Pilot Scarcity

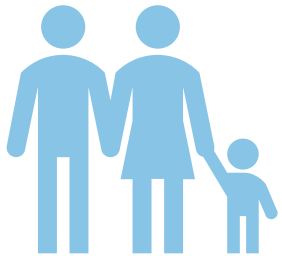
Aviation's Weakness

Presented & Researched By Allegiant Travel Company

National Air Carrier Association

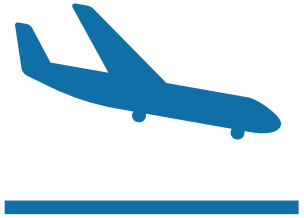
By 2030 many will not have traveled

196 Million
Pax Unable to Travel
THROUGH 2030

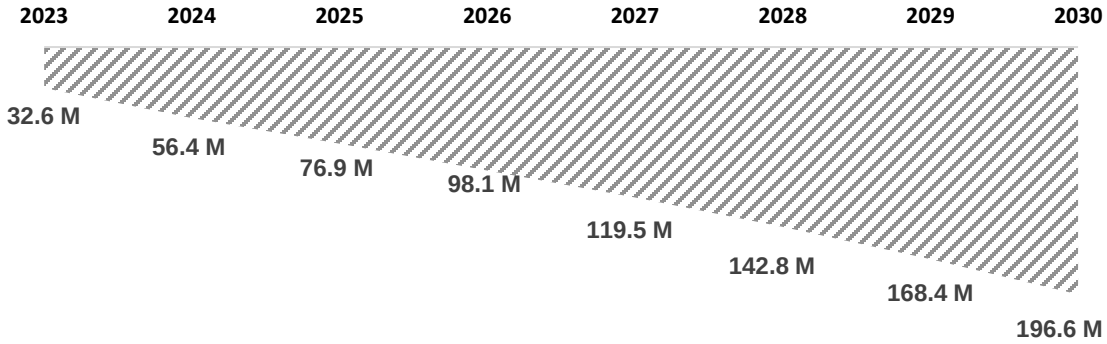


$48.7B
in Lost Revenue
THROUGH 2030

1,781
Grounded Airplanes
THROUGH 2030



Cumulative Passenger Loss
Through 2030



~$7.4B
Tax Revenue Lost
THROUGH 2030

~174K
Jobs Lost
THROUGH 2030

Source: internal analysis, assumes 2019 baseline (revenue per block hour etc.)

YOUR THOUGHTS

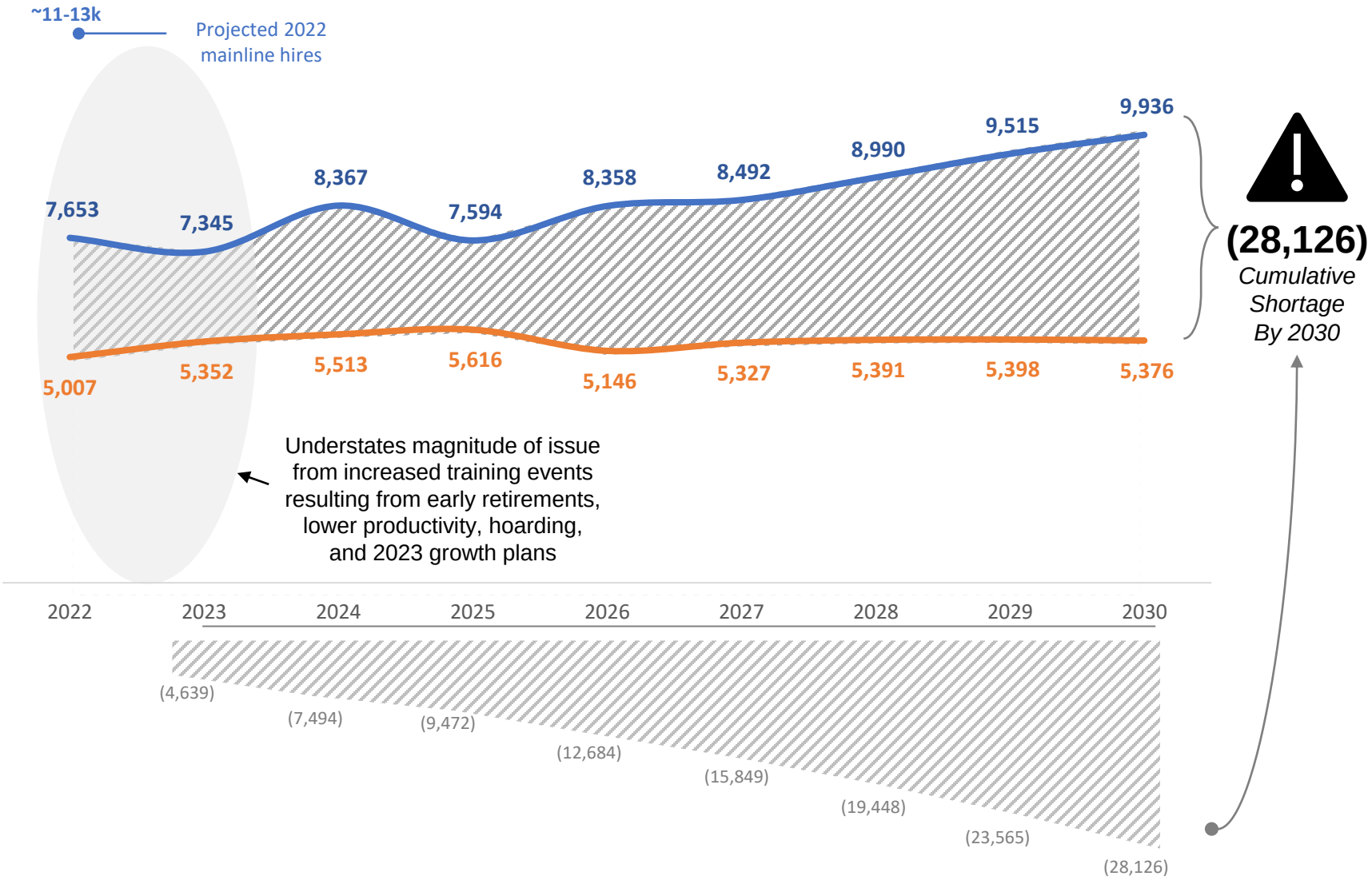
There are multiple views on this issue.
We'd liked to hear yours – it'll take 90 seconds.
We'll provide a report of the results to all who contributed.

Pilot Outlook

The pilot scarcity will limit travel options over the next decade

Industry Pilot Outlook

With current industry environment



(28,126)
Cumulative Shortage By 2030

Demand (Pilots needed)

Supply (ATP Certificates Issued)

Estimated Deficit

Assumptions:

- Feathered block hour productivity back to 2019 levels
- Near term carrier stated and long-term business model growth projections
- Current industry requirements (age 65 & FOQ rule)
- 11% 5 year lagged Student to ATP ratio (historical avg.)
- Scarcity compounded by major domestic events (9/11, 2008 economic recessions, recovery time & less war)

Source: Internal analysis

Decades long decline in student starts

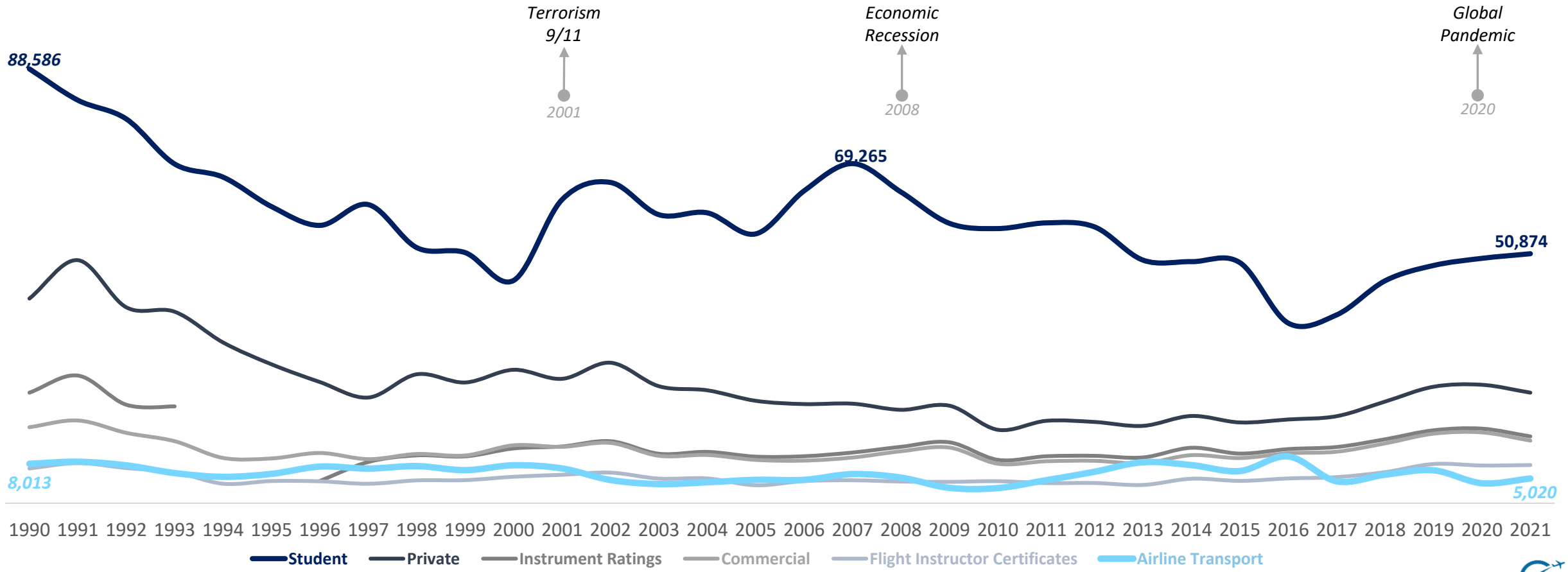
Student Pilots
1990 – 88,586
2021 – 50,874
43% reduction

Active Pilots
1990 – 573,996
2021 – 470,408
18% reduction

CFI
2013 – 98,842
2021 – 121,270
22% increase

Original Airmen Certificates Issued

2010 - 2021

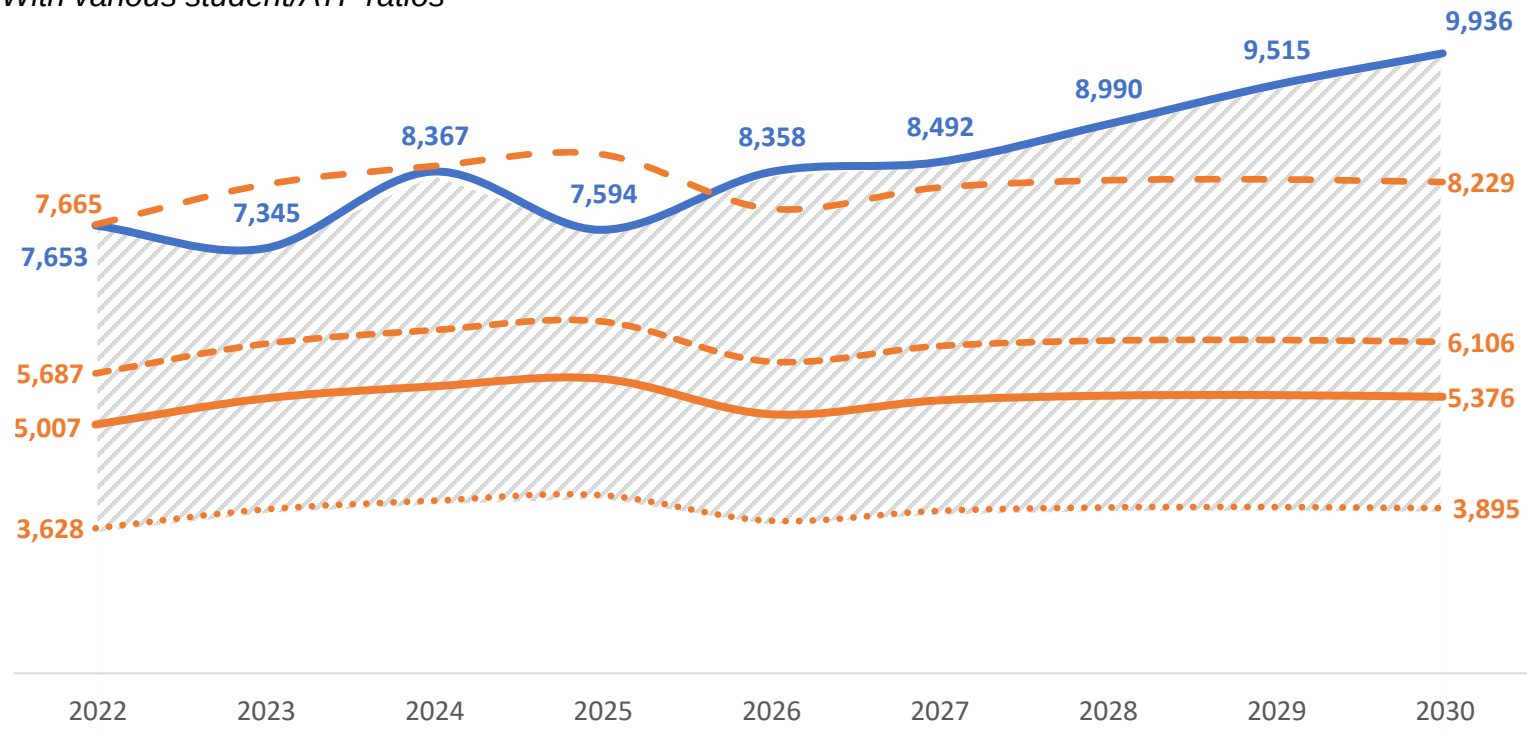


Source: FAA Civil Airman Statistics

The pilot scarcity will be largely dependent on student starts

Industry Pilot Outlook

With various student/ATP ratios



Demand (Pilots needed)

Estimated Deficit

Supply (**16%** Student/ATP Ratio – All Time High)

Supply (**12.5%** Student/ATP Ratio – Decade Avg.)

Supply (**11%** Student/ATP Ratio – Long Term Avg.)

