



Airline and Business Jet Pilot Demand Outlook

10-year view

2020 Update

Your worldwide
training partner
of choice





The civil aviation industry will require more than 260,000 new pilots over the next decade.



Dear aviation colleagues,

Today, our industry is facing unprecedented challenges. The COVID-19 pandemic is profoundly impacting day to day life, slowing down the global economy, and causing widespread disruption. The sudden drop in air travel demand has hindered the industry's record growth trajectory. The consensus is that the road to recovery will span over several years. As the global aviation community looks ahead, many of us have acknowledged that our industry will have to overcome several fundamental challenges.

First and foremost, it is important to understand the ripple effects of the pandemic on the aviation industry. In March-April 2020, travel restrictions and border closures caused an abrupt decline in passenger air travel. Airlines and operators around the world have adjusted their operations to align with lower demand. Thousands of pilots have been furloughed in recent months. Many of them have pivoted to other professions and might not want to resume their pilot careers. On the one hand, airlines and operators have reduced the pilot workforce to offset the financial impact of the pandemic. On the other hand, data indicates that the industry will face significant challenges in the upcoming years to meet the demand for pilots.

Despite the short-term decline in the number of active pilots, analysis shows that the civil aviation industry will require more than 260,000 new pilots over the next decade. As air travel resumes progressively over the next several years, the industry will experience upward mandatory retirement and attrition rates. In fact, these combined challenges are expected to drive a demand for about 27,000 new pilots as of the end of 2021.



The fundamental factors influencing pilot demand prior to the onset of the COVID-19 pandemic remain unchanged. In recent years, the significant growth in passenger air traffic translated into record demand for professional pilots worldwide. Age-based retirement combined with fleet growth were and remain the main drivers of pilot demand. Third-party analysis shows that commercial aviation and business aviation markets are forecast to continue growing over the next decade – over 11,000 additional business and commercial aircraft are expected to join the active world fleet during that period.

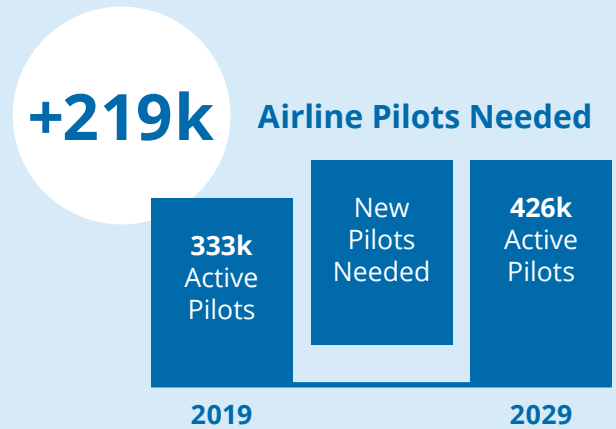
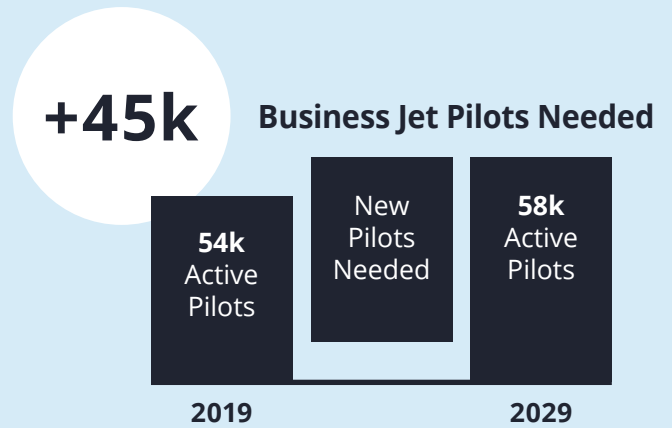
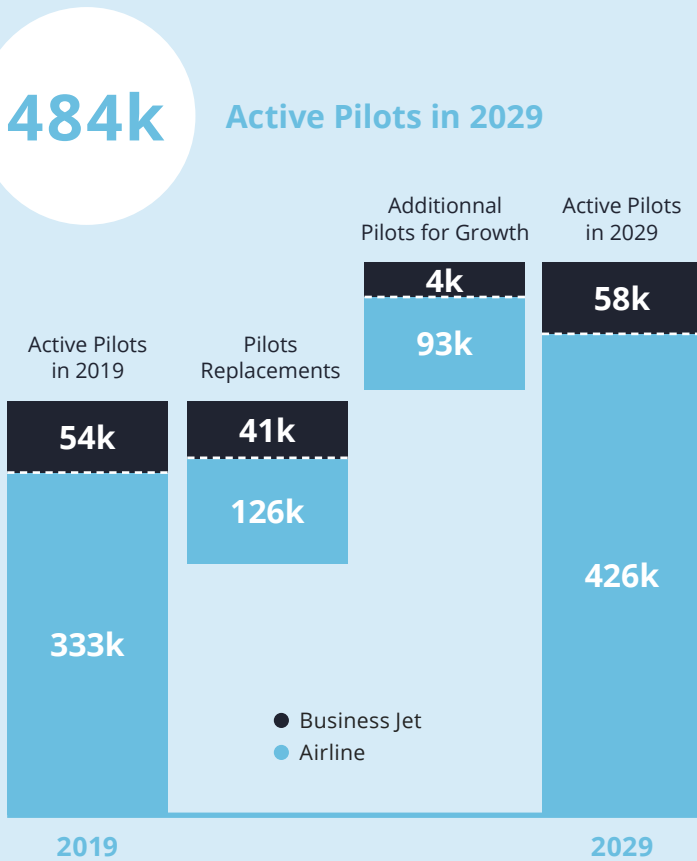
As the industry emerges from the pandemic, CAE will continue to shape the future of pilot training alongside the global aviation community – joining forces with airlines, operators, authorities, and aircraft manufacturers to ensure the highest level of safety and security of air travel.

