



SKY'S NO LIMIT

REDRESSING THE
GENDER IMBALANCE
IN AVIATION



Only way is up

How can the gender imbalance in aviation be improved? In this special content partnership with CAE, we look at the root causes behind why so few women become pilots and find out what can be done. We also celebrate successful female aviators

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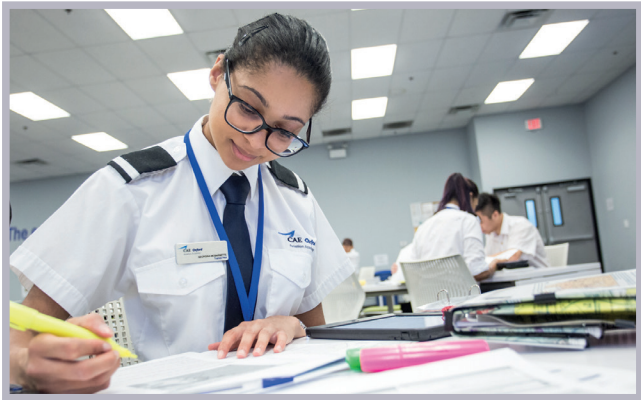
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Whether in discussions at high-level summits or studied in new research partnerships, gender diversity is becoming a high-profile topic in aviation. In contrast to the many highly skilled professions that have achieved significant progress towards gender parity, aviation is a single outlier. Today, aviation is leaving half of its available pilot talent pool on the bench.

While diversity stretches well beyond both gender and the flight deck, the lack of gender diversity specifically among airline pilots illuminates the issue in a highly visible way. Women have historically been underrepresented in flying for several reasons, including legal ones via military combat exclusion and cultural factors such as gender bias in career aspirations, fewer women in math and physics studies, and a lack of role models.

"Female or male, people become pilots for the same reasons... they love flying"

Female or male, people become pilots for the same reasons. To begin with, they love flying. An office with a view beats a desk job any day. Secondly, they are part of an elite group of professionals that are respected for their talent. And most of all, they are members of a proud family of trailblazers. Through the years, many aviation pioneers were women. Despite the significant contribution to aviation made by many women over more than a century, we still have a long way to go when it comes to pilot gender equality. While women have broken the "glass ceiling" in virtually every other industry, women still represent less than 5% of pilots in commercial aviation. With over 300,000 new pilots needed in the civil aviation industry over the next decade, CAE is taking a proactive approach to promote a better gender balance, greater diversity and inspire even more women to join the pilot profession.

Through our CAE Women in Flight programme, we are creating role models and awarding up to five full scholarships every year to CAE's cadet pilot training programmes across our global training network. This competitive programme launched in 2018 seeks female ambassadors who demonstrate leadership skills, active involvement in their communities, perseverance, who are passionate about aviation, and can inspire more women to join the profession. In addition to covering the costs of the cadet training programme, including accommodation and travel, CAE is also providing selected



Why aviation must catch up on diversity

candidates with access to their first job through our airline global partners.

We are proud of the Women in Flight programme, and we will continue to promote and support gender diversity in the aviation. We encourage the industry to exchange and engage on the state of gender diversity in aviation and share ideas for making scalable changes.

CAE has performed extensive research on this topic, creating what is likely the most comprehensive set of data available on gender diversity among pilots today, some of which are highlighted in this report.

We are happy to share our views and some of the results of our studies, and we look forward to a continued dialogue.

There is an exciting future that awaits a new generation of female pilots, and I personally invite you to read about the trials and triumphs of some of today's women in the aviation industry on the following pages. ■

Nick Leontidis
CAE Group President,
Civil Aviation Training Solutions

Breaking barriers

Why, deep into the second century of aviation, is being an airline pilot still a largely male preserve, and what can the industry do to attract more young women to the profession?

MURDO MORRISON LONDON

Of all the glass ceilings blocking the advancement of women in the workplace, perhaps the toughest to crack is at 30,000ft. A century or so after the likes of Amy Johnson and Amelia Earhart confronted the stereotype that only men could fly, the airline cockpit remains, in most parts of the world, an almost exclusively male zone.

However, unlike the invisible obstacles that stop ambitious female employees achieving their potential in other industries, the barrier that prevents more women reaching for the sky in the aviation sector often forms earlier in life.

There are many reasons more girls and young women do not consider flying as a career – fewer than 6% of commercial pilots worldwide are female. They include (fairly obviously, given the ratio) a lack of role

models and a tendency for fewer girls than boys to study science, technology, engineering and maths in high school and beyond.

There is also perhaps an unwillingness by parents, teachers and other advisers to suggest to their daughters and charges that being responsible for a machine worth tens of millions of dollars might be an exciting and rewarding career option.

GREAT STRIDES

While women have made great strides in other walks of life that 50 years ago were overwhelmingly male-dominated, from medicine to law, politics to the boardroom, the pilot profession remains almost 95% skewed in favour of men. Things are changing – some airlines have set ambitious recruitment targets for female cadets – but many believe they have not done so fast enough. What is needed, say critics, is both “pull” – initiatives by

airlines to recruit and retain women pilots – and “push” – efforts to widen the pipeline of pilot applicants by enthusing more girls and young women about what a cockpit career has to offer.