Supply (**8%** Student/ATP Ratio – Decade Low)

Pilot Outlook - Student to ATP @ 16%

2023	2024	2025	2026	2027	2028	2029	2030
859	931	1,934	1,453	1,116	377	(874)	(2,581)

Pilot Outlook - Student to ATP @ 12.5%

2023	2024	2025	2026	2027	2028	2029	2030
(3,232)	(5,337)	(6,552)	(9,065)	(11,506)	(14,374)	(17,757)	(21,587)

Pilot Outlook - Student to ATP @ 8%

2023	2024	2025	2026	2027	2028	2029	2030
(7,492)	(11,864)	(15,389)	(20,018)	(24,649)	(29,734)	(35,337)	(41,378)

Source: internal analysis

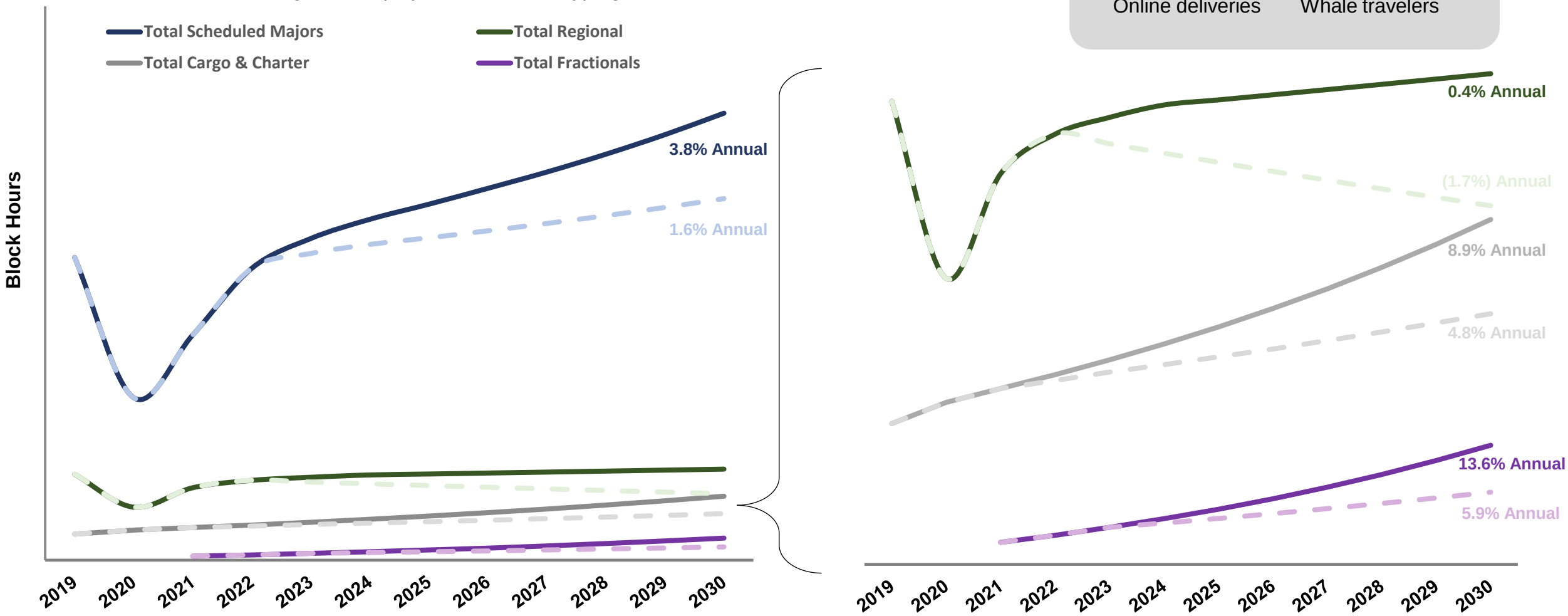
Industry growth would need to be reduced by over 50% to avoid scarcity

Block Hour Forecast With & Without Scarcity

Forecasted as of Mar. 2022 using investor projections & carrier type growth after 2024

Industry's impacted

Domestic travelers
Online deliveries
Smaller communities
Whale travelers



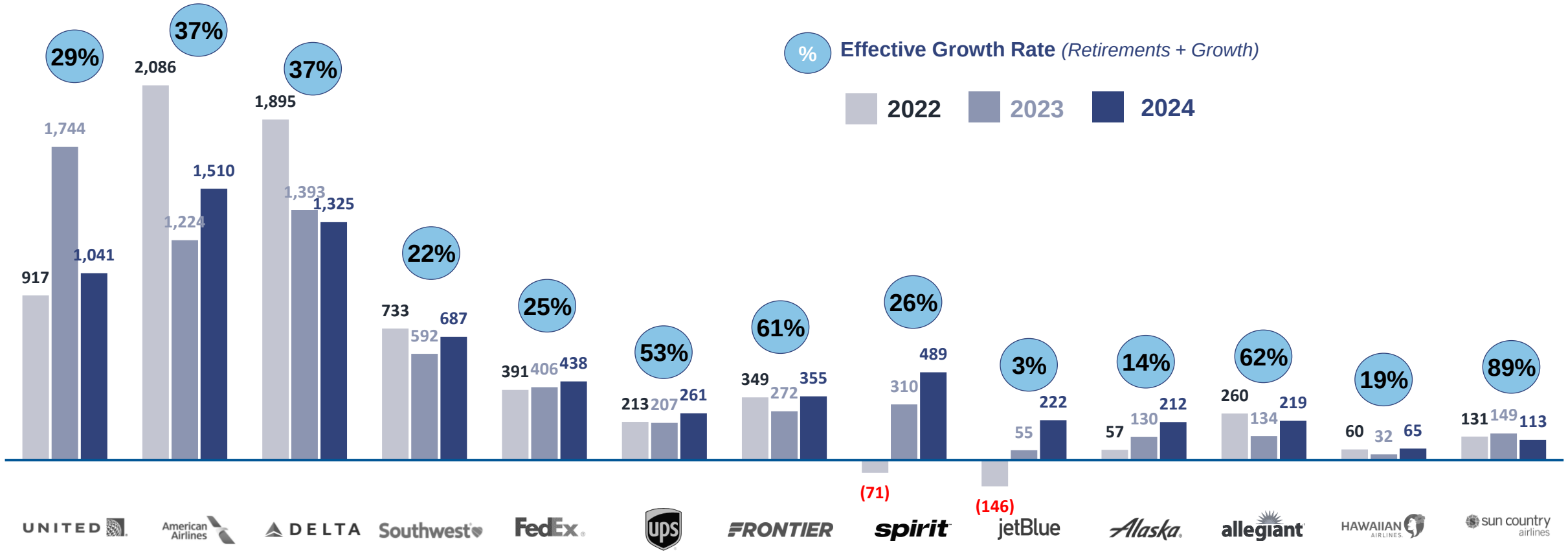
Source: internal analysis, annual growth rates over last cycle: scheduled majors - 2.4%, regionals - (0.9%)

The industry capacity growth adds pressures to the pilot scarcity

Pilot Demand Outlook – *Majors & Cargo*

Forecasted as of January 2022 using investor projections

jetBlue and Spirit have grown pilots significantly relative to block hour growth vs. 2019. Current jetBlue hiring appears to be a result of A220 transition and hiring with anticipation of return to 2019 productivity in 2023 and beyond.

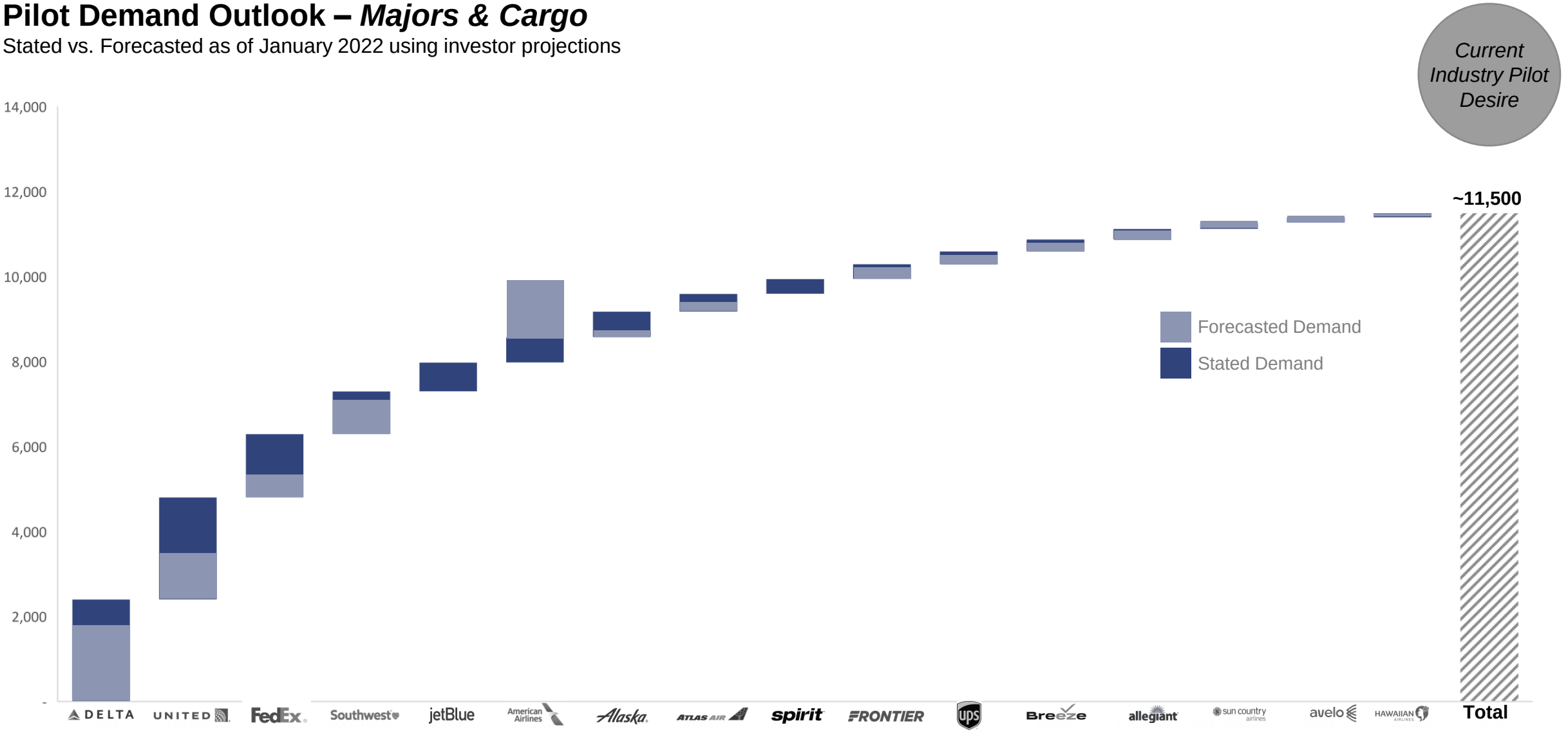


Source: internal analysis (feather block hour productivity back to 2019) & NACA data

Several airlines are hiring above need

Pilot Demand Outlook – *Majors & Cargo*

Stated vs. Forecasted as of January 2022 using investor projections



Source: internal analysis (feather block hour productivity back to 2019) & earnings calls and other public hiring information

YOUR THOUGHTS

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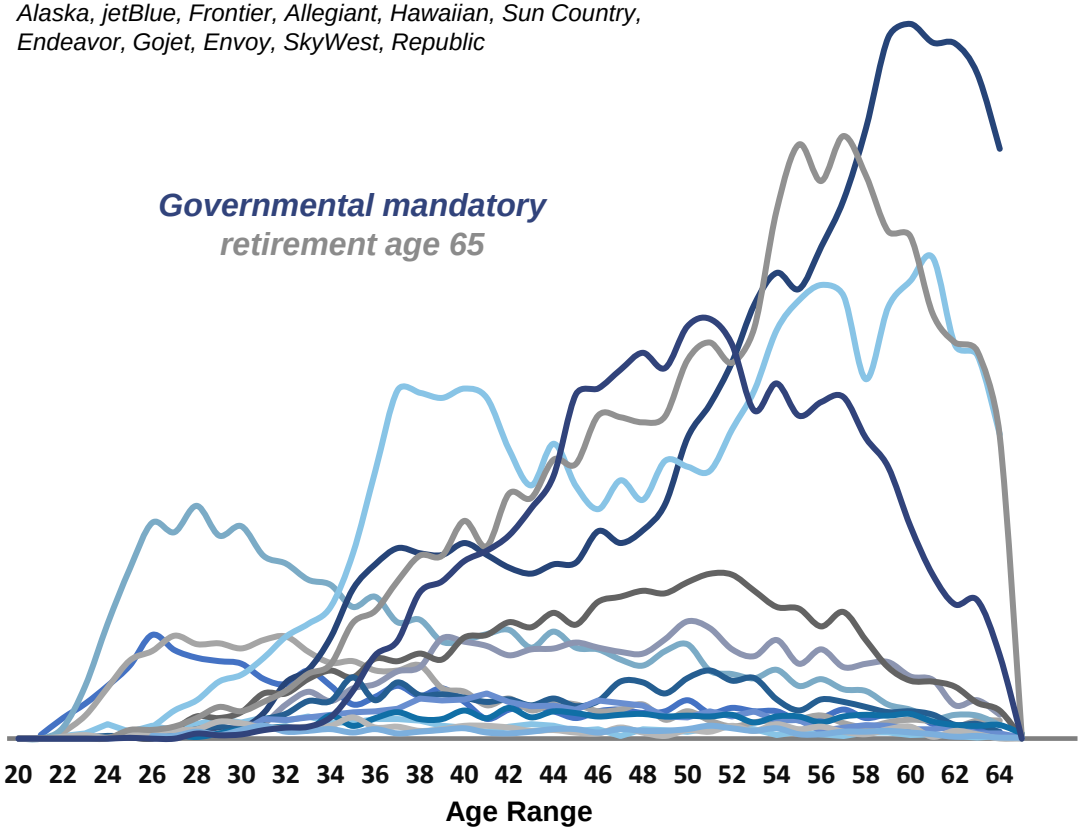
Environment

Carriers will see BIG retirements in the coming years

Age Range Distributions

Major & Regional airlines – American, Delta, United, Southwest, Alaska, jetBlue, Frontier, Allegiant, Hawaiian, Sun Country, Endeavor, Gojet, Envoy, SkyWest, Republic