With this 2020-2029 Pilot Demand Outlook, we hope to arm the industry with the insights that will help the global aviation community understand, rethink, and learn about how to build and grow the supply of highly qualified pilots. CAE's outlook also includes ideas on how to leverage data and analytical insights. The modern world is rich in new technology and our global aviation community can harness the power of artificial intelligence to meet aviation's crewing needs of the next decade, as well as the ever-evolving safety standards.

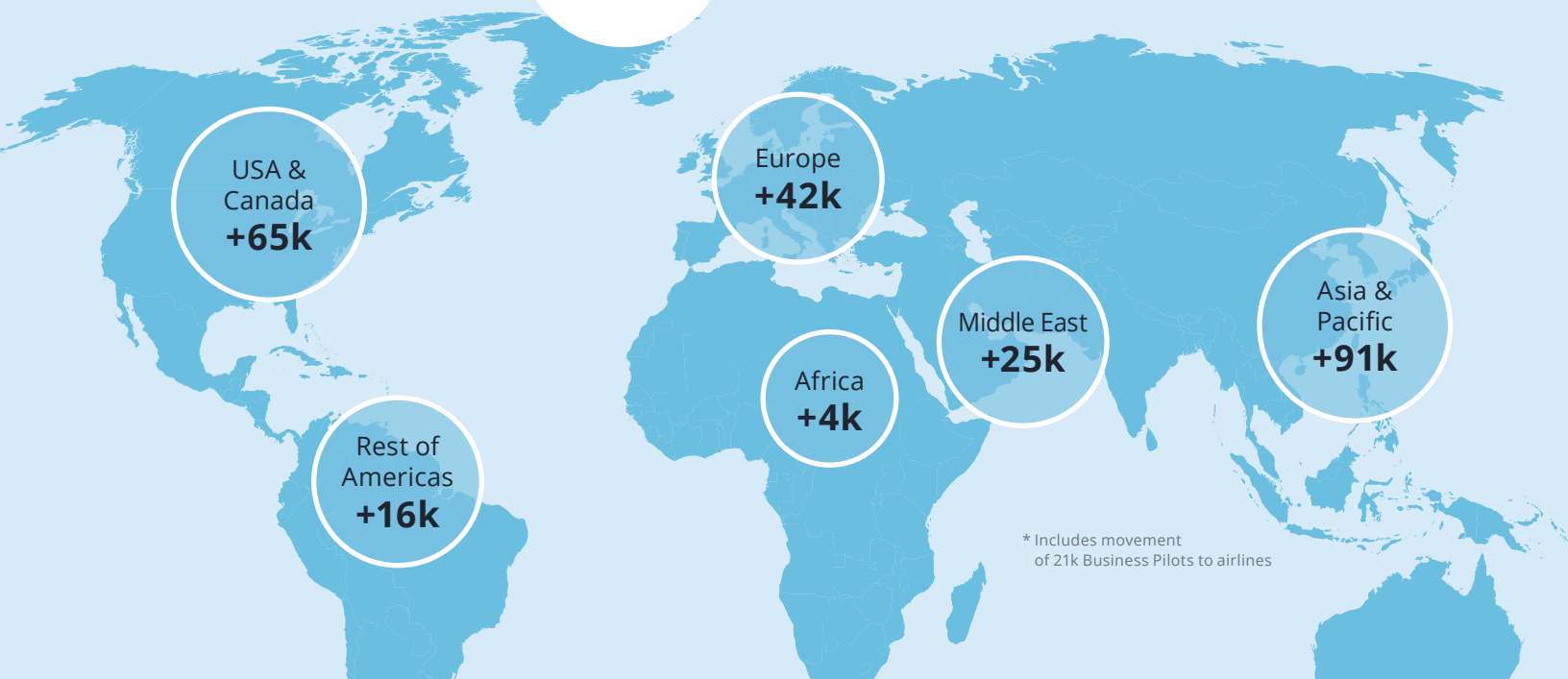
As an industry, we have weathered global storms before and have learned from those setbacks. Following 9/11, the aviation industry failed to anticipate the important need of building a strong and steady supply of pilots to support the last decade's record growth. Disruptive events are opportunities to innovate. Together, let's collaborate to develop the future of aviation training.

Nick Leontidis
CAE Group President
Civil Aviation Training Solutions

Civil aviation pilot demand



+264k* New Pilots needed over the next 10 years



* Includes movement of 21k Business Pilots to airlines

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Civil Aviation Market Drivers



This section presents business and commercial aviation market drivers causing the demand for professional pilots. The COVID-19 pandemic is causing short-term instability, which significantly affects market drivers, but the long-term commercial aviation outlook remains strong.

The overall demand for civil aviation pilots is primarily driven by the number of flights and active fleet. Crewing these flights and replacing pilots leaving the workforce due to mandatory retirement and attrition are the underlying causes of pilot demand. In 2020, business and commercial aviation markets across the globe faced headwinds which resulted in lower demand for professional pilots.