It is about more than gender injustice. If not enough women come forward as pilots, it could hit the industry in the pocket. According to a forecast by CAE released last year, the expansion of fleets and the retirement of existing pilots mean airlines will need 255,000 more flightcrew by 2027 simply to keep scheduled services in the skies. That creates a huge recruitment challenge and restricting the pool of potential recruits to the half of the population that comes with an X and a Y chromosome makes no business sense.

Prejudice may not be as bad as when female first officers began stepping into the right-hand seats of mainstream airline cockpits more than 40 years ago, and condescending captains and

a deep-rooted crew room chauvinism – not to mention misguided passengers – could make life very uncomfortable for these pioneering pilots. One would be hard pressed to find an airline worldwide – save in a handful of countries where women’s rights lag far behind – that does not at least make all the right noises about recruiting more women pilots.

However, the statistics tell a different story. The latest figures from the International Society of Women Airline Pilots (ISWAP), which regularly surveys airlines on the gender mix of their flightcrew, show that, even in countries where women are well represented in professions traditionally dominated by men, the cockpit remains a largely male preserve. In airlines as diverse as American Airlines, Air New Zealand, KLM, Qantas, Southwest Airlines and Virgin Atlantic, the proportion of women pilots is below the world average of 5%.

It is unlikely that the chief executives or human resources departments of any airline would admit to favouring male recruits. Rather, the pilot profile tends to reflect the gender balance in the supply chain – those undergoing training schemes – not just currently, but going back decades. At a conference last year, Willie Walsh, chief executive of British Airways parent IAG, bemoaned the fact that 70-80% of respondents to its advertisements for pilots are men. “It should be 50:50,” he said. “I can’t understand why it wouldn’t be 50:50, other than we are just not yet convincing young women that aviation holds opportunities for them.”

RECRUITMENT DAYS

At the same event, Ryanair chief executive Michael O’Leary said applicants for pilot roles at his airline also tend to be overwhelmingly male. “We do recruitment days for pilot cadets – it’s 90% male,” he said. “You do a recruitment day for cabin crew, and it’s the other way round: it’s 80:20 female-male. There’s nothing wrong with the gender balance in aviation. In fact, it’s heavily skewed towards females, but they are generally on the cabin crew side.”

The pay and conditions afforded to pilots should make the role “a great career for someone with a family”, in O’Leary’s view. He notes: “You do five days on, four off. You are limited to 900 hours a year – 18-and-a-half hours a week and you get paid 200 grand a year. We need to communicate that message more actively to women.” O’Leary, whose airline has been mired in negotiations with pilot unions, also notes wryly: “If we had more female pilots, you’d have a generally more sensible pilot body anyway, because women tend to be more intelligent and sensible than men at the best of times.”

Kathy McCullough, a retired Boeing 747 captain with Northwest who is active in



Indian airlines have some of the highest proportions of female pilots in the industry

HOW AIRLINES COMPARE ON WOMEN IN THE FLIGHTDECK

Airline	Total pilots/female pilots/captains	Share of pilot total
Aeroflot	4,250/50/8	0.11%
Air Asia (India)	260/26/10	10%
airBaltic	338/19/6	5.62%
Air Canada	4,217/278/39	6.59%
Air Hong Kong	110/4/1	3.64%
Air India	1,710/217/93	12.70%
Air India Express	347/46/14	8.47%
Air Mauritius	203/7/1	3.45%
Air New Zealand	963/45/9	4.67%
Air Transat	656/36/4	5.49%
Air Wisconsin	574/31/10	4.07%
Alaska	3,013/200/44	6.64%
Allegiant	786/32/10	4.07%
Alliance Air India	122/17/2	13.90%
American Airlines	15,421/749/170	4.86%
Arkea	80/2/0	2.50%
Atlas	1,451/55/15	3.79%
Avianca Brasil	648/33/4	5.09%
British Airways	4,180/245/52	5.86%
Canadian North	106/7/2	6.60%
Cathay Dragon	562/33/4	5.87%
Cathay Pacific	3,254/139/21	4.20%
China Air lines	1,359/48/21	3.53%
China Southern Air	6,398/18/5	0.28%
Compass Airlines	779/50/26	7.19%
Czech Airlines	164/10/3	6.01%
Delta Air Lines	14,435/695/118	4.77%
easyJet	3,300/164/62	5.00%
Eastern Australia Air lines	219/21/0	9.59%
El Al	500/4/0	<1.00%
Emirates	4,230/95/15	2.25%
Endeavor Air	1,963/118/44	6.01%
Envoy	2,436/105/35	4.31%
ExpressJet	1,312/86/30	6.56%
First Air	117/10/0	8.54%
Frontier	1424/70/29	4.92%
Go Air	391/20/10	5.12%
GoJet Air lines	556/33/9	5.94%
Hawaiian Air	842/81/24	9.62%
Horizon Air (QX)	585/38/20	6.50%
Iceland Air	640/70/na	10.90%
IndiGo	2,689/351/118	13.90%



Link to the past: Air UK women pilots in the 1980s



Engaging girls at a young age is vital

» ISWAP, has been visiting schools since 1991 to talk to students about being a pilot, and despairs at the general lack of interest in the career from girls. “Invariably at the end of my hour, I’ll get the question: “How do I become a flight attendant?” I don’t know how to reverse that. Yes, you work hard as a flight attendant, but it’s about more than the pay. In the cockpit you are the one calling the shots. I would have thought more women would want to do that, but it’s is hard.”