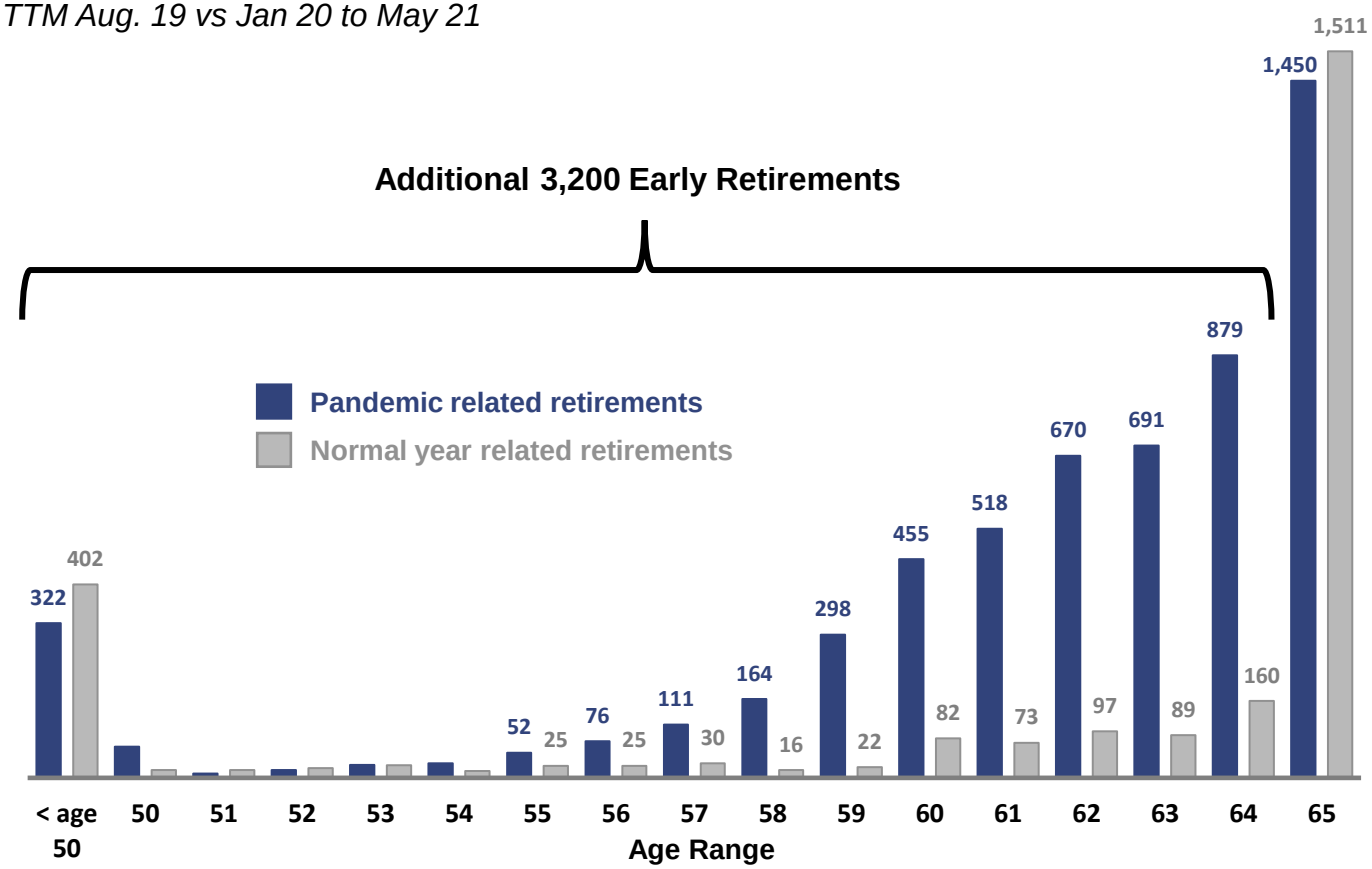


Over next 5 years, ~12,000 mandatory retirements, equivalent to ~14% of US industry (96,000). Based on 2021 NACU age data, we can discern that the starting ages for a pilot at the regional level is around age 23 whereas at the majors' levels its around age 34.

(Lowest age group made up of more than 1% of the total pilot pool)

Retirements by Age

TTM Aug. 19 vs Jan 20 to May 21



At least 3,200 additional experienced pilots took early retirement and are unlikely to come back. Pilots who took early outs are particularly unlikely to return because they would be at the bottom of the seniority list.

Source: NACU pilot age data. Carriers that provided data included.

3,200+ early retirements as a result of pandemic magnified by faster recovery

Ripple effect felt through the whole industry when a Big 4 pilot retires

1
A350 Pilot Retires @ Delta

Majors

Up to 12 training events triggered @ Delta

DL hires Captain from Endeavor

Regionals

Up to 4 training events triggered @ Endeavor

Endeavor hires Captain from Cape Air

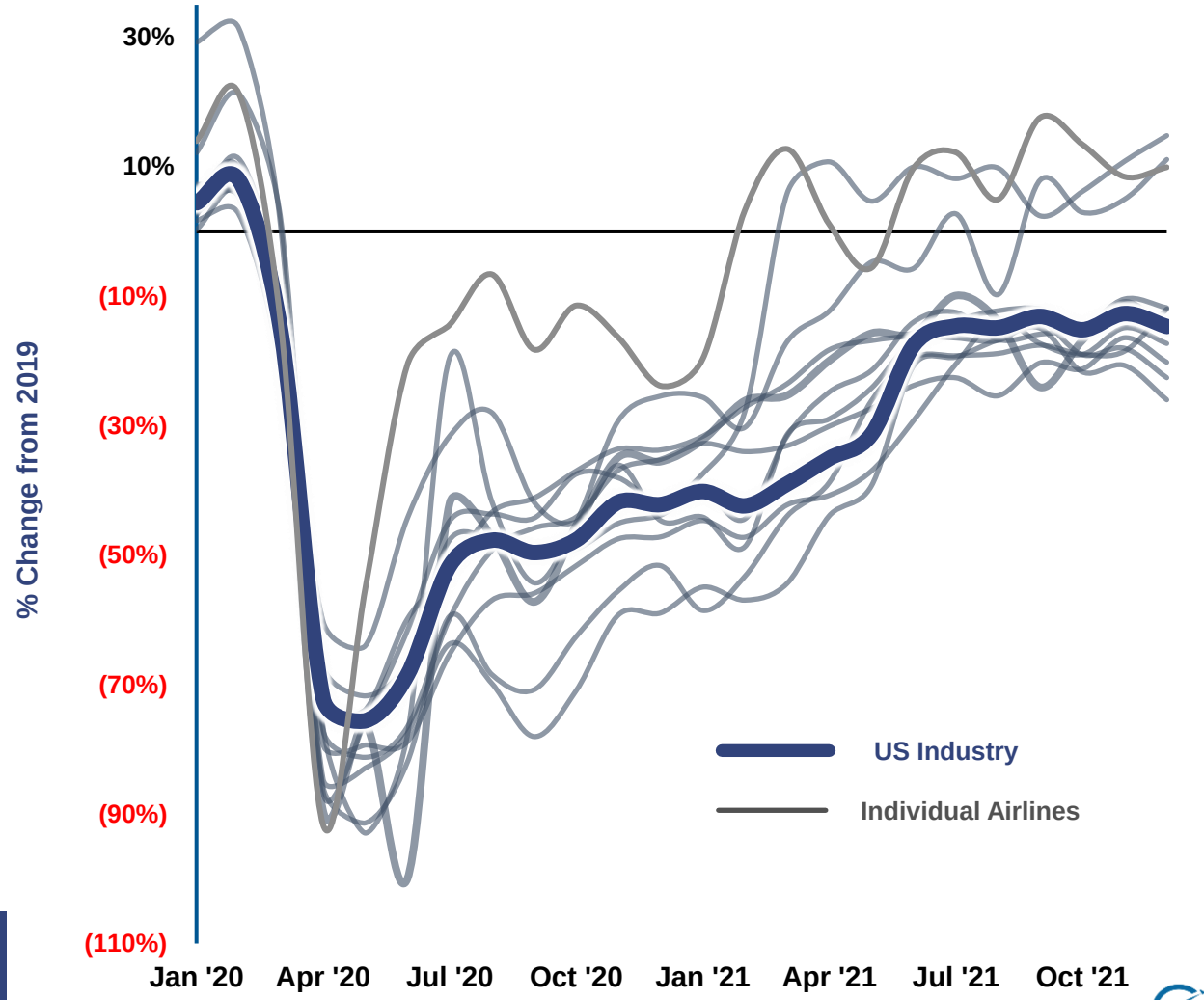
Part 135

Up to 2 training events triggered @ Cape Air

Cape Air hopes to find a pilot

% Change in Departures vs 2019

Jan '20 – Nov '21 (Actual), Dec '21 (Scheduled)



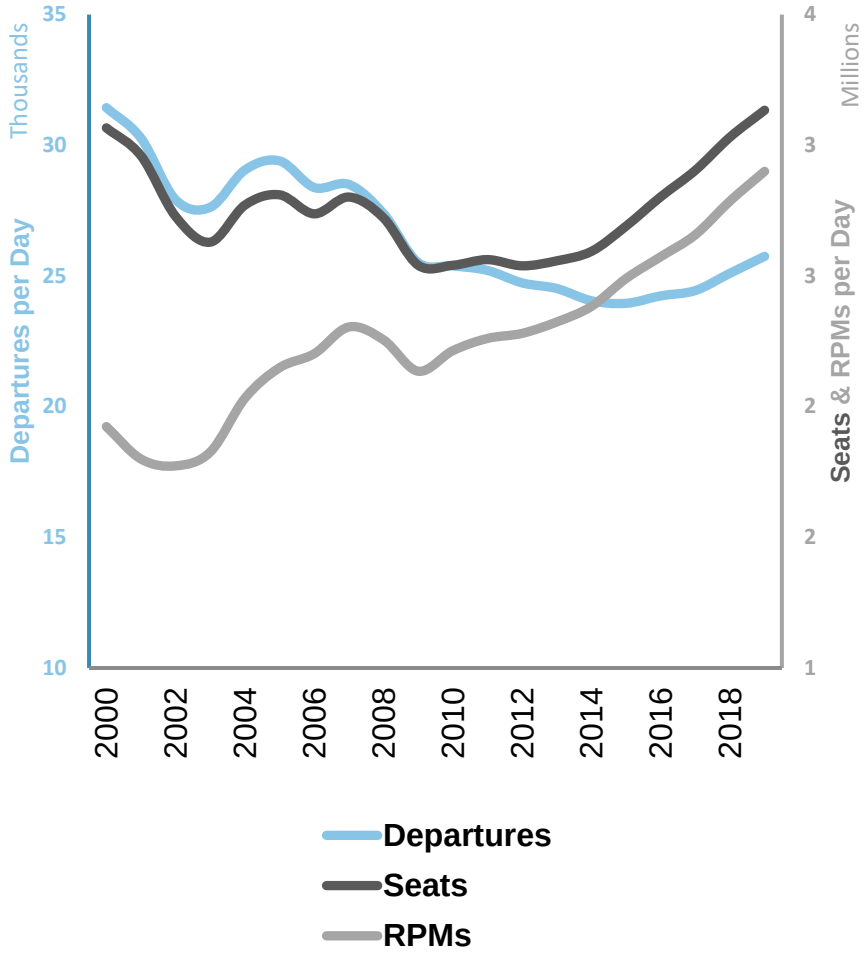
Source: Primary data sources, T100, & airline schedules filed with Cirium