Commercial Aviation

In 2020, commercial aviation will witness a sharp decrease of 66% in terms of revenue passenger kilometers (RPK). The commercial aviation industry is facing unprecedented challenges, but this setback is temporary. Looking ahead, industry forecasts indicate a 75% rebound in 2021 YoY, and subsequently a 15% compound annual growth rate (CAGR) over the following four-year period (2021-2025). Despite the short-term negative impact of the COVID-19 pandemic, the long-term commercial aviation outlook is positive.

Commercial air travel will return to pre-pandemic numbers within 5 years

	2019-2020 YOY (Jan-Aug)	2020-2021 YOY	2021-2025 Forecast
 REVENUE PASSENGER KILOMETER (RPK)	-66%	+75%	+15% CAGR
 TOTAL PASSENGERS	-55%	+62%	+13% CAGR



TOTAL COMMERCIAL AIRCRAFT FLEET INCREASE (2020-2029)




7800

Business Aviation

Following a 27% drop in the number of cycles in 2020 YOY (Jan-Aug), business aviation markets have shown signs of improvement, notably in North America. Forecasts indicate a 37% rebound in 2021 YOY, and subsequently a 4.7% CAGR over the following four-year period (2021-2025). This positive momentum is also present in Europe. After experiencing a drop of 28% in the number of cycles in 2020 YOY (Jan-Aug), forecasts indicate a 35% rebound in 2021 YOY, and subsequently a 5.5% CAGR over the following four-year period (2021-2025).

Several new large business jet platforms are expected to drive growth, including the Bombardier Global 7500, the Bombardier Global 5500/6500, and the Gulfstream G500/600. Furthermore, the Dassault Falcon 6X and Gulfstream G700 are preparing to enter service in 2022. Compared with small and medium platforms, the large jet segment is predicted to remain the fastest-growing segment in business aviation.

Long-term outlook remains strong & positive

	BUSINESS AVIATION UTILIZATION / CYCLES	2019-2020 YOY (Jan-Aug)	2020-2021 YOY	2021-2025 Forecast
	NORTH AMERICA	-27%	+37%	4.7% CAGR
	EUROPE	-28%	+35%	5.5% CAGR



TOTAL BUSINESS JET FLEET INCREASE (2020-2029)

3600

Demand for new pilots

Total demand for new pilots over the next 10 years.

The civil aviation industry will require 264,000 new pilots over the next decade. Age-based retirement and attrition combined with fleet growth are the main drivers of pilot demand. As air travel resumes progressively over the years following the onset of the COVID-19 pandemic, the industry will still experience a challenge to fill cockpits. The commercial and business aviation markets are forecast to continue growing over the next 10 years as approximately 11,000 additional business and commercial aircraft will join the active civil aviation world fleet.

Demand to offset retirement and attrition

Today, pilots over 50 years of age represent 38% of the total civil aviation industry pilot pool.

The general aging of the pilot workforce presents a challenge for airlines and operators to solve. With the industry facing massive retirement numbers over the next ten years, the percentage of pilots over the age of 50 continues to increase versus the total civil aviation industry pilot pool. Currently, this pilot population age represents a disproportionately high rate. As experienced pilots retire, a chain reaction of new hires is triggered.

In commercial aviation, replacements consist mainly of age-based retirement, early retirement, and pilot attrition. Around 3.8% of commercial pilots are expected to retire or leave the profession every year over the next 10 years, creating a need for 126,000 new commercial aviation pilots over that same period.

Commercial Aviation

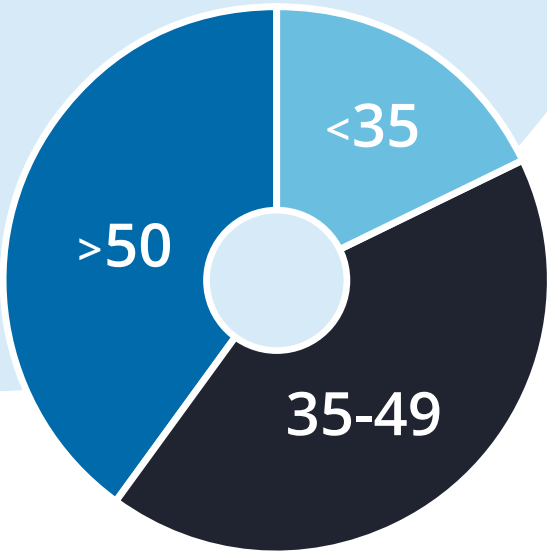
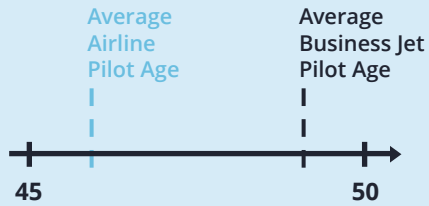
3.8%

Retirements / year

+126k

New pilots needed to offset retirements and attrition over the next 10 years

Pilot-Age Distribution in 2020



In business aviation, replacements mainly consist of age-based retirement, attrition, and the movement of pilots from business to commercial aviation. Over the next decade, business aviation pilots are expected to join commercial airlines at a rate of 4.0% every year. In addition, 3.6% of pilots will leave due to both retirement and attrition. This translates into a need for 41,000 new business aviation pilots over the next 10 years.