While interesting girls in being a pilot can be a challenge, retaining women once qualified can be tough too. Hard statistics are not available, but the attrition rate among women pilots may be greater than it is for males, and this could contribute to the gender imbalance. While the politically incorrect attitudes common in crew rooms and airline culture generally in the 20th century may not be prevalent these days, McCullough says there are still plenty of hindrances for women pilots, from lack of bathrooms on the flightdeck for those who are pregnant to unattractive maternity pay.

BABY ON BOARD

Last year, the British Airline Pilots’ Association (BALPA) called for better maternity pay for pilots to “help make the profession attractive to women”. Its Baby on Board campaign claimed that airlines who stuck to statutory maternity pay meant some pilots have to take a 90% pay cut when they have a family. The union called for airlines to pay in full female pilots leaving to have a child for the first 26 weeks of their leave, with half pay for the remainder of their statutory maternity entitlement. BALPA said this would put airlines in line with other large employers in the UK.

McCullough has friends who have quit as pilots because they have not been able to afford to take maternity leave (although she says that it is not a problem that she had while flying for Northwest Airlines). “If you don’t have family friendly policies it’s difficult,” she says. She also worries that more progressive attitudes to women pilots might actually

HOW AIRLINES COMPARE ON WOMEN IN THE FLIGHTDECK

Airline	Total pilots/female pilots/captains	Share of pilot total
Japanese Air lines	2,700/34/3	1.30%
Jazz	1,522/100/29	6.57%
Jet Air ways	1,867/231/100	12.40%
jetBlue	3,967/187/41	4.71%
Jetstar Airways Group	999/54/14	5.40%
Juneyao Air	433/11/4	2.54%
KLM	2,900/140/42	4.83%
Kalitta Air	636/9/2	1.42%
Lufthansa	5,400/375/54	6.94%
Mesa Airlines	1,345/63/17	4.68%
Network Aviation	129/11/0	8.53%
Norwegian	2,674/102/33	3.81%
Omni Air	318/14/2	4.40%
Pakistan International Airlines	600/17/3	2.83%
PenAir	100/3/2	3.00%
Perimeter Air lines	121/8/2	6.61%
Piedmont	700/33/12	4.71%
Porter Air lines	267/34/19	12.70%
PSA	1,980/102/41	5.15%
Qatar	3,917/95/0	2.42%
Qantas	2,222/125/15	5.63%
QantasLink	441/51/21	11.60%
Republic Air lines	2,104/105/40	4.99%
Royal Jordanian	400/9/3	2.25%
SAS	1,510/57/35	3.77%
SF Express	515/1/0	0.19%
Shenzhen Air	2,116/10/0	0.47%
SilkAir	270/12/4	4.40%
Singapore Air lines	2,800/10/0	0.36%
Sky Regional	312/13/4	4.17%
SkyWest	4,605/307/65	6.67%
Southern Air	296/10/2.	3.38%
Southwest	9,650/393/132	4.07%
SouthAfrican Airways	759/71/0	9.35%
South African Express	140/17/6	12.10%
Spice Jet	853/113/23	13.20%
Spirit Air lines	2,196/69/38	3.14%
Sun Country	359/16/7	4.46%
Sunstate Air lines	238/35/0	14.70%
Sunwing	421/22/7	5.33%
SusiAir	170/5/2	2.94%
Tibet Air lines	404/10/0	2.47%
Transavia	614/52/26	8.50%
Trans States	565/22/11	3.89%
TUI	151/8/na	5.30%
United Airlines	13,083/980/295	7.49%
UPS	2882/173/66	6.18%
Virgin Atlantic	842/27/7	3.21%
Virgin Australia Group	1,600/60/17	3.75%
Vistara	355/42/10	11.80%
Wasaya	91/9/3	9.89%
WestJet	1,618/94/30	5.81%
WestJet Encore	527/58/28	11.00%
Xiamen Air	1,930/16/1	0.83%

be reversing, with occasional reports of harassment and a return of the attitude that “you’re taking a man’s job”.

She believes the tipping point – the critical mass, an idea popularised by the writer Malcolm Gladwell, at which social attitudes suddenly change – will come when 20% of airline pilots are women. Convincing enough young women that it could be a career for

them and hitting that figure in the next few years is possible, she believes. “The women I know who are flying absolutely love their job,” she says. “For most of us, it’s the travel and the ability to manipulate the airplane that’s so enjoyable. It’s great to be up there and watch the world go by beneath you. For the most part, it’s not a high-pressure job. It takes intellect. But it’s fun.” ■

Airlines making a difference

Five well-known carriers are partnering with CAE in an innovative scholarship scheme that recognises the need to bring more women pilots onto the flightdeck



KERRY REALS LONDON

In an effort to drive up the percentage of women in the cockpit, airlines are taking proactive steps to encourage more female applicants to join their cadet programmes – and these actions are slowly beginning to yield positive results.

Five global airlines – Aeromexico, American Airlines, AirAsia, CityJet and easyJet – are collaborating with flight training provider CAE on its Women in Flight scholarship programme. Under the initiative, CAE awards five full scholarships to selected female candidates from cadet training programmes mentioned by the five carriers.

These airlines report sharp rises in the number of new entrant pilot applications from women since they started to prioritise gender equality in the cockpit, but they acknowledge that there is still a long way to go.

Of the 42 female pilots recruited by Irish regional carrier CityJet so far, for instance, 31 were hired in the last four years. The wet-lease operator currently employs 26 female pilots, which represents 5.9% of its total pilot workforce.