Pilot scarcity despite higher loads, up-gauging, and increased stimulation

Departures, Seats, and Passenger Trends

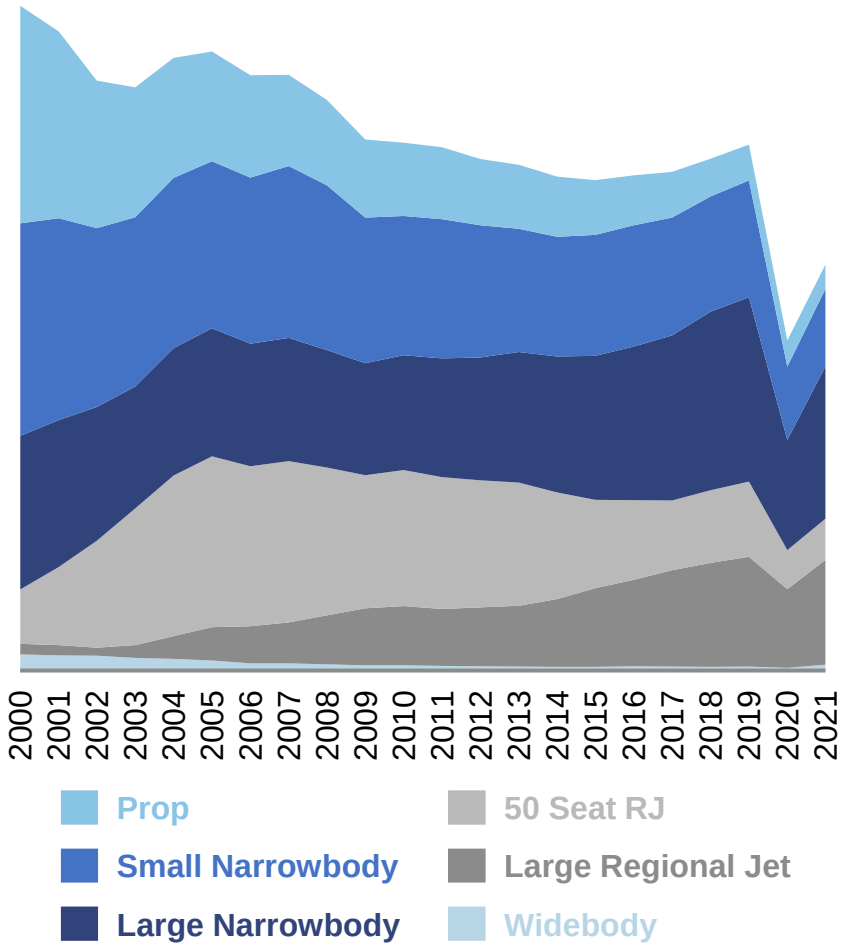
Pre-pandemic

Domestic, 2000 - 2019



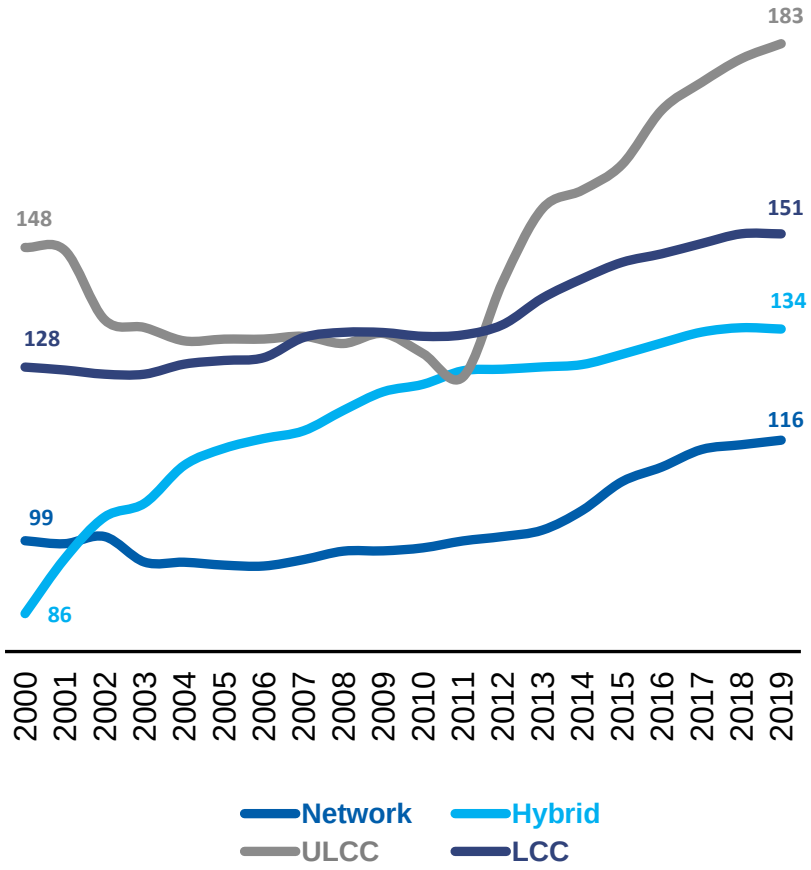
Departures by Aircraft Type Trend

Domestic, 2000 - 2021



Seats per Departure by Airline Type Trend

Domestic, 2000 - 2019



Source: Form 41 & schedules filed with Cirium

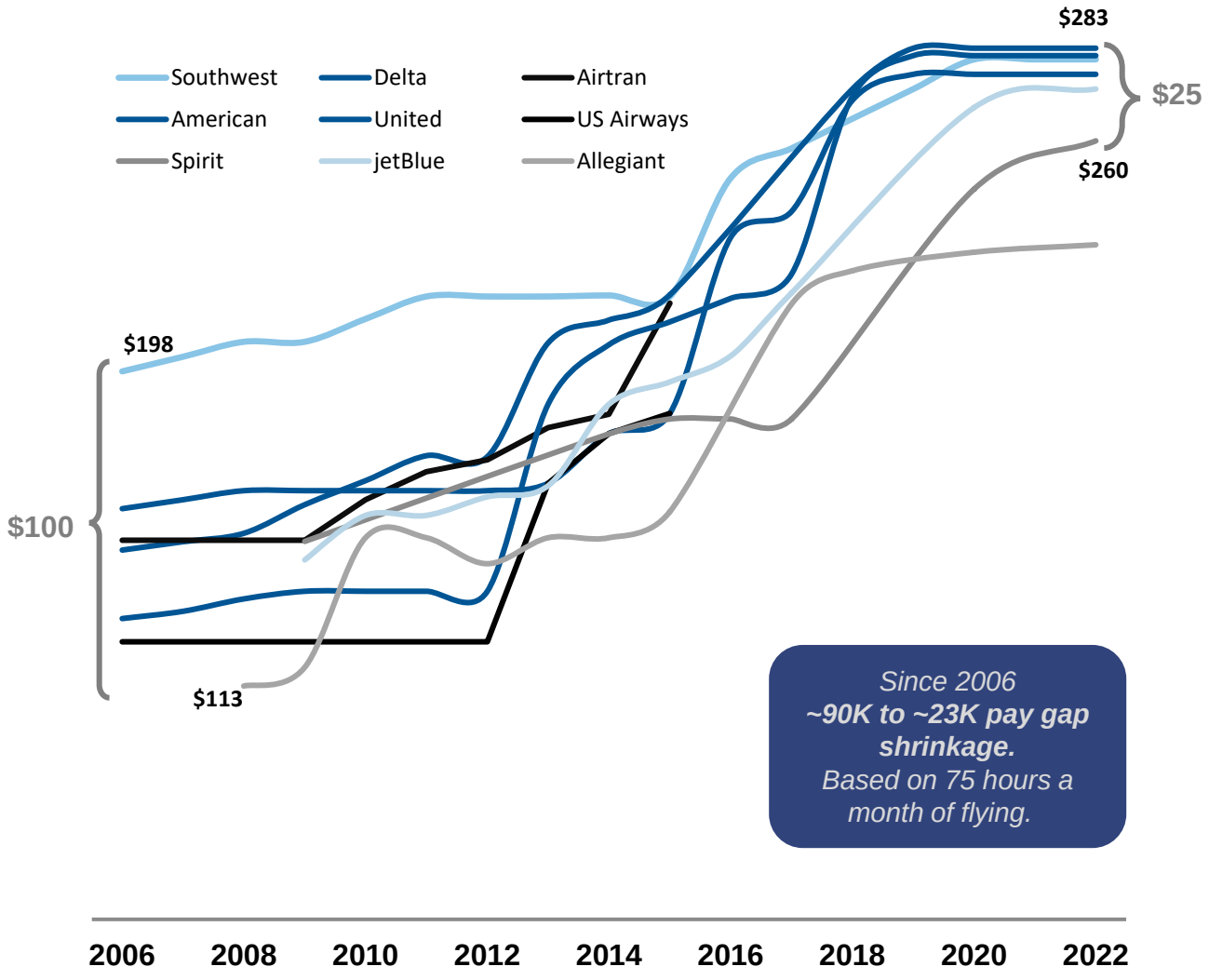
Pay bumps not significant to stimulate/retain additional interest

Captain Hourly Pay Trend

12 Year Rates

2006 - 2022

13 US Major Carriers
8 currently in contract negotiations
$320 - $340

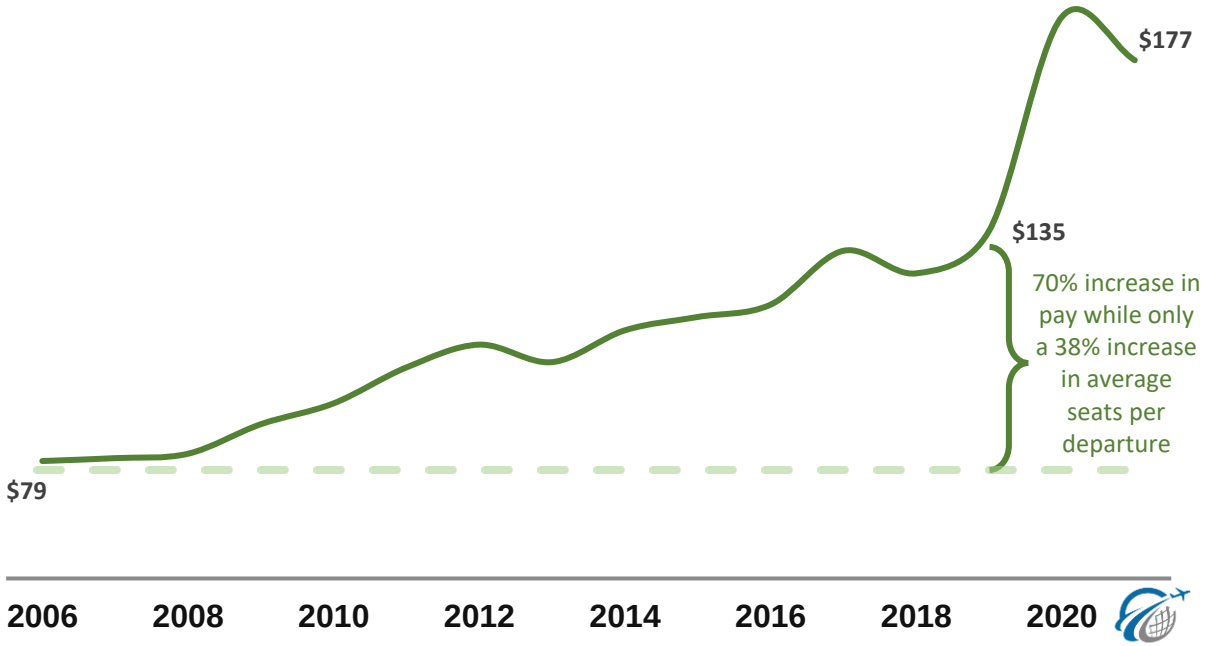


Since 2006
~90K to ~23K pay gap shrinkage.
Based on 75 hours a month of flying.

Regional Pay Trend

Form 41 Pilot & Co-pilot Salaries per Pilot Block Hour Flown

2006 - 2021

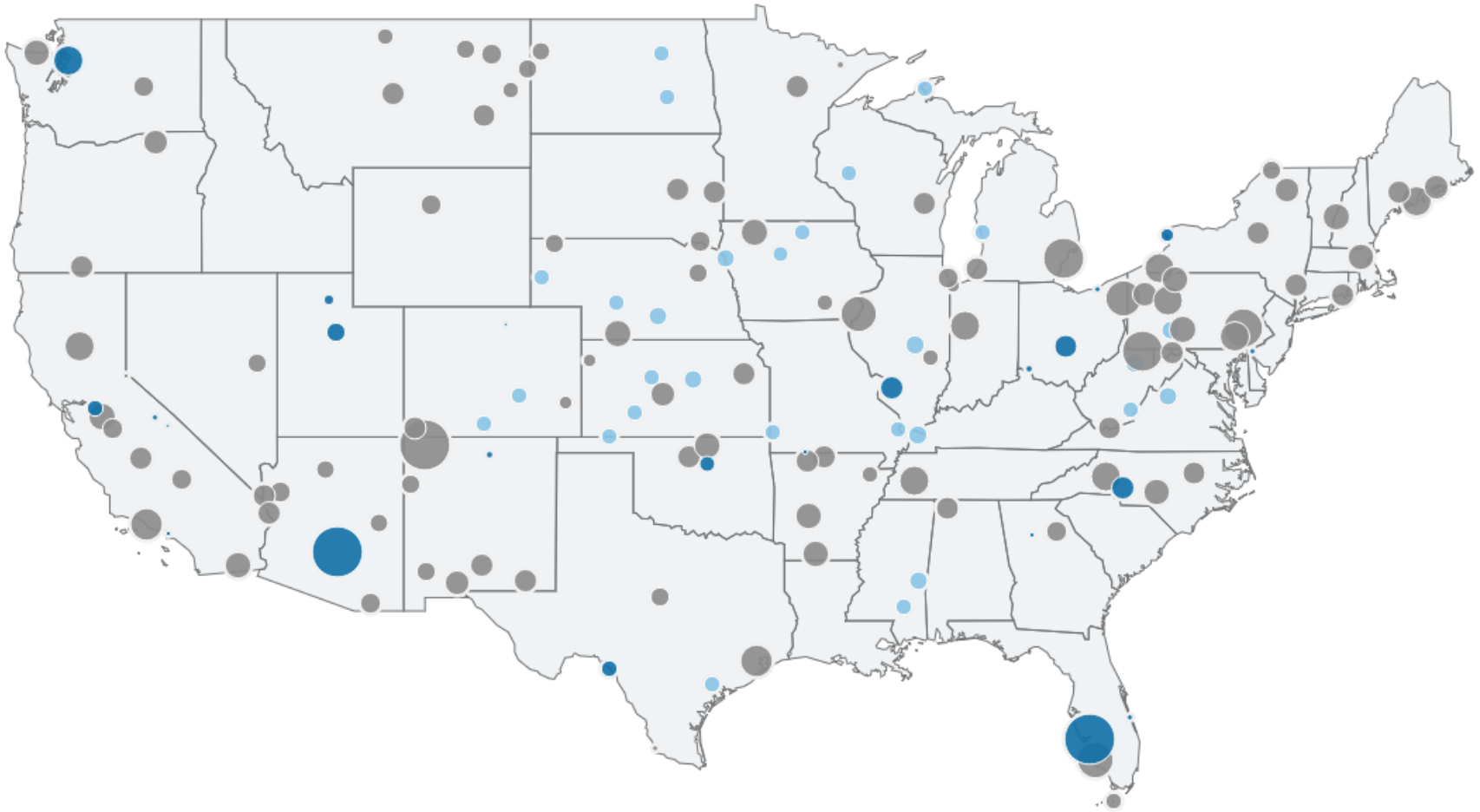


Source: Pilot CBA agreements, AirlinePilotCentral & Form 41

Despite the industry's best efforts …97 airports have already lost service

USA O&D Airports – Gain or Loss of Service

2019 vs. 2000



BUBBLE SIZE INDICATES TOTAL DEPARTURES

GAINED (23 airports)

LOST (97 airports)