Business Aviation

3.6% + 4%

Retirements / year

Pilots moving to airlines

+41k

New pilots needed to offset retirements and attrition over the next 10 years

UNDERSTAND



Demand to support growth

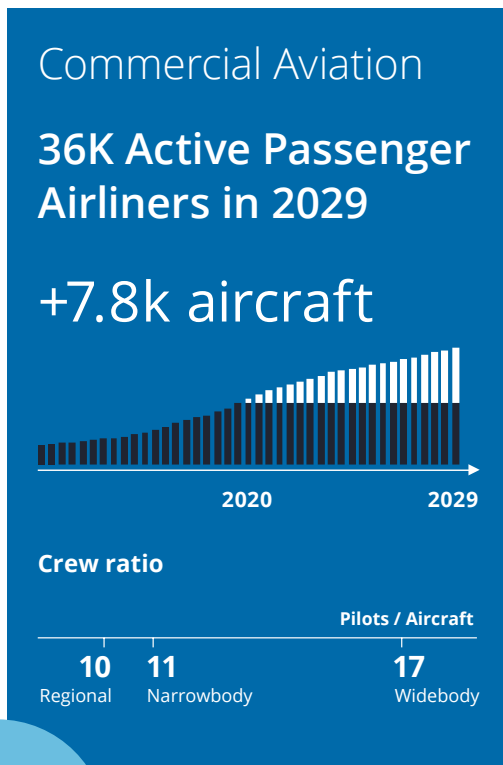
11,000 additional business and commercial aircraft will join the active fleet in civil aviation over the next ten years.

While pilot demand stems from retirement, attrition, and movement to other sectors, there is a direct correlation between new pilot demand and fleet growth. As the industry follows the path to recovery, new aircraft will be added to business and commercial aviation fleets, requiring new pilots to fly the world fleet.

For commercial aircraft, the 10-year average compound annual growth rate (CAGR) is 2.5%, which is higher than the expected growth in business jet fleets. The active commercial fleet is expected to grow by 7,800 aircraft to reach 36,000 aircraft by 2029.

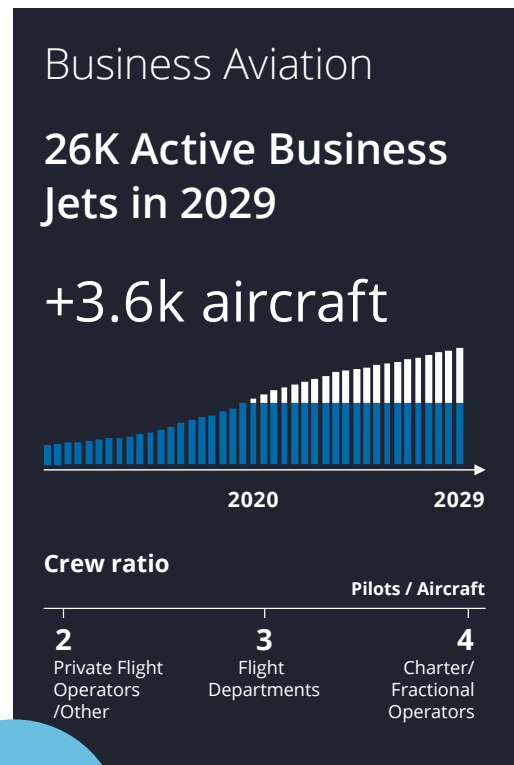
In business aviation, modest increases in fleet additions are anticipated. With a CAGR of 1.5%, the active business jet fleet is expected to grow by 3,600 aircraft over the next 10 years, bringing the fleet total to approximately 26,000 aircraft.

Overall, fleet growth is driving the need for 93,000 new airline pilots and 4,000 new business jet pilots over the next decade.



+93k

New pilots needed for growth



+4k

New pilots needed for growth

All figures based on CAE analysis using data from the following sources: FAA/Eurocontrol/ IATA/Aviation Week/Rolland Vincent Associates Rand

The impact of COVID-19

Border closures and lockdowns translated into sudden drops in flight numbers, revenues, and civil aviation pilot jobs around the globe.

Travel restrictions, health concerns, and a slump in demand among travelers caused by the outbreak of COVID-19 have significantly impacted the aviation industry, causing drastic drops in business aviation while forcing airlines to furlough or lay off employees.

By April 2020, in both business and commercial aviation segments, passenger traffic was a fraction of what it used to be, capacity declined significantly, and revenues dropped. After a steep decline, domestic markets began to lead the way in passenger demand as more countries began to loosen travel restrictions within their borders. Internationally, air travel showed signs of growth as restrictions in the Schengen Areas were lifted.

As indicated by the decrease in revenue passenger kilometers (RPK) for commercial aviation and the decrease in cycles for business aviation, both of these markets have experienced significant decreases in revenues in 2020. Rising to the challenges of a crisis is nothing new to the aviation industry. Just as the industry has overcome past health epidemics, economic recessions, and other catastrophic events, it will overcome the COVID-19 crisis. Global border closures are forcing airlines to reduce operations abruptly. Therefore, this recovery is expected to be more gradual with turbulence along the journey. Of the two markets, business aviation is expected to be the first to return to 2019 levels of activity.

Commercial market recovery

After a significant drop in early 2020, the industry expects revenue passenger kilometers (RPK) and the total number of passengers to return to 2019 levels between late 2023 and early 2024. The industry also expects a 3.0% compounded annual growth rate (CAGR) for RPK over the 10-year outlook period (2019-2029) and a 3.3% CAGR for the total number of passengers over the same period.