“We recognise that there’s a need to increase that figure,” says Robert Campbell-Smith, general manager of flight operations at CityJet. The carrier has set a “very ambitious” target for 10% of its pilots to be women by the end of 2022.

To achieve this aim, CityJet has launched an ambassador programme through which “female pilots have been recruited locally as

internal brand ambassadors”, says Campbell-Smith. Those ambassadors will also have an external role that will see them visit schools to promote their profession to “the younger generation, prior to them making their education decisions”.

CityJet is also working to ensure that female pilots feature prominently in its promotional literature.

“Historically, the advertising material that we’ve put out for pilots over the last five to 10 years has been quite male-orientated. But we’ve been changing that to make the face of CityJet not just male, but also to include our female pilots,” says Campbell-Smith. He

believes that this change has contributed to an increase in the number of female pilot applicants over the past few years.

PASSIONATE

CAE announced last year the names of the first three winners of its Women in Flight scholarship programme, one of whom was CityJet’s Bisma Petafi. Campbell-Smith says Petafi is “passionate about the idea of sitting in the flight deck”, and will be a “fantastic ambassador” for encouraging more women to take up flying careers.

At Aeromexico 93 pilots are women, representing 5% of the total cockpit crew



easyJet has been a major proponent of recruiting more female flightcrew

» workforce. The Mexico City-based carrier says it is “aware that this is only the beginning” and is working “to create more innovative mechanisms for us to increase more and more the participation of female pilots”. This includes developing policies to ensure that there is “a balance between personal and working time”.

MATERNITY LEAVE

In addition to maternity leave, which is granted “regardless of marital status or sexual orientation”, Aeromexico offers “home office and flexible time policies for all our employees”.

“Empowering women not only means providing the necessary tools to fully develop, but it is also an opportunity to help us boost the talent of our entire team and generate new work dynamics where equity and inclusion are always present,” adds the airline.

Ernesto Tapia, managing director of Aeromexico’s training centre, acknowledges that the airline pilot profession has “traditionally been dominated by men” but says the carrier “wants to break with this tradition”.

In addition to joining CAE’s Women in Flight programme, Aeromexico has embarked on “a big advertising campaign to promote the role of women in aviation”, says Tapia, in order to “reinforce the message that women are very important for the aviation industry in Mexico”.

Aeromexico says it is particularly committed to achieving the fifth objective of the United Nations’ Sustainable Development Goals – gender equality. The airline wants to “lead the path where we can have a balance between genders”.

UK-based easyJet launched its Amy Johnson Flying Initiative in October 2015 with the objective of doubling the number of female new entrant pilots from 6% to 12% within two years. Under the initiative, easyJet agrees to underwrite the £100,000 (\$121,650)



Irish airline CityJet has been rethinking its recruitment tactics to make itself more relevant to women pilots

Marie Fourmy SIPA/Shutterstock

training loans for six female applicants in each annual intake.

The carrier hit its 12% target within the first year of the initiative and is now working towards a goal for one-fifth of its pilot intake to be female by the end of this year.

“As a result of the campaign, in 2016 easyJet had doubled the intake to 12% and has been working ever since towards its ambitious target of 20% by 2020,” says the airline.

By the end of last year the number of female new entrant pilots at easyJet had reached 15% – a figure that is “set to increase”, putting the carrier “well on track” to reach its 2020 target.

“When we set out the goal we expected that 20% would equate to 50 female pilots. Owing to our growth, we have attracted more than 50 female pilots in 2019, and now have more than 200 female pilots flying for easyJet. This is around 5% of our growing pilot community,” the airline says.

easyJet is already looking beyond its 2020 target. The airline says that attracting more female pilots to join its operation “will

continue to be a priority”, and it is “currently looking at what the next steps will be as part of our commitment to diversity and inclusion across the airline”.

FEMALE FLIERS

According to the International Society of Women Airline Pilots, the global percentage of female pilots flying for Part 121 airlines is 5.03%, dropping to 1.33% for female captains. Regional variations range from 1.55% in Asia to 9.78% in Africa. In Europe and North America, 5.61% and 5.37% of pilots are female, respectively, while in South America and the Middle East the figures are 5.09% and 2.05%.

In Asia, where the percentage is below average – with the exception of India, which boasts a 12.4% female pilot rate – AirAsia bucks the trend.

“We have one of the largest percentages of female pilots in aviation at around 6.3% of the airline’s total pilot base, or 220 female pilots flying across Asia Pacific,” says the Malaysia-based airline group’s chief people officer, Varun Bhatia.

“AirAsia’s boundaryless company culture means we are committed to attracting and retaining talent irrespective of gender, sexuality, race or religion, and we actively participate in initiatives such as CAE’s Women in Flight programme to encourage women to consider and commence a career as a pilot.”

AirAsia employs a total of 3,500 pilots. It recruits about 20 cadet pilots each month and is currently training 260 cadets in various locations across the Asia-Pacific region. The airline says it pays “close attention to career progression and employee benefits, such as providing work-life balance and competitive remuneration”.