SKYWEST EAS (28 airports)
Potential Loss
Announced March 9th,2022

Zero (0) profits in ceasing service

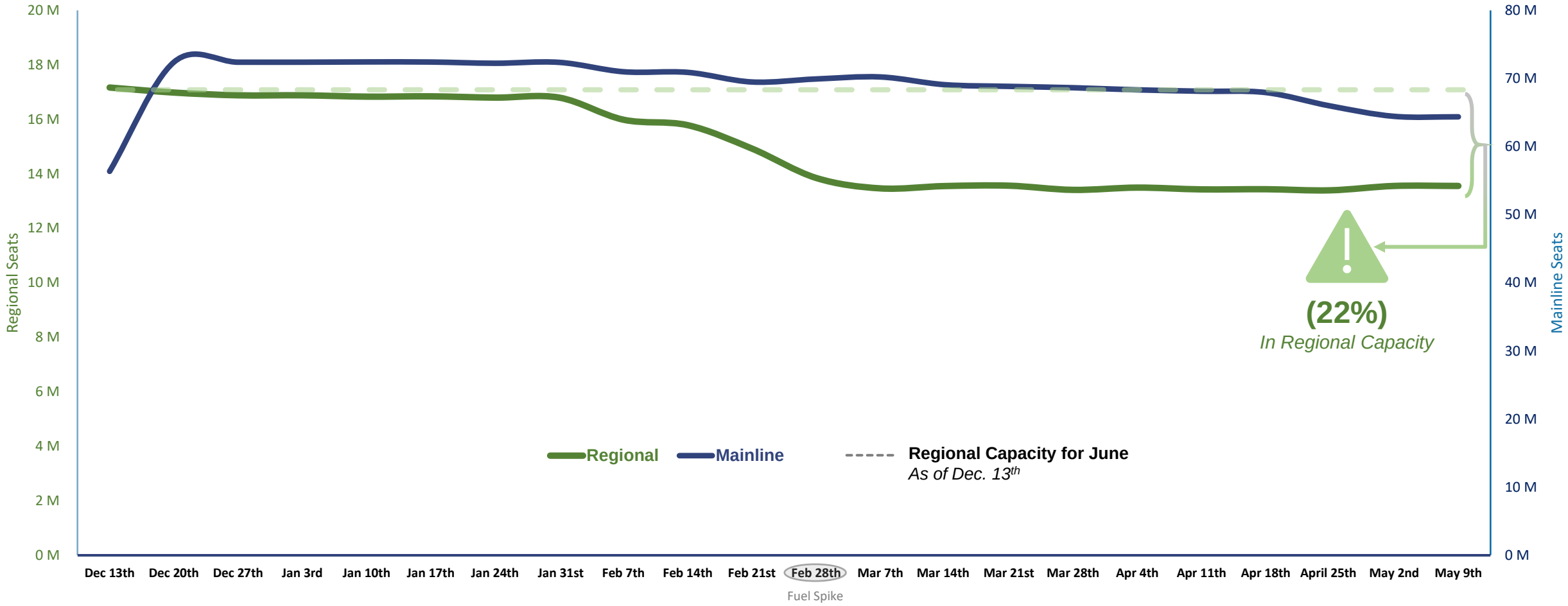
Source: Schedules filed with Cirium. See appendix for table list.

NACA

Scarcity driving regional pull down putting inflationary pressure on fares

Mainline and Regional Seats for June

Dec 13th – May 9th Schedule Filings

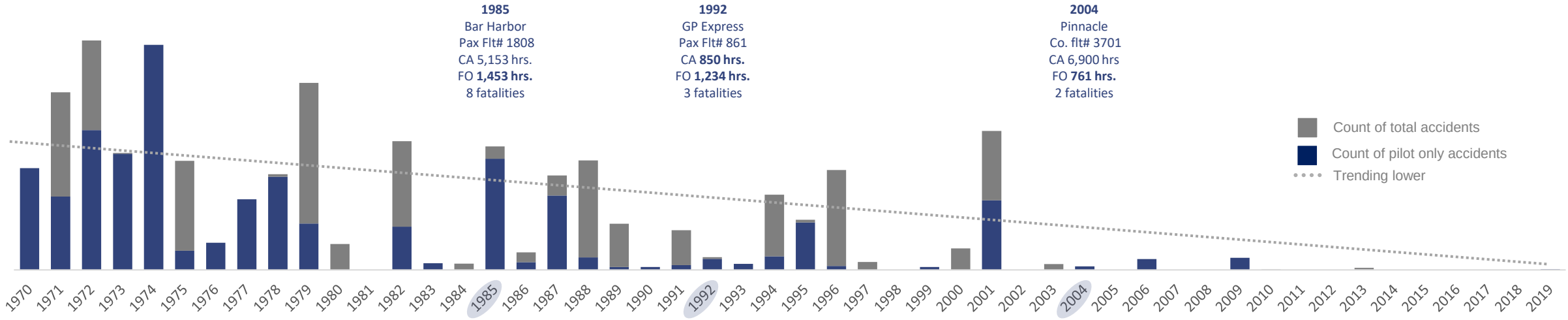


Source: Schedules filed with OAG

Airline safety has improved dramatically since the industry's birth

Historical Fatalities per Million Enplanements

Includes only Pilot Error related causes vs total inclusive of ATC, Aircraft, MX, Terrorism, Weather and Unknown causes
1970 – 2022



Only 5 out of 128 pilots with less than 1,500 Hours
4%

66
total pilot error accidents
1970-2022

2,494 total fatalities in 52 years
Avg. 48 fatalities per year

Enplanements increased by 439% since 1970
169M vs. 915M

44
total excluding pilot accidents
1970-2022

2,388 total fatalities in 52 years
Avg. 54 fatalities per year

8,177 avg. flight hours 5.4x min. requirement

~11.6 years

1979-1999
1,007 total fatalities
Avg. 50 fatalities per year

62% reduction

2000-2020
384 total fatalities
Avg. 19 fatalities per year

1979-1999
1,329 total fatalities
Avg. 66 fatalities per year
Excludes Terrorism

88% reduction

2000-2020
155 total fatalities
Avg. 8 fatalities per year
Excludes Terrorism

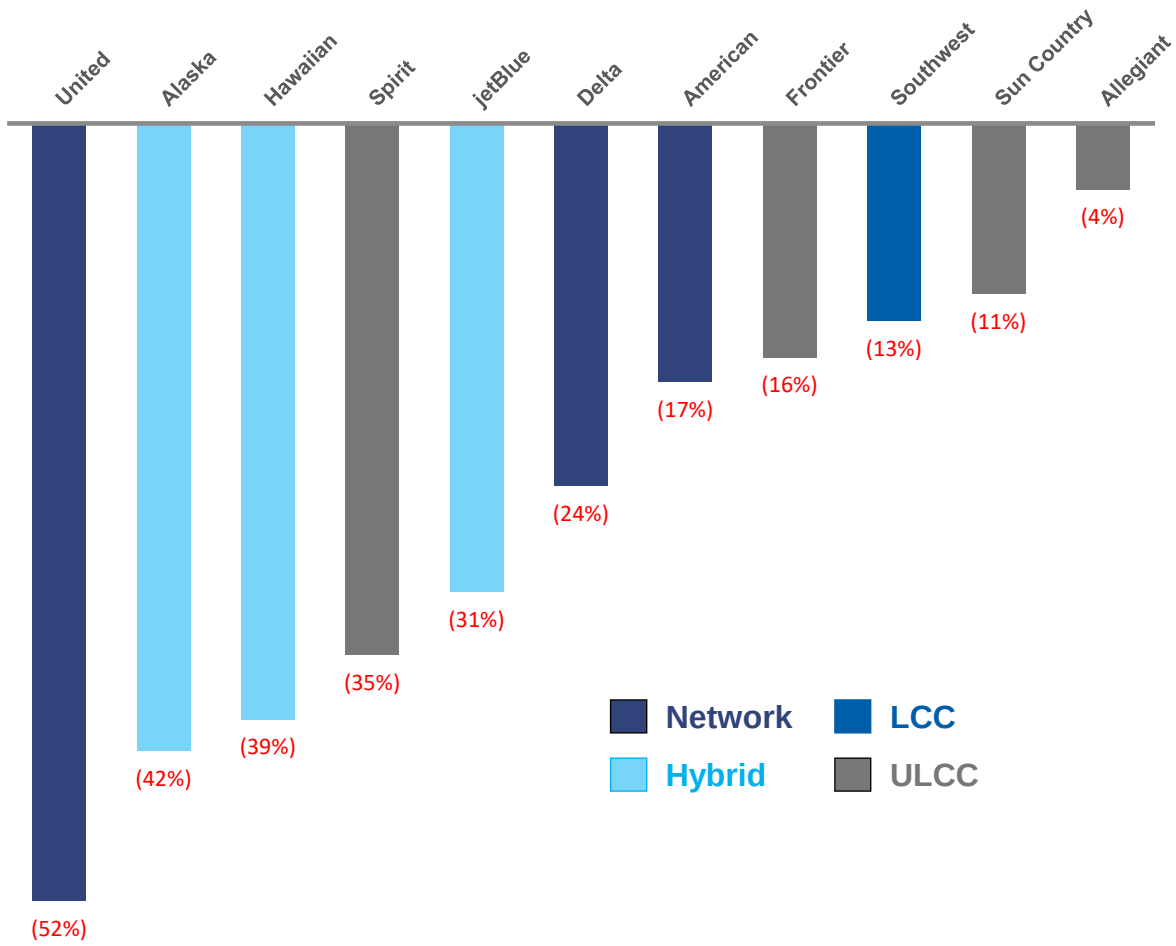
Source: NSTB Reports

NACA

Productivity has decreased and airlines have added pilots ahead of capacity

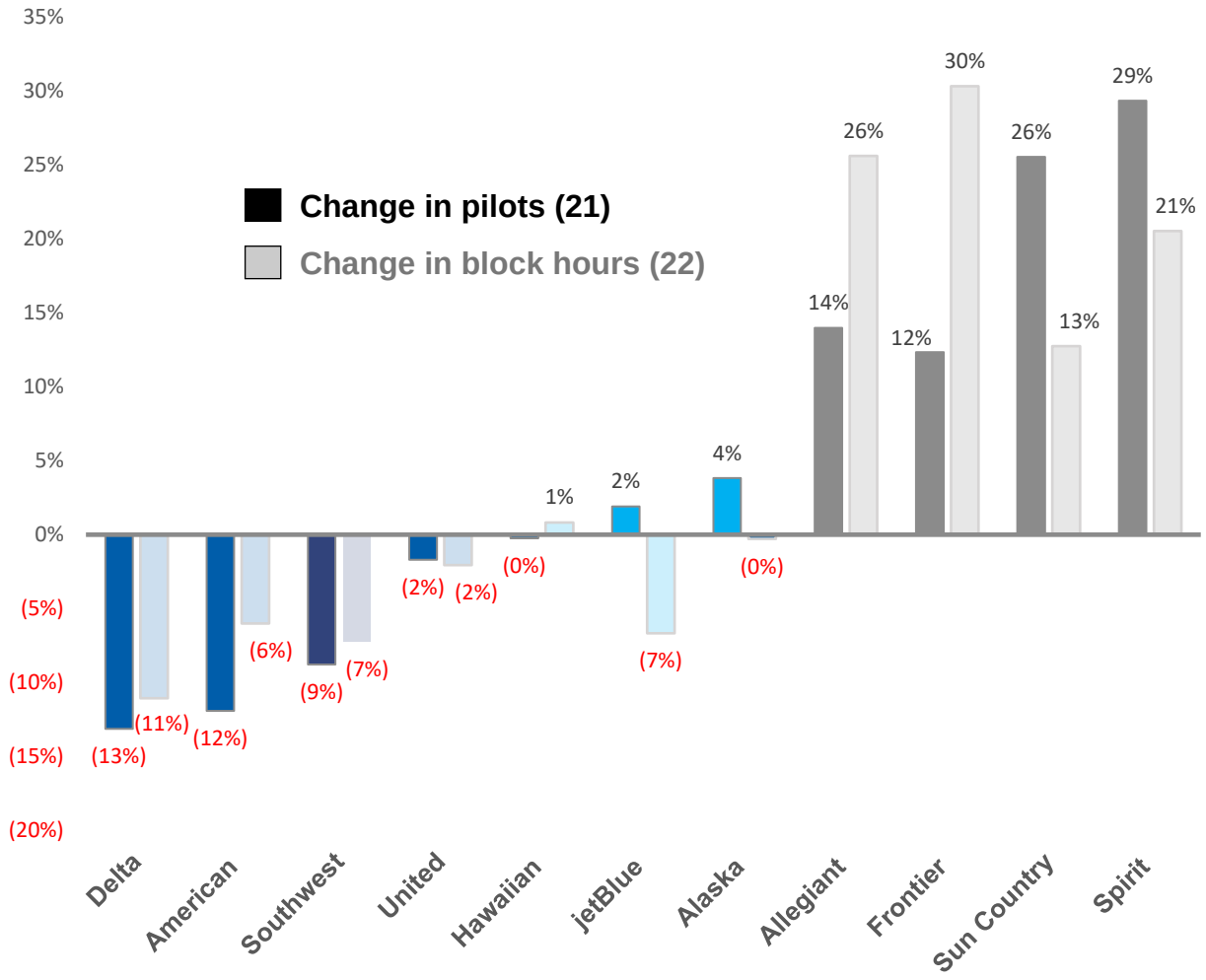
Change in Pilot Productivity (Block Hours per Pilot)

2021 vs. 2019



Change in Pilots vs. Block Hours

2021/22 vs. 2019



Source: NACU and block hours flown from SEC filings and projected block hours flown as of January