Business market recovery

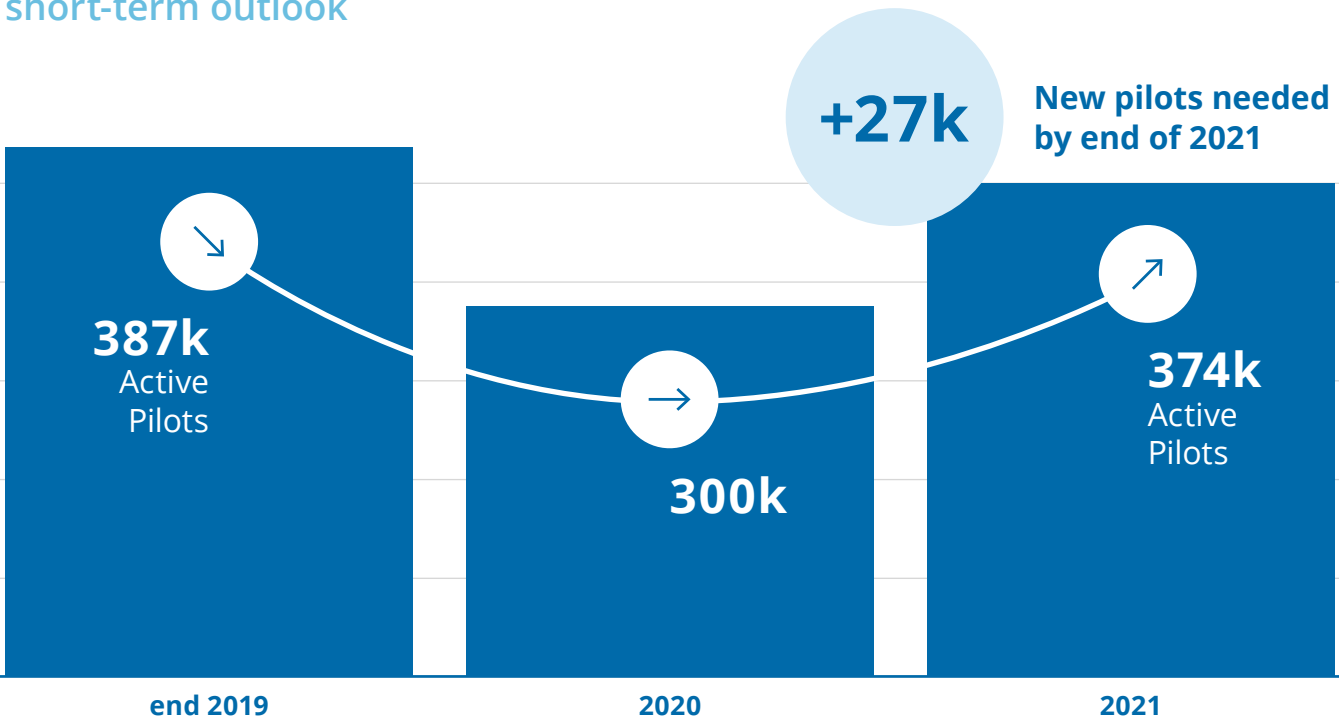
For US operations, which represent most of the global business aviation activity, the industry expects the number of business jet cycles to return to 2019 levels by as early as mid-2021. However, European operations are expected to experience a slower recovery as compared to the US.

Impact on short-term pilot demand

While the demand for active pilots has decreased significantly during 2020, analysis shows that the active pilot population will return to 2019 levels in 2022.

Airlines and operators are pursuing recovery and taking short-term measures to offset the impacts of the COVID-19 pandemic. This has resulted in a decrease in the number of active pilots in 2020. This however is temporary as active fleets return to service through 2021 and 2022 as expected by the industry. In addition, a significant number of age-based retirements and attrition will continue to reduce the available pilot pool. This will result in a global requirement for 27,000 new pilots by the end of 2021.