While efforts to boost the number of female pilots at proactive airlines are starting to bear fruit, there is still a long journey ahead before true gender parity reaches the flight deck. ■



Aeromexico cadets in training at CAE. The airline has 93 female pilots but wants more

Dreamliner dreaming

Daniela Saucedo, 20, is beginning her career in aviation as a trainee with CAE Phoenix, where she is a flying ambassador for the national carrier’s cadet programme after receiving the CAE Women in Flight scholarship. She explains why she wants to be a pilot, and aspires to fly the Boeing 787 for Aeromexico

What is your background and what attracted you to this career?

I grew up in Mexico City, and as a little girl I was in contact with the aviation world because both my parents were flight attendants. I knew about the lifestyle of these hardworking people, who have big challenges and help this incredible machine fly through the skies. But it was not until I started training that I began to fully understand what it means to be a pilot – to have the knowledge and abilities to control an aircraft, no matter what its size. Pilots dedicate themselves to continuous study, which takes you

to a new reality, filled with huge responsibilities, new experiences and a much wider understanding of what happens inside and outside the cabin.

When did you start your training and how is it going?

I began with the theory phase in August 2018, and for seven months learned the necessary knowledge that we put into practice when flying. I made my first flight in April in 2019, and at that precise moment realised I was made for it. Nothing makes me happier than having control of this beautiful piece of machinery and hearing the air flow past the

wings. I felt that it was the first of many times that I was going to see the world from a different perspective. By mid-2019 I had flown 54 hours and it has been an amazing experience. I can’t imagine doing anything else. I know none of it could have been possible without my family, my instructors in Mexico and now all the amazing people who work at CAE. I hope to finish my training by early 2020 and receive my CPL [commercial pilot’s licence], after which I aim to get my pilot life started as soon as possible.

What are your ambitions and what aircraft would you like to fly?

One of the reasons I chose Aeromexico and CAE was because I want to be a pilot in my beautiful country, and to fly as many of the Aeromexico fleet as I can – including the Boeing 787-8.

Fewer than 5% of airline pilots worldwide are women. Why do you think this might be the case, and do you think the situation is changing? What does the industry need to do to attract more young women?

This percentage does need to grow. It is a profession once reserved for men, but now women are making a difference. I believe that women who have the passion and desire to fly will change this percentage. To be part of a small group of women pilots inspires me to work harder than ever to inspire other women to become pilots as well. Gender is not a limit – the limit is the sky. ■



Saucedo hopes to complete her training and begin her career as a pilot in 2020

Daniela Saucedo

CAE**WomeninFlight**



Ready to pursue and achieve your dream of becoming an airline pilot?

CAE is committed like no other training organisation to the advancement of women in aviation. Our CAE Women in Flight scholarship programme offers five full scholarships worldwide, covering the entire cost of a cadet's training. In addition, our scholarship comes with the opportunity of securing your first pilot job with one of our airline partners.

Are you a future women in flight?
cae.com/womeninflight

Follow us on  #CAEpilot

Your worldwide
training partner
of choice



What keeps women grounded?

Research by CAE using interviews and other data sources has begun to get to the bottom of why so few females want to be pilots in the first place, and how this can be addressed

Over the past few decades women have made huge strides in formerly male-dominated professions. Hire a lawyer, and there is four in 10 chance they will be female. If you are treated by a physician or surgeon, more than one time in three it will be a woman. One in five air traffic controllers are female, and one in 10 engineers. Yet of every 20 airline pilots, just one is a woman, according to research by CAE. And, while that figure is significantly higher than in 1960, when just one in 500 pilots were women, female representation has grown far more slowly than in other careers with high social stature and above average rates of pay.

The story is not universally bad, with some territories much better than others when it comes to opportunities for women. For instance, in India, one in eight pilots is female.

However, in Australasia, Europe and North America, the percentage hovers just above the global average of around 5%, and in regions where aviation has been growing such as Africa and Latin America, the proportion is lower. In China and the rest of Asia, excluding India, and in the Middle East, 2% or fewer of airline pilots are women.

The news is also more encouraging when the data focuses on gender diversity in the “pipeline”, looking at the proportion of women pilots in various age groups, although the findings here too highlight some concerns. A study conducted for CAE in the USA in 2011 showed that the highest percentage of women pilots was in the 30-34 age category, at 7%, falling sharply through the age categories to around 1% for pilots aged 60 and above.

Research carried out five years later shows an almost identical graph, with the main

exception being that the proportion of women pilots has risen slightly across most age groups, but the peak of around 7% has moved forward to pilots in their twenties. In 2011, in the 20-24 age group, just 4% were women, rising to around 6% for those in the 25-29 age category. However, the 2016 figures show a slightly lower percentage of women pilots in their thirties than five years earlier, although between the ages of 40 and 70, women have nudged up their representation.

There are various theories for this. The rise in the proportion of women pilots in their twenties between 2011 and 2016 could be down to the impact of programmes to encourage girls to take up a career in the cockpit. However, the 30- to 34-year-olds in 2011, who would have been 35-39 in 2016, did not maintain their representation as they aged. This could be a result of an influx of men entering the profession in that age group, from the military and other careers, or women leaving for family reasons.