YOUR THOUGHTS
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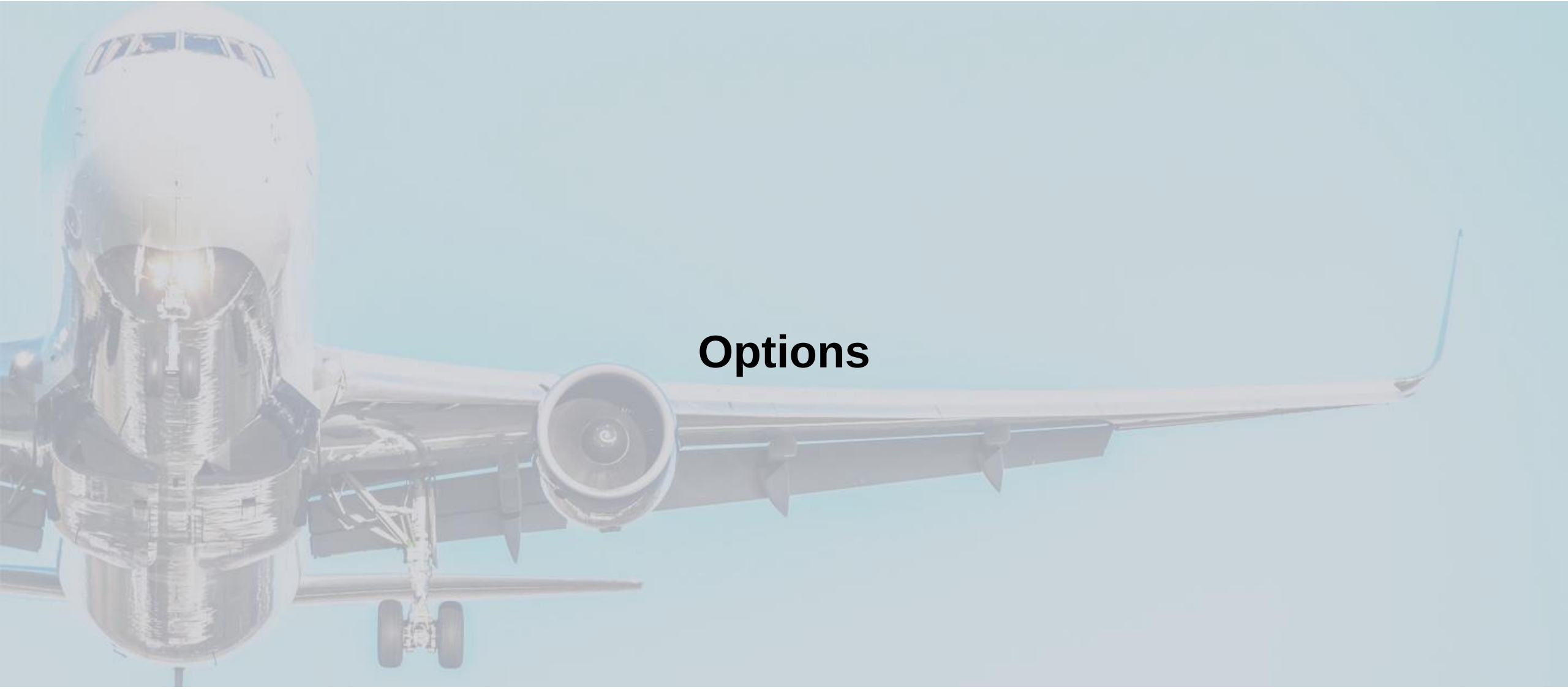


Options

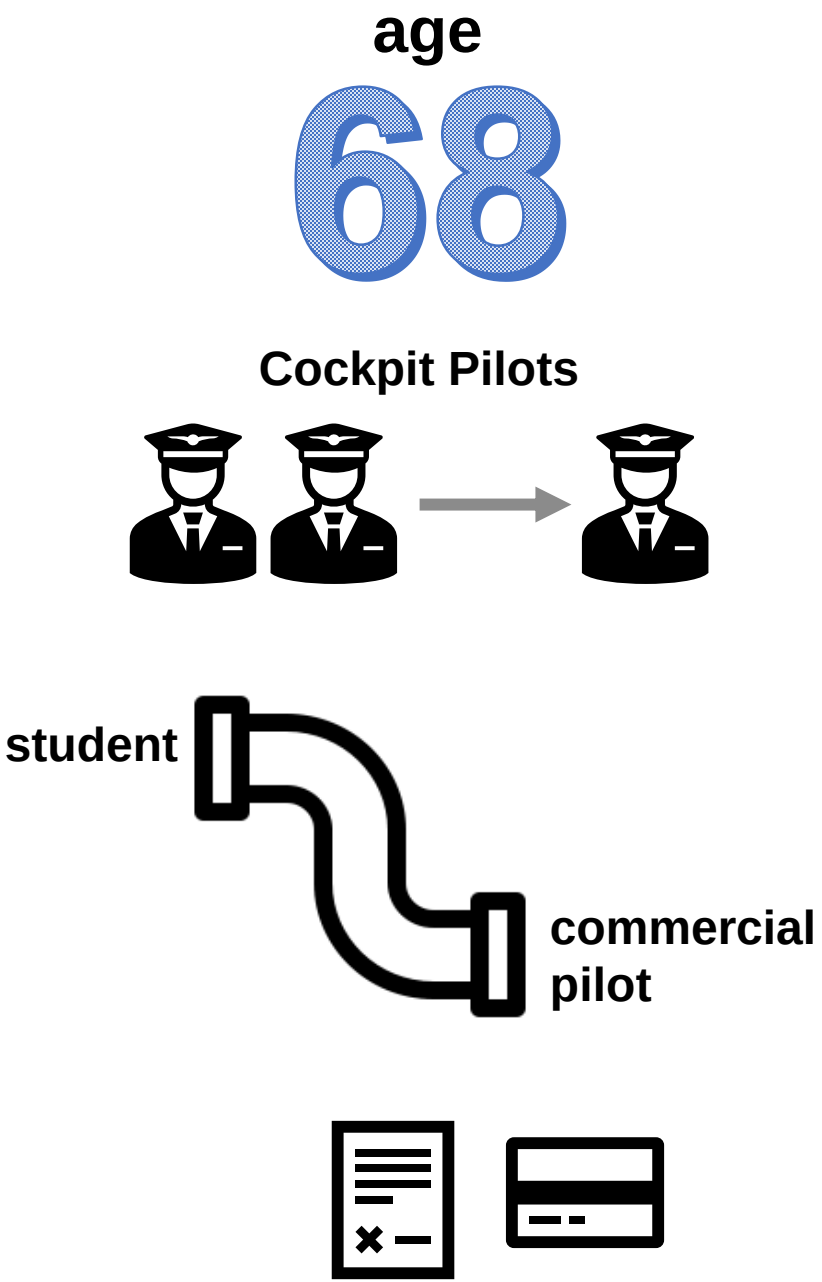
Alternative means of compliance – FAA approval?

Extend pilot use – As part of our analysis, we looked at the option of pushing the federal retirement age to 68, however this only really kicks the problem further out by three years rather than solving the scarcity.

Reduce pilot demand – Could provide an opportunity to rethink crew staffing and improve productivity by reducing total pilots required in the cockpit to one (1) while driving down costs. This is likely several years away from widespread adoption especially in passenger flights, however, presents an opportunity to reduce total number of pilots required to operate an airline fleet.

Reinforce the pipeline **–** Actionable steps could be taken now. Airlines have the control and means to continue investing in training programs and pilot recruitment. Furthermore, there have been numerous advances in simulator technology allowing for sophisticated training program to be developed permitting airlines to take innovative steps to help reduce the pressures on the pipeline. Recruiting new pilots is critical and training programs need to provide the resources to allow pilots to be successful.

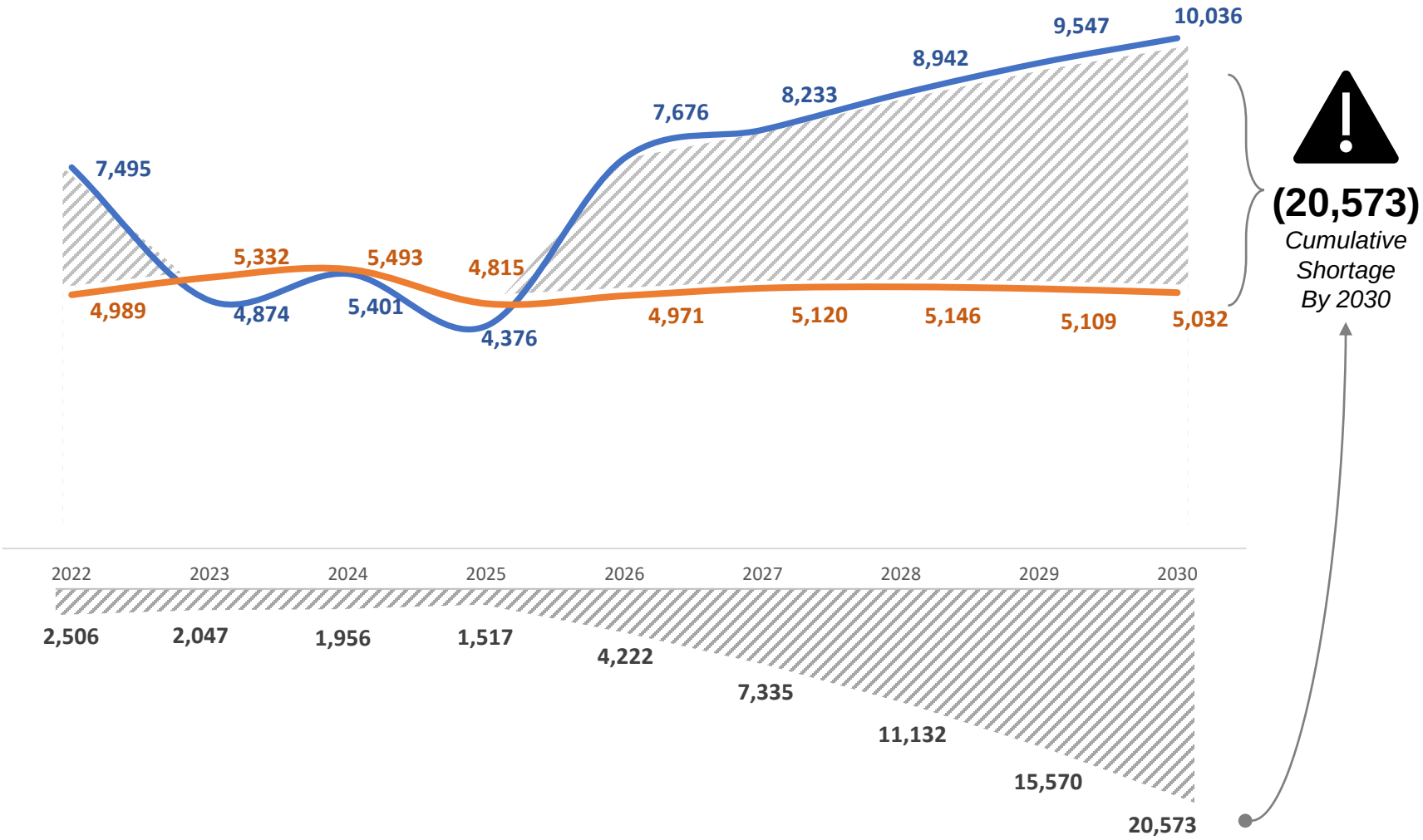
Expand visas for international pilots – Visa's for prospective international pilots could be expanded potentially mirroring the Australian E-3 program as a template. To be successful this program would also need a pathway to a Green Card. *US Talent is going abroad.*



Age 68 is a temporary fix, pushes issue by 3 years

Industry Pilot Outlook w/ Age 68 Retirements

With Current Industry Entry requirements



(20,573)

Cumulative Shortage By 2030

Demand (Pilots needed)

Supply (ATP Certificates Issued)

Estimated Deficit

Source: internal analysis (Feather 2019/2021 block hour productivity), Wolfe Research growth projections

NACA

Proposed hour to credit equivalents

Physical Equipment

Minimal Equipment

Hour : Credit
1:1
$220

High Performance

Hour : Credit
1:1.1
$510

Complex

Hour : Credit
1:1.2
$510

Multi-Engine

Hour : Credit
1:1.5
$400

Turbine

Hour : Credit
1:3
$1,500

Simulators

BATD*
Basic Aviation Training Device

Hour : Credit
1:1
$35

AATD*
Advanced Aviation Training Device

Hour : Credit
1:2-3
$150

FTD
Flight Training Device

Hour : Credit
1:2
$500

FFS (Level A & B)
Full Flight Simulator

Hour : Credit
1:2.4
$1,000

FFS (Level D)
Full Flight Simulator

Hour : Credit
1:3+
$1,000

**Subject to FAA Letter of Approval (LOA). Current cap at 100 hours of sim time can count towards ATP per 61.59*

Proposed pathway to pilot career

Status Quo (61,141, 142)

- 70 - 80 hours — Private & Instrument — Minimal Equipment / AATD
- 120 - 190 hours — Commercial & Multi-Engine — Minimal Equipment / Complex / Multi-Engine / AATD
- 750 – 1,310 hours — Build Time — Fly minimal equipment / flight instruct / Part 135 First Officer
- 2 or 4 years — Optional University Courses Reduce Time

Time to student 1,000 – 1,500 hours / credits

Cost to student *$75k - $420k*

- Requires students to take on large sums of debt or be able to pay significate up-front costs
- Take second jobs while building time to 1,500 hours
- Risk – financial & time
- No straight pathways

Republic R-ATP Exemption

- 70 hours — Private & Instrument — Minimal Equipment
- 120 hours — Commercial & Multi-Engine — Minimal Equipment / Multi-Engine
- 510 hours — Build Time — Flight instruction
- ~320 hours — University Course Equivalents

Time to student 750 hours / 750 credits

Cost to student *$75k*

- Still requires $75k
- Doesn't add "special" experience pertinent to airline specific operations
- Significant amount of flight instruction time

MPL Program

- 88 hours — Core Flying — Minimal Equipment / Multi-engine / AATD
- 34 hours — Basic — FTD (A320 / 737)
- 96 hours — Intermediate — FTD (A320 / 737)
- 32 hours — Advanced — FFS (A320 / 737) / Turbine
- ~800 hours — University Course Equivalents

Time to student 252 hours / 476 credits

Cost to student *$0**

- $75k - $110k but guaranteed job with earnout
- Significant amount of flight instruction time
- Provides significant experience in actual airline operations beyond what you get in existing US programs

Carrier Extension Training Program

- 70 hours — Private & Instrument — Minimal Equipment / AATD
- 120 hours — Commercial & Multi-Engine — Minimal Equipment / Multi-Engine / AATD
- 96 - 245 hours — Intermediate — Minimal Equipment / AATD / FTD (A320 / 737)
- 42 - 235 hours — Advanced — FFS (A320 / 737) / Turbine
- ~800 hours — University Course Equivalents

Time to student 398 - 740 hours / 726 - 1498 credits

Cost to student *$0**

- Airline takes on the cost of training with employment opportunities afterwards to “repay the debt”
- Less focus on financials and more on high quality training & learning
- Helps de-risk career path
- Produces safer pilots

Core Flying | Specialized Jet Airline Training | Time Building | Knowledge Building

Not relative hours/sizes between programs

Source: 14 CFR 61,141,142. Astonfly, CAE, & BAA Flight School, Republic Exemption Filing

NACA

US vs. world pathway comparison

Not Paid to Fly

Paid to Fly

CPL enough

1. Private Pilot -> Instrument -> Commercial -> Multi-Engine -> Flight Instructor 250 hours — 2 – 4 years
2. Flight instruct or fly for Part 135 Carrier 250 to 500 hours ***(TT 500-750)*** — 1 year
3. Fly for regional as FO for 1000 hours ***(TT 1500)*** — 1 – 2 years
4. Obtain ATP
5. Fly for regional as Captain for 1,000+ hours ***(TT 2500)*** — 1 – 2 years
6. ~2,500 to start at larger part 121

ATP required

1. Private Pilot -> Instrument -> Commercial -> Multi-Engine -> Flight Instructor 250 hours — 2 - 4 years
2. Flight instruct or fly for part 135 Carrier 1,250 hours ***(TT 1500)*** — 2 – 3 years
3. ATP Certificate Training Program -> Airline Transport Pilot License (ATP) **Both FO & CA 1500 hours**
4. Fly for regional 1,000 hours as FO ***(TT 2500)*** — 1 – 2 years
5. ~2,500 to start at larger part 121

MPL / ATPL

1. MPL / ATPL License – 240 hours minimum — ~2 years
2. Fly for large airline

Fly for Part 121 carrier
(major, cargo, and regionals)

Pilot Career Risk

- At least 3-4 before you get paid to fly
- Becoming an instructor before becoming an airline pilot
- Time and cost investments
  - Potentially over a decade before flying at majors
  - Up to ~$300,000 all in for ATP license
  - Additional training once hired at part 121
- No clear one-stop-shop for all training
- Short –term pay not worth the investment
- Medical out at any point
- No guarantee of job (9/11, GFC)

You can either pursue a degree or non-degree pathway to becoming a pilot. Depending on the pathway requirements vary slightly.