Active pilot population short-term outlook



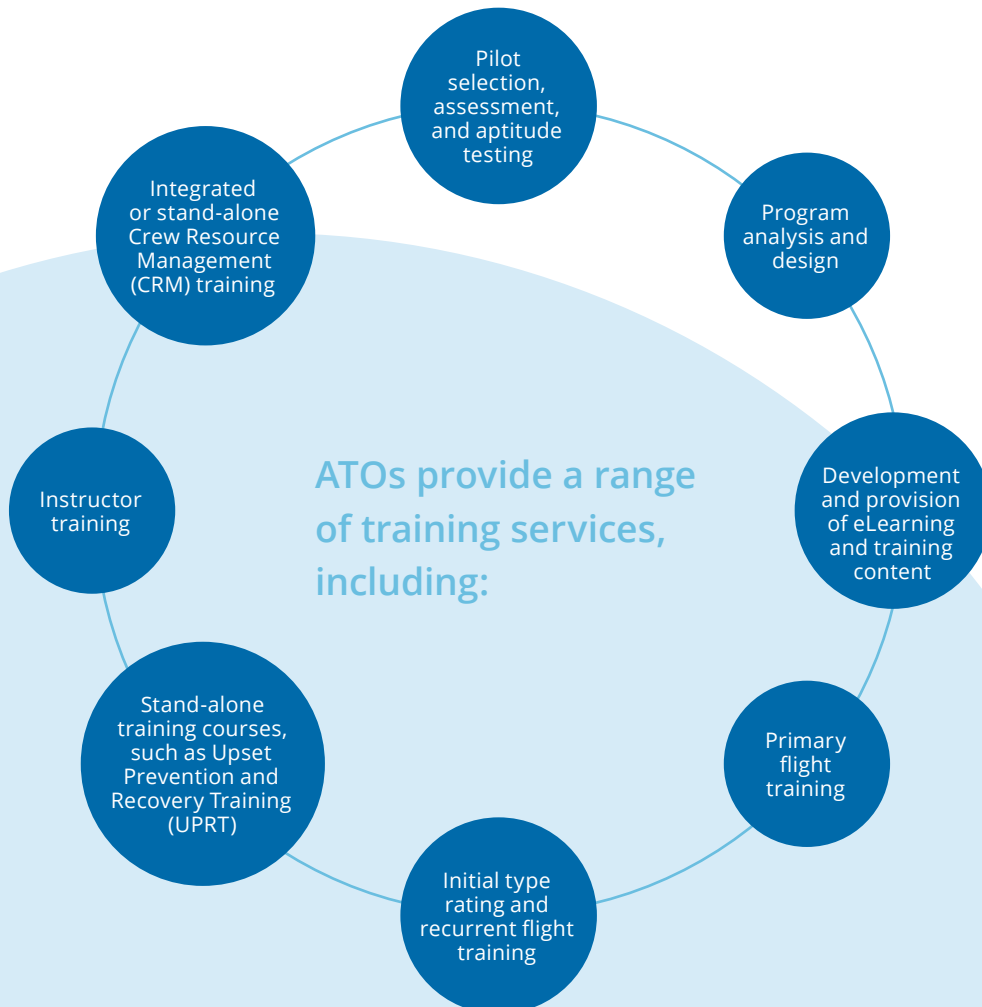
Maximizing efficiencies today, preparing for growth tomorrow

The industry is experiencing an unexpected change of course and facing unprecedented challenges, driving us to reconsider how we can develop and train better pilots.

In some ways, this challenge is not new. Even before our current environment, airlines asked tough questions about traditional approaches to recruiting, training, and developing their people. More than ever, now is the time for operators to rethink the way they create and train pilots, and in doing so, effectively address both ongoing needs and the requirements of the future.

Training Partnerships

One smart approach for coming together as an industry to meet the demand for pilots as well as instructors is to embrace training partnerships. Instructor provisioning was an issue before COVID-19. As growth returns to the industry, the availability of high-quality instructors will pose a challenge for years to come. To meet this critical need, training organizations can alleviate the stress to recruit, train, and retain instructors.



To maintain momentum, growth, and the engagement of their people and customers, air operators that rethink training partnerships will be the ones who thrive.

Operators could form partnerships with ATOs (Approved Training Organizations) which would enable them to refocus their efforts on their core competencies. By doing so, air transport operators can become more agile and navigate through uncertainty with more flexibility, minimizing operational risk at the same time.

There are two types of ATOs, those that engage in the delivery of basic training programs at the primary level and those responsible for aircraft type and systems training.

Funding Pilot Training

The high educational cost associated with becoming a pilot has kept aspiring pilots from reaching their goals. Many have difficulty gaining access to funding for their training program. Receiving funding is dependent upon the risk and return financing institutions are willing to take. Will the student drop out or fail her training? Will she pass it but not find employment? How long should the loan terms be? These are the questions financial institutions ask themselves before lending, which, unfortunately do not usually meet the institution's risk/return parameters.

Less than 10% of eligible aspiring pilots have access to direct funding. Rather than leaving talent on the bench due to funding, we can work as facilitators for access to direct funding by educating the financial industry on the job outlook for pilots and the reality of training.

Recently, CAE launched a new financing initiative for aspiring pilots in collaboration with financial institutions around the world. With this initiative, aspiring pilots are connected to banking partners that offer specific financing solutions for pilot training, making the profession more accessible to those who wish to pursue their dream of flying for a living. Approved partners will speed up the processing of applications and will offer competitive rates. In addition, future pilots will have access to a dedicated team that understands the reality of future pilots and a centralized point of contact in each of the participating banking institutions.

www.cae.com/funding for a list of partners.




CAE
INSTRUCTOR

Tapping into a Wider Pool of Talent

Through the years, many aviation pioneers were women. Despite their significant contribution to aviation, women represent less than 5% of pilots in commercial aviation. To better understand the root causes of low female representation in the flight deck, together with McKinsey, CAE conducted over 150 interviews and gathered diversity data from over three-dozen sources, including data extracted and derived from a variety of publicly available sources.

The research highlights that women entering the aviation career pipeline must meet three prerequisites:

- Awareness of aviation as a realistic career option at a young age
- Development of an academic background with a strong grounding in mathematics and physics
- Exposure to female role models

To make an impact on gender parity in the industry, everyone has a role to play. The global aviation community has an opportunity to take a leadership role in supporting and developing the pipeline of pilots by promoting gender diversity in the cockpit. Expanding the talent pool by attracting more women to the profession addresses a market need while providing increased opportunities for underrepresented demographics in aviation. Effective action is needed to attract women to the profession. The industry can rethink and encourage more women to join the pilot profession.

For more information on how CAE's Women in Flight scholarship program aims to develop the industry's future women pilot ambassadors discover [Sky's no limit: Redressing the gender imbalance in aviation](#).

The growing importance of data collection and usage for training

Training data collection and the identification of actionable insights can drive the development of effective Competency-Based Training and Assessment (CBTA), as well as adaptive and individual training content.