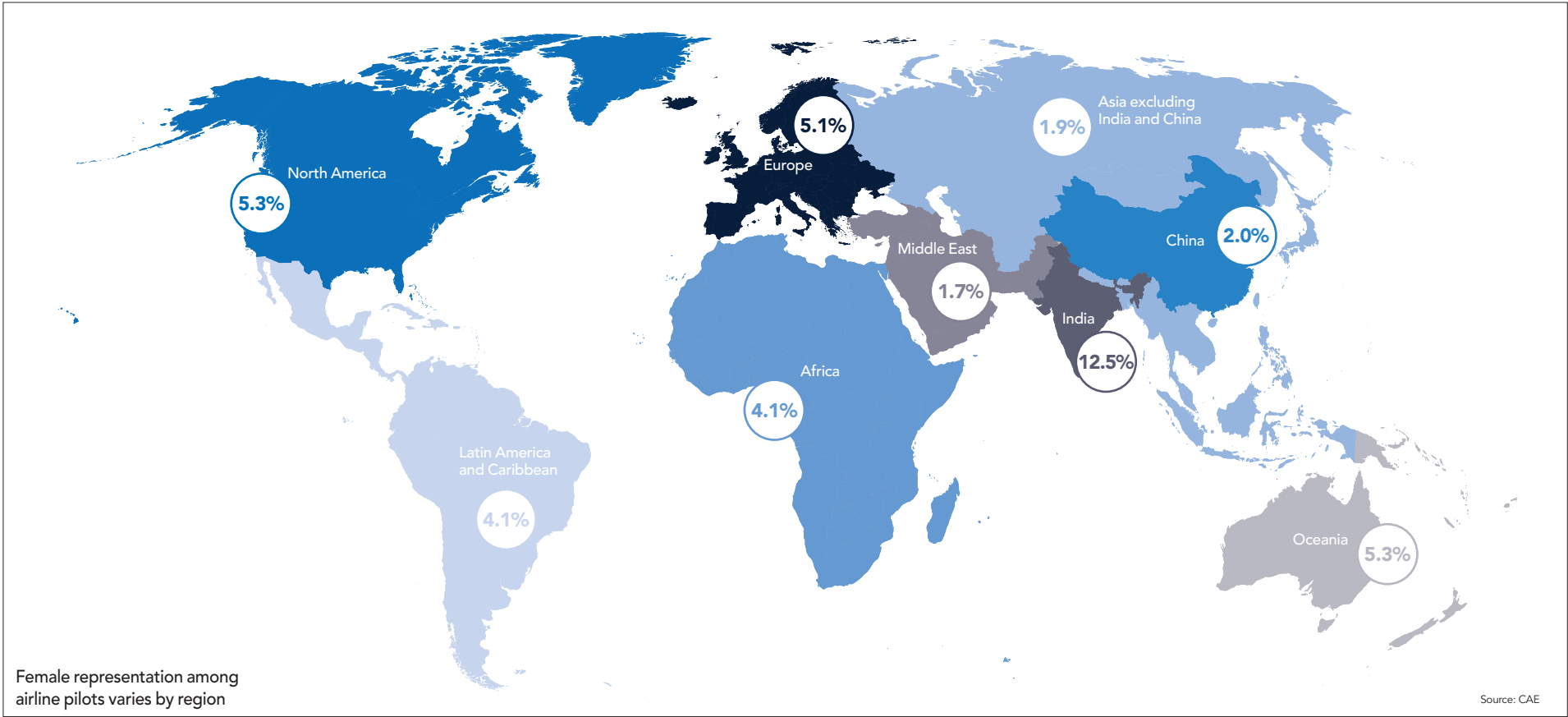
Along with McKinsey, CAE has looked into the root causes behind low female representation on the flightdeck, conducting more than 150 interviews and pulling data from more than 35 sources. The research concluded that women entering the pilot profession have usually met three criteria: they will have had

an awareness of aviation as a realistic career option; they will have an academic background that has a strong grounding in mathematics and physics; and they will have been exposed to female role models.

Interviews concluded that early exposure to aviation – often through family members who have been pilots or cabin crew, or by growing up near an airport or military base – as well as frequent flights from an early age are crucial factors. Job descriptions and marketing materials are also an influence. Traditionally, many of these have had a male bias, with men rather than women used in publicity photographs or case studies. Thankfully, this has been changing with some organisations working hard to share images that reflect aspirations to a more inclusive environment.

STEM PRINCIPLES

Additionally, interviews revealed that many female pilots had enjoyed science, technology, engineering and maths courses in high school. This applied to many that did not discover a passion for aviation until later. Given the importance of an understanding of STEM principles to being a pilot, addressing the gender imbalance among girls studying such subjects at an early age would perhaps go some way to promoting greater gender diversity in the cockpit.



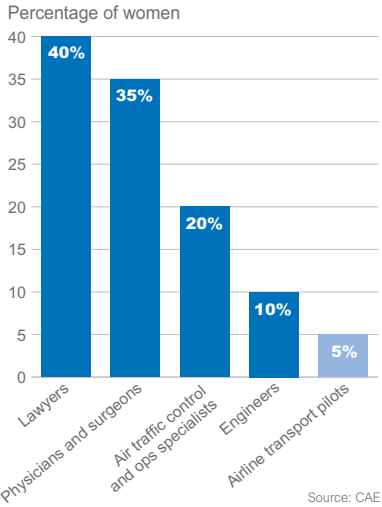
A study in the UK looked at how both girls and boys aged seven to 11 saw their future professionally. Even at this young age, gender differences are making themselves felt. A career as a pilot was 11th most popular career for boys, but ranked 27th for girls. While among those aspiring to the top 20 professions, more girls than boys expressed an

interest in STEM subjects, this was skewed by the 18.6% of girls who wanted to be doctors or veterinarians. Boys had a more even split between those wishing to be scientists, engineers, doctors and other professions.