YOUR THOUGHTS
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Appendix

Click on which topic to explore

The US landscape requires significant movement from rural to urban areas

Long term projected salaries

Even non-pilot aviation job interests have declined over the decades

More sim training – the greenest way to produce pilots

Age distribution across the industry: regional vs mainline

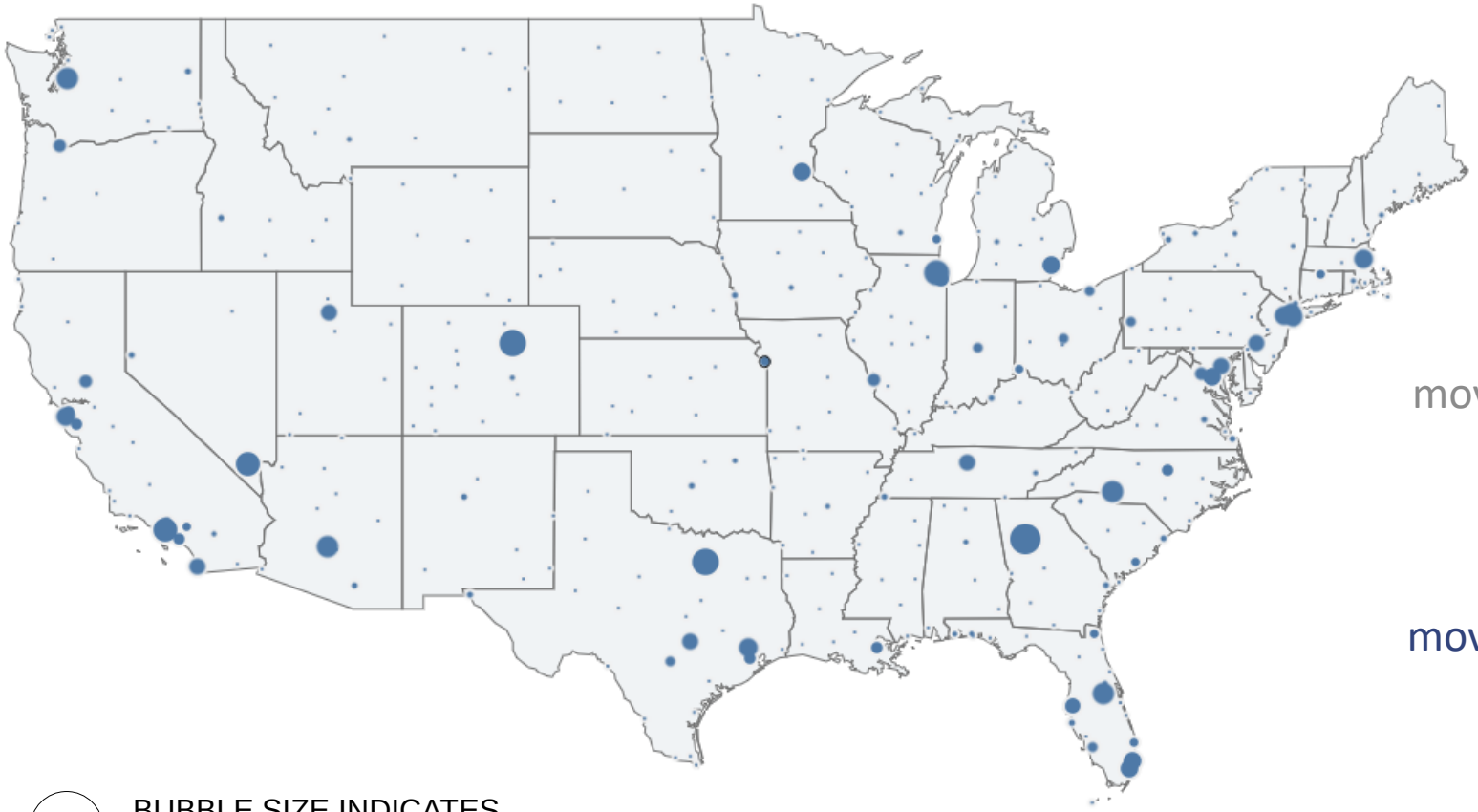
USA O&D airports – gain or loss of service

Allegiant's pilot outlook analysis

The US landscape requires significant movement from rural to urban areas

USA O&D Airports

May 2022



BUBBLE SIZE INDICATES
TOTAL SEATS

CHANGES IN ENVIRONMENT

Approximately 400 airports in the lower 48

May 2019
Serving between **34,000 flights** &
moving any where between **4.8 million seats**

May 2022
Serving between **27,000 flights** &
moving any where between **4.1 million seats**

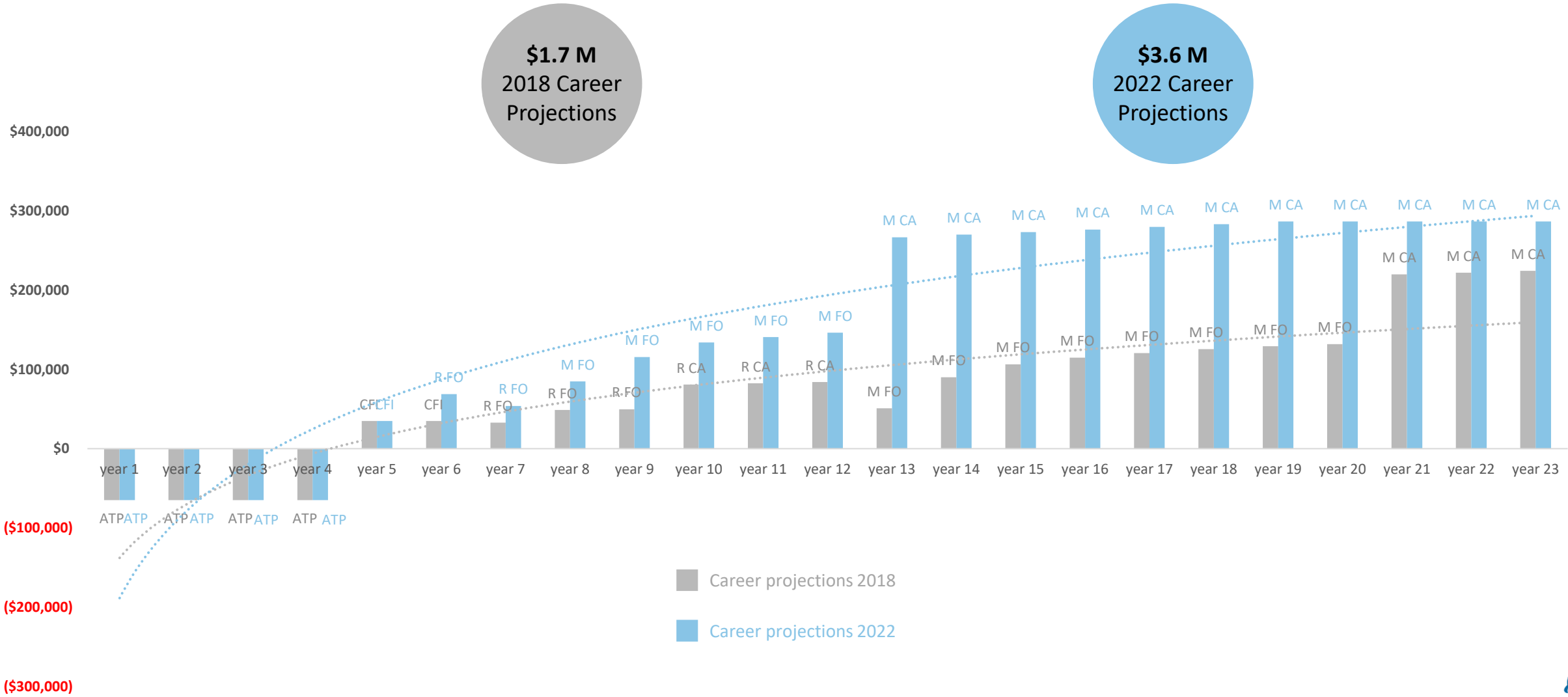
21% reduction in flights

15% reduction in seats

Long term projected salaries

Hypothetical Initial Pilot Career Comparison

2018 vs. 2022

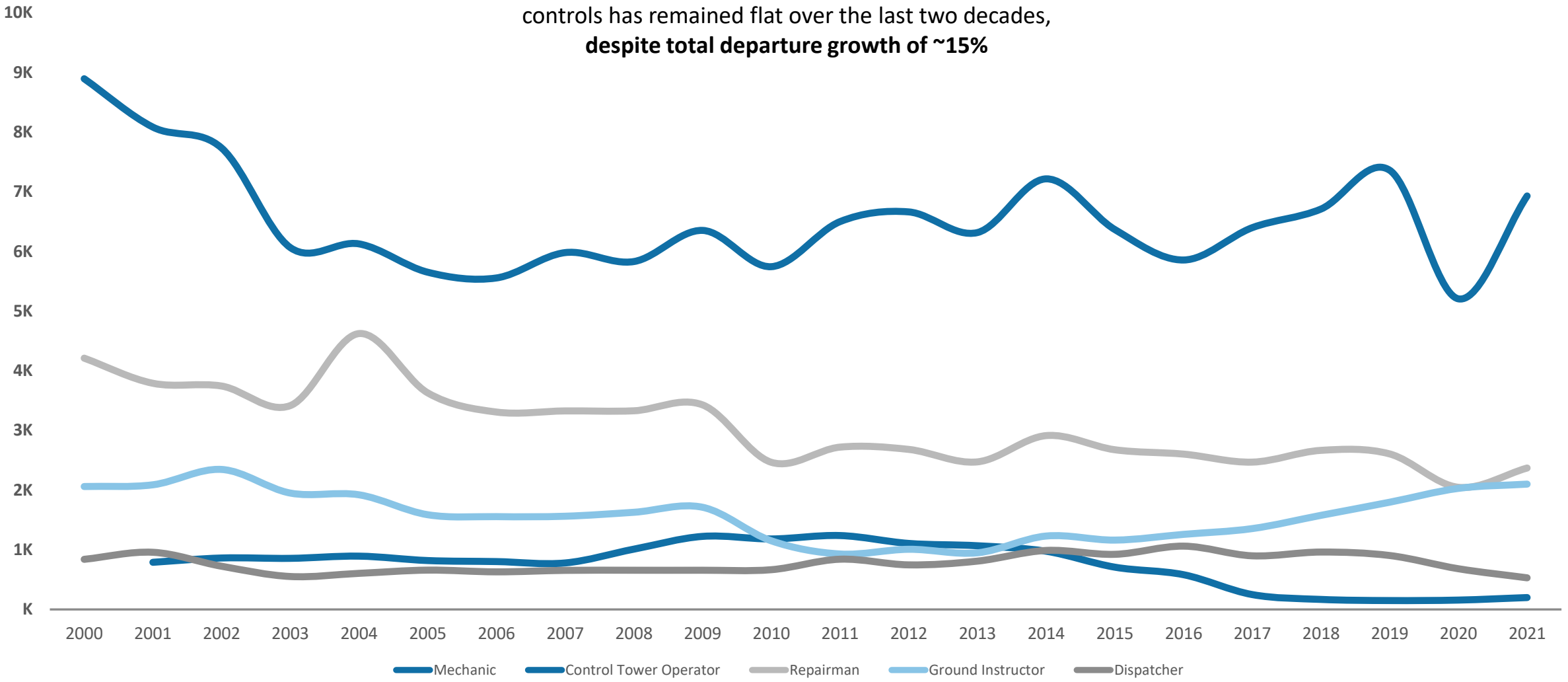


Even non-pilot aviation job interests have declined over the decades

Trend in Non-Pilot Aviation Jobs

2000 - 2021

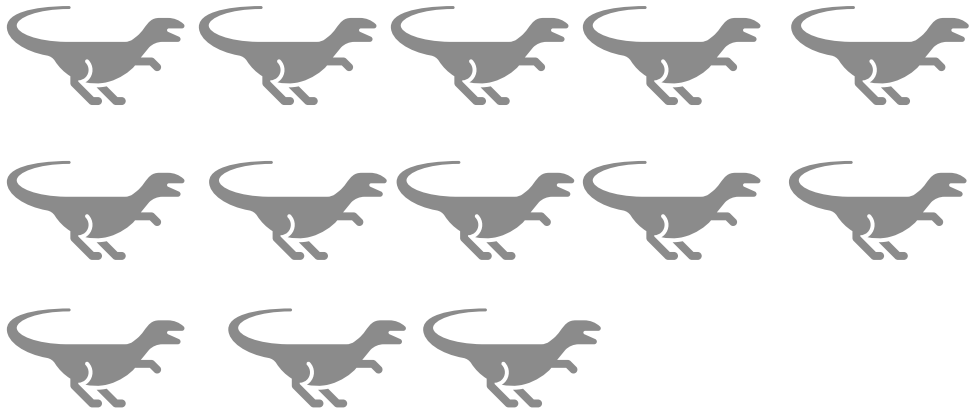
Critical aviation jobs like mechanics and air traffic controls has remained flat over the last two decades, **despite total departure growth of ~15%**