Data collected during training sessions arm instructors with a wealth of information that helps them identify areas of improvement for an individual trainee and the effectiveness of training content in general.

However, many training programs today are not influenced by the learnings that data collection can provide. Those that utilize data are focused on regulatory compliance, with data often collected in a fragmented manner. From assessment to induction and beyond, looking into connecting data from every touchpoint of a pilot training journey will help gain better insights and improve safety. In addition, the use of Artificial Intelligence can identify ways to better predict how successful a pilot can be.

In the future, data will play a larger role in all types of pilot training. To optimize performance, safety, and the pilot learning experience, training data should be shared across the pilot training journey. In addition to aircraft operators, ATOs should be eager to share line training data, as it lends to the creation of more effective training throughout the pilot training cycle from assessment to flight training to type rating and to line flying.

A data-driven approach is specifically designed to:

- 1** Improve the learning experience throughout the pilot's training journey
- 2** Equip instructors with the best tools and analysis, so they can optimize efficiency and deliver the best results
- 3** Provide heads of training with the right insights, allowing training curriculums to be improved
- 4** Integrate relevant training data into Safety Management Systems

CAE Rise™ Training System

Through the CAE Rise™ platform, training data regarding the performance of pilots is immediately obtained and can be analyzed on dashboards powered by software systems.

To achieve a continuous loop, training data needs to be integrated with operational data. By doing so, operators can see the true effectiveness of training on job performance and safety and if needed, revise training curriculums and candidate assessments based on tracking pilot performance to ensure greater pilot success.



While data produced from the training simulator is valuable, other metrics are also tracked, including:

- 1 Success rates for specific courses, aircraft types, and training topics
– To understand how pilots are performing
- 2 Crew behavioral indicators in training scenarios
- 3 Inter-rater and referent-rater reliability analysis
- 4 Student and instructor feedback
– To gather data used for correcting both parties

Learning science and the training management ecosystem

A well-designed curriculum is the foundation and pillar of education. Today's technology enables modern learners to direct their own learning, which they prefer over traditional ways of learning.

They now have access to interactive tools and can select a learning mix of classroom, online, short videos, and mobile application delivery. Modern learners are more informal in their approach, learning from channels that allow them to have access to content 'anytime, anywhere' – such as social media channels like YouTube. These channels also connect them to their peers, where they can ask questions to one another and share content.

Traditional training curriculums are not well adapted to the modern learner. Typically, they are teacher-centered and use a delivery method that does little to accommodate an individual student's interests, learning styles, strengths, and weaknesses.

More and more, individualized learning paths are outperforming traditional classroom settings when it comes to learner engagement. Data collection plays a key role in developing learning because it enables the customization of training in two important ways:



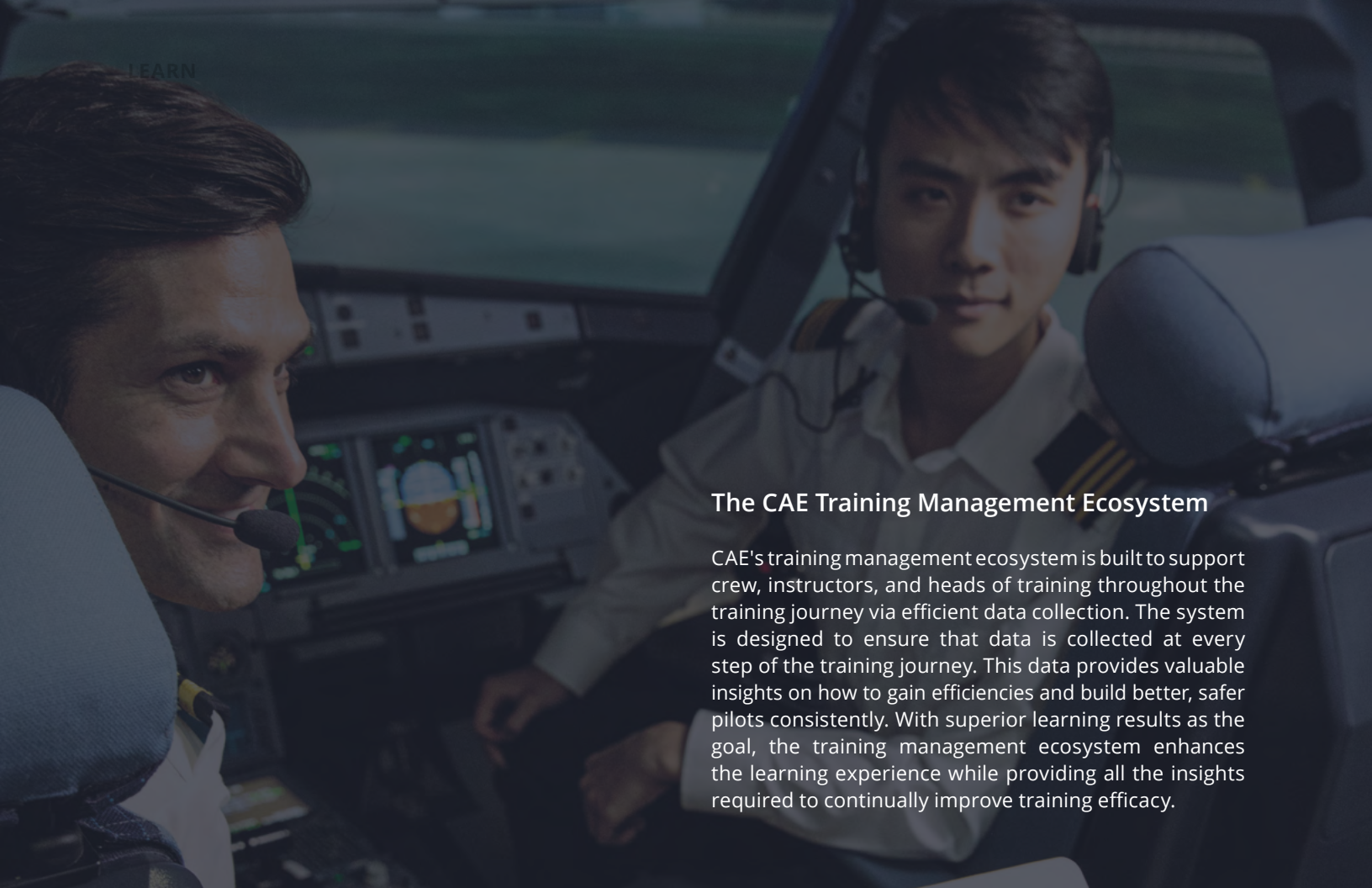
1. Data Collection allows for Adaptive Learning