Based on those numbers, male interest in the pilot profession outweighs female interest by four to one – in the UK at least. However, this would result in females making up 20% of pilots assuming that all the boys and girls pursued their early professional ambitions. Given that the proportion of women airline transport pilot licence holders in the UK is only around 4.3%, it means that many girls are losing interest in aviation before they enter the training pipeline, either because they later consider that aviation is not for them, or they lack the academic background to follow it.

Popular culture and the military must perhaps share much of the blame. With very few exceptions, Hollywood pilots have been men. The exclusion until fairly recently of women from frontline military aviation has also helped reinforce the message that flying an aircraft – whether an airliner or fast jet – is no job for a woman. Girls need role models and creating them in aviation is as much a challenge for wider society as it is for the industry itself. ■

Women in various professions (US)



The female fliers who got there first

From a pre-First World War French aristocrat to a modern-day former Afghan refugee, women aviators have been making history for over a century. We celebrate 10 of the best

RAYMONDE DE LAROCHE

French aviator Raymonde de Laroche became the first woman to make a solo flight in 1909, after convincing her friend and aircraft builder Charles Voisin to let her taxi one of his creations. She reportedly ignored his orders to stay on the ground and briefly lifted off.

Demonstrating both the barriers to entry that women faced and the importance of this milestone, a 30 October, 1909 article from *Flight* – the predecessor to *Flight International* – said: “Yet another sphere which some had thought man would, for some time, at any rate, retain for his own has been invaded by the gentler sex. Baroness Laroche has been successfully piloting a Voisin biplane, and has thereby earned the right to be known as the first lady flyer or ‘aviatress’.” (see below)

On 8 March 1910 Laroche became the first licensed female pilot in the world, when the Aeroclub de France issued her papers.



Getty/Shutterstock

BESSIE COLEMAN

“The air is the only place free from prejudices,” US aviator Bessie Coleman is quoted as saying. She went on to defy racial and gender prejudices to become the first black woman to earn a pilot’s licence in 1921 – but her journey was not straightforward.

After moving to Chicago, Texas-born Coleman decided she wanted to be a pilot. However, US flight schools did not admit women or African-Americans at that time, so she learned to speak French and in 1920 travelled to Paris to earn her pilot’s licence. She then took advanced training courses in Europe before returning to the USA, where she performed stunt flights at air shows and earned the nickname “Queen Bess”.

Coleman did not get to realise her dream of opening a flight school for black aviators before her untimely death in 1926, at the age of 34, when her Curtiss JN-4 crashed in Florida.

AMY JOHNSON

Yorkshire, England-born Amy Johnson became the first woman to fly solo from England to Australia after taking off from London Airport, Croydon on 5 May 1930, headed for Darwin. In the following two years Johnson piloted other record-breaking flights to Moscow, Tokyo and Cape Town, making her one of the UK’s most well-known female aviators.

When the Air Transport Auxiliary was formed in 1940 to deliver aircraft to Royal Air Force (RAF) airbases during the Second World War, Johnson signed up. She lost her life on 5 January 1941 when an Airspeed Oxford aircraft she was delivering flew off course in adverse weather conditions and crashed into the Thames Estuary.

Johnson’s body was never recovered, but her memory lives on. easyJet named a positive action campaign to boost female pilot numbers after her, and the Royal Aeronautical Society’s Women in Aviation and Aerospace Committee holds Amy Johnson lectures at its London headquarters.

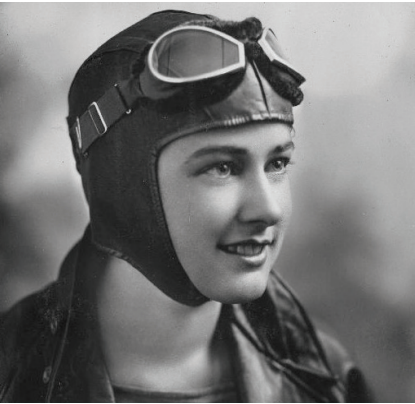


Roger Voller/Shutterstock

HELEN RICHEY

Helen Richey was the first woman to be hired as a pilot by a US commercial airline. She joined Pennsylvania-based carrier Central Airlines in 1934 but was not allowed to fly in bad weather and was denied the right to become a member of the pilots’ union.

During the Second World War Richey joined the UK’s Air Transport Auxiliary before returning to the USA and joining the Women Airforce Service Pilots (WASP) organisation. According to the Smithsonian National Air and Space Museum’s website, Richey was “unable to find aviation employment after the WASPs disbanded in 1944” and committed suicide in 1947.



Wikipedia Commons



Rippelmeyer (right) with colleague Beverly Burns in a People Express 737

LYNN RIPPELMEYER

Former flight attendant Lynn Rippelmeyer was the first woman to fly the Boeing 747 and the first woman to captain the type across the Atlantic.

She began her aviation career in 1972 as a TWA flight attendant, before taking flying lessons and eventually being hired as a first officer at Air Illinois in 1977. In the early 1980s she joined cargo operator Seaboard World Airlines and flew the 747. Rippelmeyer then joined

People Express Airlines and became the first woman to captain a 747 across the Atlantic. Landing in the UK she received great interest from the press, was later named Woman of the Year in England – the first American to receive that accolade.

In an interview earlier this year with US broadcaster PBS, Rippelmeyer said: “My hope for women in aviation is that we become so commonplace that it is no big deal.”