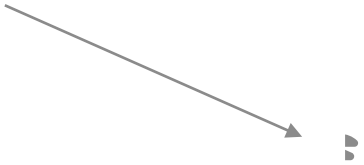
Source: FAA Civil Airman Statistics

More sim training – the greenest way to produce pilots

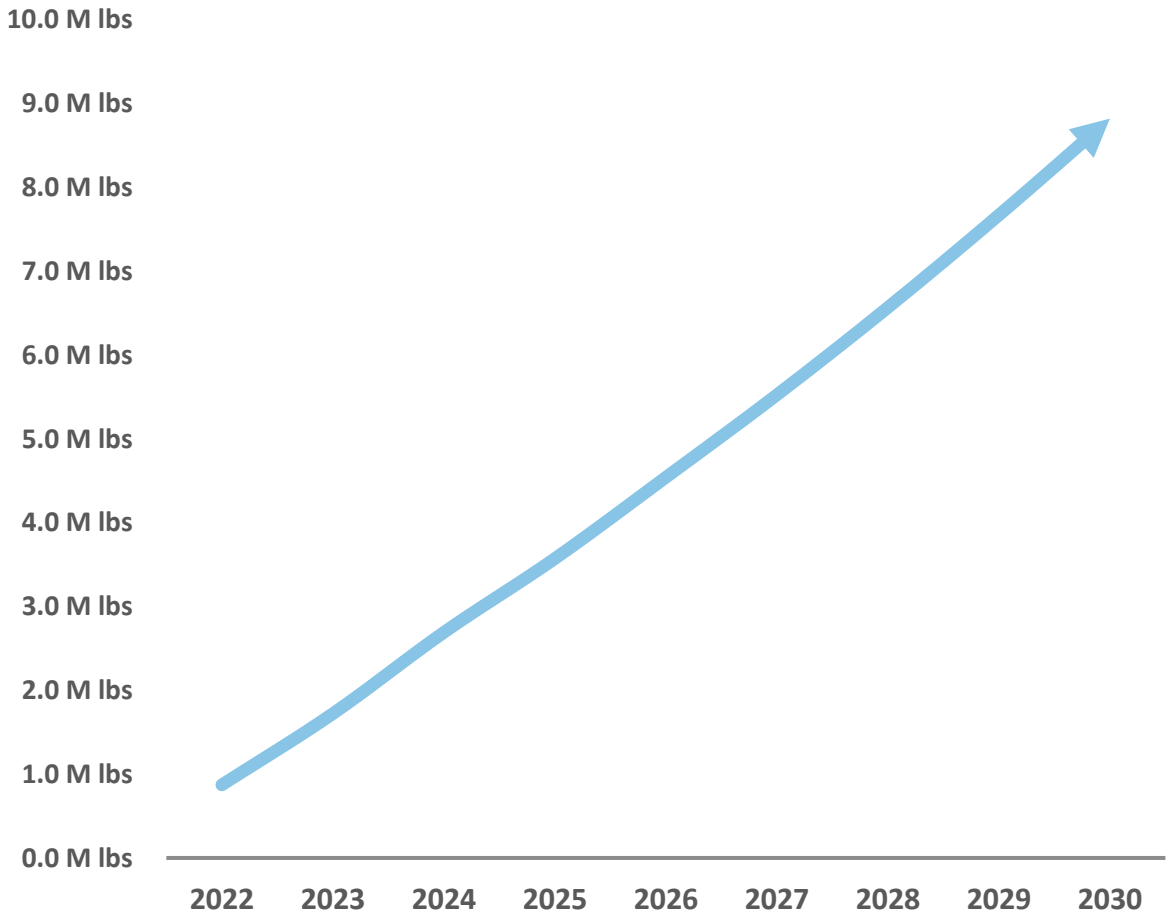
1,500 hours of Cessna 172 time burns 116 tons of CO2 or 13 Tyrannosaurus Rex



1,500 hours of Level D simulator time burns only 0.3 tons or 3% of 1 Tyrannosaurus



Incremental Co2 emissions
Based on growth & retirement projections

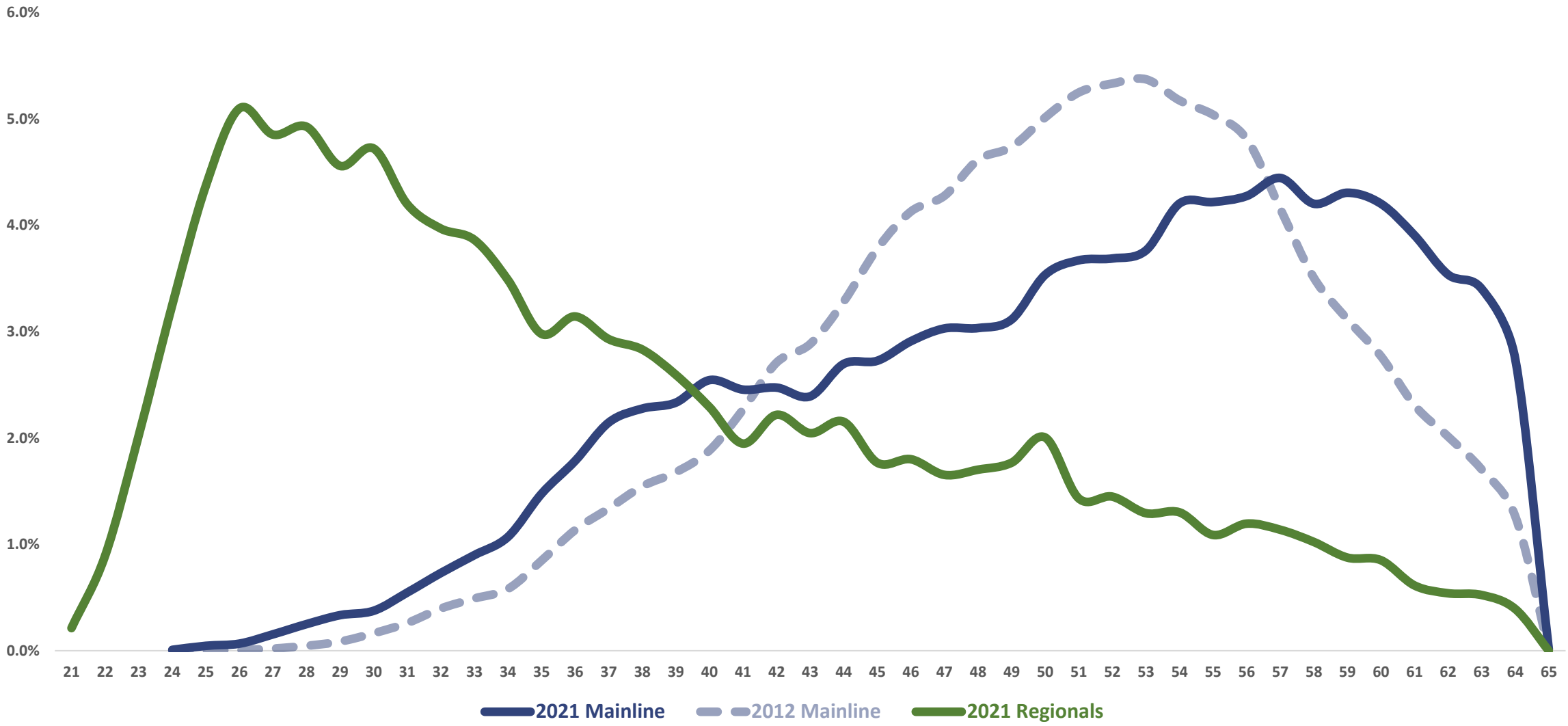


Simulator energy consumption from: https://www.mdpi.com/1996-1073/15/2/580 converted to tons of CO2 using EPA calculator. Cessna 172 fuel burn 8.5 gallons per hour. 1 gallon of averages = 18.3 lbs. of carbon.

Age distribution across the industry: regional vs mainline

Distribution of Pilots by Age

Mainline 2012 vs. 2021 and Regionals in 2021



USA O&D airports – gain or loss of service

2019 vs. 2000

AZA	Gained	AHN	Lost	EFD	Lost	IFP	Lost	MTH	Lost	WDG	Lost	MCW	SkyWest EAS
BIH	Gained	ALM	Lost	ELD	Lost	IGM	Lost	MTO	Lost	WMH	Lost	MEI	SkyWest EAS
BKG	Gained	AOO	Lost	ELY	Lost	IPL	Lost	MWH	Lost	WRL	Lost	MKG	SkyWest EAS
BKL	Gained	APF	Lost	FAL	Lost	ISN	Lost	OFK	Lost	YKN	Lost	PAH	SkyWest EAS
BLV	Gained	AUG	Lost	FHU	Lost	IYK	Lost	OLF	Lost	YNG	Lost	PIB	SkyWest EAS
DRT	Gained	BED	Lost	FKL	Lost	JBR	Lost	OSH	Lost	ALS	SkyWest EAS	PUB	SkyWest EAS
FNL	Gained	BEH	Lost	FMN	Lost	JHW	Lost	OTM	Lost	BFF	SkyWest EAS	SHD	SkyWest EAS
HHR	Gained	BFD	Lost	FOE	Lost	LAA	Lost	OXR	Lost	CGI	SkyWest EAS	SLN	SkyWest EAS
IAG	Gained	BFI	Lost	GBD	Lost	LAF	Lost	PDT	Lost	CKB	SkyWest EAS	SUX	SkyWest EAS
ILG	Gained	BHB	Lost	GCN	Lost	LEB	Lost	PNC	Lost	CMX	SkyWest EAS	VCT	SkyWest EAS
LCK	Gained	BKX	Lost	GDV	Lost	LMT	Lost	POU	Lost	DDC	SkyWest EAS		
LUK	Gained	BLF	Lost	GGW	Lost	LNS	Lost	RDG	Lost	DEC	SkyWest EAS		
MMH	Gained	BRL	Lost	GLD	Lost	LRU	Lost	RKD	Lost	DVL	SkyWest EAS		
OGD	Gained	BWD	Lost	GON	Lost	LWT	Lost	RWI	Lost	EAR	SkyWest EAS		
PAE	Gained	CBE	Lost	GPZ	Lost	LYU	Lost	SDY	Lost	EAU	SkyWest EAS		
PDK	Gained	CDR	Lost	GUP	Lost	MCE	Lost	SLK	Lost	FOD	SkyWest EAS		
PGD	Gained	CEZ	Lost	GYY	Lost	MCK	Lost	SOP	Lost	HYS	SkyWest EAS		
PVU	Gained	CGX	Lost	HII	Lost	MGW	Lost	SOW	Lost	JLN	SkyWest EAS		
SCK	Gained	CIC	Lost	HKY	Lost	MKL	Lost	SPW	Lost	JMS	SkyWest EAS		
SWO	Gained	CLM	Lost	HON	Lost	MLS	Lost	SVC	Lost	JST	SkyWest EAS		
TSM	Gained	CNM	Lost	HOT	Lost	MOD	Lost	TVL	Lost	LBF	SkyWest EAS		
USA	Gained	DET	Lost	HRO	Lost	MSL	Lost	UCA	Lost	LBL	SkyWest EAS		
VRB	Gained	DUJ	Lost	HVR	Lost	MSS	Lost	VIS	Lost	LWB	SkyWest EAS		

Continental US Only

Alaska excluded – has a ton of small airports but they are served with 9 seat or smaller airplanes and don't really connect to the rest of the airline system

Hawaii excluded - Hawaii only lost service at one airport that has had service on and off for a long time

SkyWest - on March 9th, SkyWest announced its intention to leave 29 airports that it serves under EAS contracts (the government pays for them to fly the route because the air service is “essential”) . Despite the government subsidy SkyWest stated that they simply can’t find enough pilots to serve the routes. While other airlines might bid to replace this service, it will likely be with 9 seat aircraft without codeshare agreements (SkyWest flies EAS with United regional jets) cutting these communities off from the national air transportation system.

Allegiant's pilot outlook analysis

We conducted a comprehensive and dynamic analysis of the pilot outlook for the U.S aviation industry through 2030.

Our forecasts are made based on the number of pilots in 2019 and 2021 and block hours @ 2019 & 2021 flying levels –this allowed us to establish a productivity baseline and pilot utilization baseline for the industry.

We further included two economic input assumptions fuel and GDP. By changing these variable inputs, we are able see the different potential outcome severities of the scarcity.

We believe every dollar of fuel price is worth about 1% of industry growth and created a **Low** ($1 per gallon), **Baseline** ($2 per gallon) and **High** ($3 per gallon) input model manipulation ability. Further we believe every point in GDP growth is worth ~2% of industry capacity growth and created a **Low** (1.3%), **Baseline** (2.3%) and **High** (3.3%) GDP input model manipulation ability. **The graphs and charts in this presentation use baseline assumptions for Fuel and GDP.**

Outlook Scenarios				
		Fuel		
	Matrix	Low	Baseline	High
GDP	Low	14,652	7,725	1,220
	Baseline	32,786	28,126	11,337
	High	69,823	52,661	37,556

Decade Outlook. Accumulative Pilot demand. 2022-2030

Carriers included in the analysis

Majors (13) – *American, United, Delta, Hawaiian, Alaska, JetBlue, Spirit, Allegiant, Frontier, Sun Country, Avelo, Breeze*

Color code

Regionals (11) – *GoJet, Endeavor, Enovy, SkyWest, Republic, CommutAit, PAS Airline, Air Wisconsin, Horizon Air, Mesa Airlines, Piedmont Airlines*

Color code

Cargo & Charters (16) – *Air Transport International, Amerijet, Atlas Air, Everts Air , GlobalX, iAero Airways, Kalitta Air, Lynden Air, Miami International, Northern Air, Omni Air International, USA Jet Airlines, Western Global Airlines, World Atlantic Airlines, FedEx, UPS*

Color code

Fractional (4) - *NetJets, Airshare, FlexJet, PlaneSense*

Color code

Footnote: Charts and graphs included are made using the baseline scenarios for both fuel and GDP, $2 per Gallon & 2.3% respectively.