high schools**
- **Sixth District Compact**
- **Davis High School in Downtown Cleveland (KBKL)**
- **FAA Grants for Pilots and Aviation Maintenance**
- **Dean- Female; Associate Deans both Female and Minority**
- **The Leadership must set the example**
- **Working with Industry; Diversity is a solution**
- **Increasing diversity, aviation is still white male dominated**





*Estimated Active Women Pilot Certificates Held By Category And Age Group of Holder*

Age Group	Type of Pilot Certificates							Flight Instructor 2/	Remote Pilot 2/
	Total	Student	Sport	Recreational	Private 1/	Commercial 1/	Airline Transport 1/	CFI 3/	
<b>Total</b>	<b>39,187</b>	<b>15,971</b>	<b>223</b>	<b>15</b>	<b>10,009</b>	<b>6,081</b>	<b>6,888</b>	<b>6,848</b>	<b>793</b>
14-15	48	48	0	0	0	0	0	0	0
16-19	2,382	1,955	2	0	396	29	0	9	10
20-24	6,852	4,449	18	5	1,508	819	53	350	67
25-29	6,075	3,266	21	5	1,164	1,229	390	688	132
30-34	4,493	1,974	14	0	927	820	758	931	107
35-39	3,658	1,373	7	1	723	558	996	979	98
40-44	2,731	683	6	0	595	423	1,024	852	61
45-49	2,684	606	13	0	634	339	1,092	836	80
50-54	2,794	584	25	0	776	356	1,053	670	95
55-59	2,775	486	48	1	1,028	407	805	563	74
60-64	2,240	304	31	0	1,026	418	461	451	44
65-69	1,295	143	16	1	634	350	151	269	19
70-74	718	69	15	1	387	186	60	143	4
75-79	278	22	5	1	148	79	23	66	2
80 and over	164	9	2	0	63	68	22	41	0

1. Data current as of December 31, 2016 (FAA, 2017)
2. Includes pilots with an airplane and/or a helicopter and/or a glider and/or a gyroplane certificate. Pilots with multiple ratings will be reported under highest rating. For example a pilot with a private helicopter and commercial airplane certificates will be reported in the commercial category.
3. Not included in total active pilots
4. Certified Flight Instructor

*Estimated Active Pilot Certificates Held by Category and Age Group of Holder*

Age Group	Type of Pilot Certificates							Flight Instructor 2/	Remote Pilot 2/
	Total	Student	Sport	Recreational	Private 1/	Commercial 1/	Airline Transport 1/	CFI 3/	
<b>Total</b>	<b>584,361</b>	<b>128,501</b>	<b>5,889</b>	<b>178</b>	<b>174,517</b>	<b>112,056</b>	<b>163,220</b>	<b>104,382</b>	<b>20,362</b>
14-15	259	259	0	0	0	0	0	0	0
16-19	16,491	12,697	16	3	3,482	293	0	56	214
20-24	57,599	31,808	112	28	14,815	10,058	778	3,637	1,388
25-29	64,176	26,837	201	30	13,698	17,703	5,707	8,101	2,397
30-34	55,351	17,693	239	12	13,167	12,011	12,229	11,884	2,761
35-39	50,246	12,314	234	10	12,342	8,997	16,349	11,919	2,564
40-44	44,770	6,212	292	9	12,577	7,513	18,167	10,691	2,217
45-49	49,254	5,571	427	11	13,322	7,417	22,506	11,642	2,143
50-54	56,377	4,962	676	11	16,929	8,214	25,585	10,614	2,094
55-59	59,558	4,069	933	19	20,822	8,966	24,749	9,733	1,746
60-64	52,066	2,847	993	15	21,015	9,275	17,921	8,703	1,425
65-69	36,580	1,798	807	14	15,516	8,598	9,847	7,572	893
70-74	23,543	954	560	9	9,758	6,762	5,500	5,499	376
75-79	11,018	328	266	3	4,382	3,574	2,465	2,683	118
80 and over	7,073	152	133	4	2,692	2,675	1,417	1,648	26

1. Data current as of December 31, 2016 (FAA, 2017)
2. Includes pilots with an airplane and/or a helicopter and/or a glider and/or a gyroplane certificate. Pilots with multiple ratings will be reported under highest rating. For example a pilot with a private helicopter and commercial airplane certificates will be reported in the commercial category.
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4. Certified Flight Instructor



Table 1: Kent Campus Undergraduate Aeronautics Students by Gender and Ethnicity, 2017F-2021F



# Kent State Statistics 15.9%

Gender	Ethnicity	2017F	2018F	2019F	2020F	2021F
Female	Asian			1	1	1
	African American	4	4	4	5	6
	Foreign	3	3	3	5	3
	Hispanic	5	4	4	3	3
	Multiple	1		2	1	2
	Native Hawaiian or Other Pacific Islander					1
	Caucasian	41	36	41	50	69
	Not Reported	1	2	2	1	2
<b>Female Total</b>		<b>55</b>	<b>49</b>	<b>57</b>	<b>66</b>	<b>87</b>
Male	Asian	4	6	6	7	10
	African American	18	16	20	21	26
	Foreign	61	46	24	23	24
	Hispanic	11	14	13	16	21
	Multiple	11	12	11	10	10
	Native American/Alaskan Native					
	Caucasian	265	255	285	331	352
	Not Reported	9	12	14	15	17
<b>Male Total</b>		<b>379</b>	<b>361</b>	<b>373</b>	<b>423</b>	<b>460</b>
<b>Grand Total</b>		<b>434</b>	<b>410</b>	<b>430</b>	<b>489</b>	<b>547</b>



# Drone Advisory Committee

June 23, 2021 Meeting

## Task Group 10, Gender-Neutral Language for the Drone Community

- **More inclusive; gender neutral; tasked to DAC**
- **Removing barriers and attract talent; inclusive, safe and productive ecosystem- robust safety culture**
- **Women are greatly underrepresented; 6.7% are RPIC**
  - Attracting and retaining people regardless of gender is a goal- avoid shortage
  - Repairman- Technician
  - Airman/men-Aviator
  - Wife-Spouse
  - NOTAM- Notice to Air Missions (Where did this come from?)
  - Unmanned-uncrewed





# Questions?



## Jason Lorenzon, Esq, ATP

**Board Certified- Aviation Law**

**Assistant Professor**

**Kent State University**

**[jloren10@kent.edu](mailto:jloren10@kent.edu)**