Resources and learning activities are customized to address the unique needs of each learner.



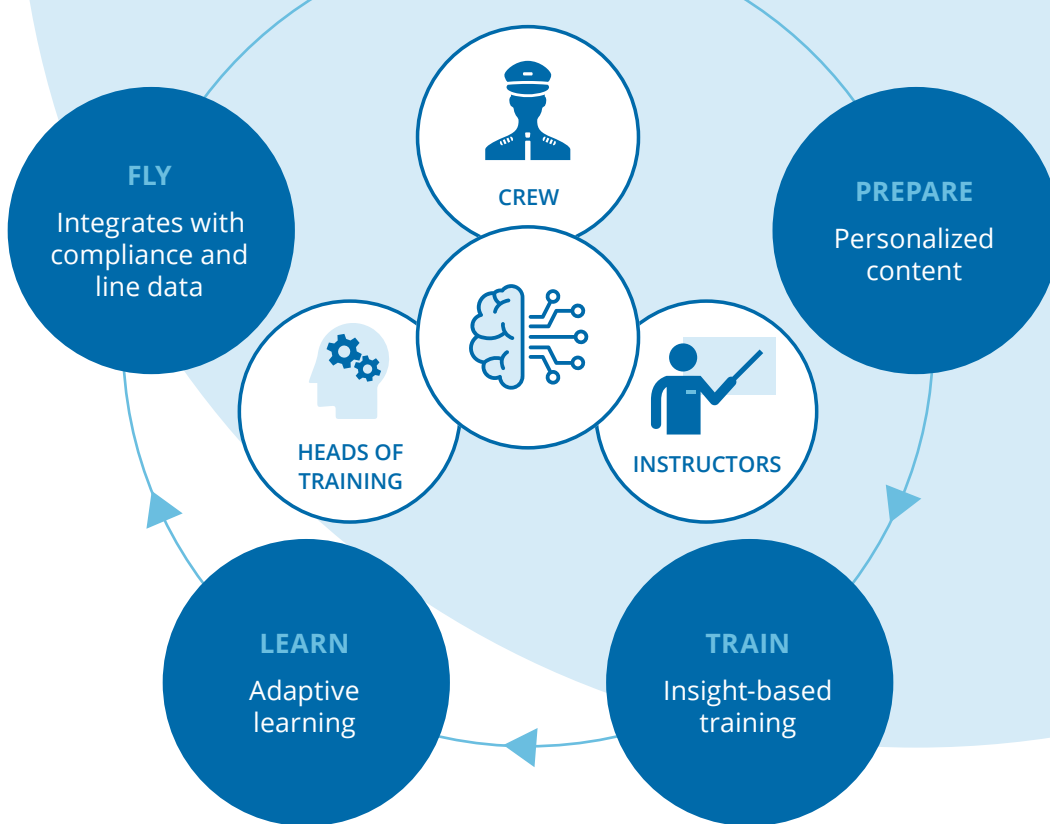
2. Data Collection Facilitates Flexible Training Channels

Learners are provided with content through different forms of delivery that cater to preferred styles of learning.



The CAE Training Management Ecosystem

CAE's training management ecosystem is built to support crew, instructors, and heads of training throughout the training journey via efficient data collection. The system is designed to ensure that data is collected at every step of the training journey. This data provides valuable insights on how to gain efficiencies and build better, safer pilots consistently. With superior learning results as the goal, the training management ecosystem enhances the learning experience while providing all the insights required to continually improve training efficacy.



Discover CAE's 10-year outlook on pilot demand

About CAE

CAE is a high technology company, at the leading edge of digital immersion, providing solutions to make the world a safer place. Backed by a record of more than 70 years of industry firsts, we continue to reimagine the customer experience and revolutionize training and operational support solutions in civil aviation, defence and security, and healthcare. We are the partner of choice to customers worldwide who operate in complex, high-stakes and largely regulated environments, where successful outcomes are critical. Testament to our customers' ongoing needs for our solutions, over 60 percent of CAE's revenue is recurring in nature. We have the broadest global presence in our industry, with approximately 10,000 employees, 160 sites and training locations in over 35 countries.

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training partner
of choice