BEVERLEY BASS

Florida-born Beverley Bass was originally discouraged from taking flying lessons by her parents, who wanted her to focus on the family’s racehorses. But her determination to fly led to her becoming American Airlines’ first female captain in 1986, a decade after being hired as the carrier’s third female pilot (Bonnie Tiburzi was the first). Later that year, Bass hit the headlines again when she led the first all-female crew of a commercial airliner.

On 11 September, 2001, Bass was piloting an American Airlines Boeing 777 from Paris Charles de Gaulle to Dallas Fort Worth. Her aircraft was one of 38 to be diverted to Gander in Newfoundland when US airspace was closed in the wake of the terrorist attacks. The generosity shown by local people to the scores of stranded passengers and crew was later portrayed in a Broadway show, *Come From Away*, with one of the main characters based on Bass.



Bass: a career that made it all the way to Broadway



Getty/Shutterstock

AMELIA EARHART

American aviator Amelia Earhart became the first woman to fly solo across the Atlantic when she took off in a single-engine Lockheed Vega 5B from Harbour Grace, Newfoundland, bound for Paris, on 20 May 1932. Strong winds and mechanical problems >>

» prevented Earhart from reaching Paris, but she touched down 14h 56min later in a farm field in Northern Ireland, securing her place in the history books.

In the years that followed, Earhart became the first person to fly solo from Hawaii to California, and from Los Angeles to Mexico City.

In 1937, she set out to become the first woman to fly around the world. In June of that year Earhart and her navigator, Fred Noonan, took off from Miami, Florida for the 25,000nm (47,000 km) journey. However, radio contact was lost as their Electra 10E aircraft approached Howland Island in the Pacific Ocean in early July. A prolonged search and rescue effort found no sign of the aircraft or crew, and Earhart's disappearance remains a mystery to this day.



EMILY HOWELL WARNER

Four decades ago, women in the flightdeck were a genuine rarity. Born in Colorado in 1939, Emily Howell Warner became the first female captain at a scheduled US airline in 1976, three years after joining Frontier Airlines as the country's second female commercial pilot. In between these two achievements she became the first woman member of the Air Line Pilots Association (ALPA).

At the age of 17, a visit to the cockpit during a flight inspired her to learn to become a pilot. She became a receptionist at her local flight school and took flying lessons on her days off. After working her way up to flight school manager and chief pilot, and later becoming a US FAA pilot examiner, Warner joined Frontier as its first female pilot.

BARBARA HARMER

Former hairdresser Barbara Harmer became the first female Concorde pilot in 1993. She spent the next decade piloting regular transatlantic Concorde flights for British Airways, until the supersonic jet was withdrawn from service in October 2003.

Harmer was born in Essex, UK in 1953. She left school at the age of 15 to become a hairdresser before switching to train as an air traffic

controller at London Gatwick. Bitten by the aviation bug, she took flying lessons and gained her commercial pilot's licence in 1982. She was flying long-haul McDonnell Douglas DC-10 flights for British Caledonian when it merged with British Airways in 1987, and then took a Concorde conversion course to become the first qualified female Concorde pilot on 25 March 1993.

Harmer passed away in 2011.



Getting there fast: Harmer flew Concorde during the final 10 years of the supersonic transport

SHAESTA WAIZ

In 2017 Afghanistan-born Shaesta Waiz became, at the age of 30, the youngest woman to fly solo around the world in a single-engine aircraft – a mission she undertook to inspire other women to pursue careers in science, technology, engineering and maths (STEM) fields.

Waiz's round-the-world flight departed Daytona Beach on 13 May 2017, and included 30 stops in 22 countries – each of which

was “strategically selected based on the need for STEM outreach”.

On the website for Dreams Soar – a non-profit organisation founded by Waiz – she describes how being born in a refugee camp in Afghanistan and emigrating to an “underprivileged” area in California during the Soviet-Afghan war in 1987 inspired her to “share and promote the importance of STEM” to young women around the world.



Waiz: from Afghan refugee camp to flying around the world solo

Helping pilots on their career path

Judy Choi is an Airbus A320 and A330 flight instructor with CAE in Hong Kong. She explains what first got her excited about aviation and what she enjoys about her job

Tell us about your role at CAE. What are the most enjoyable aspects of being an instructor?

My role is to facilitate the learning of our trainees, and help them achieve the required performance and standard in terms of attitude, skills and knowledge as competent crew on the flightdeck. An instructor has to be able to identify the strengths and weaknesses of the trainees and adapt appropriate instruction techniques to motivate them – not only to meet the standard, but also to continue developing themselves further, as their experience and understanding grows along their career paths. The most enjoyable aspects of being an instructor, of course, is seeing those trainees grow and develop their way of learning to achieve higher things. I learn a lot from my trainees as well. They help me gain different perspectives and improve my skills. You learn something new every day.

What was your route into your current job and how did you get started in aviation?

I joined the Hong Kong Air Cadet Corps, set up by the British armed forces, at 11 years old. I was fortunate to receive flying scholarships to train with the Royal Air Force air cadets and met many inspiring individuals in different bases and flying schools. The air cadets provided a lot of opportunities to learn and gain deeper understanding of the industry. As my passion for flying grew, I started my career flying the Airbus A330 with a local airline in Hong Kong. I have always wanted to explore and learn. Eventually, I landed my current job as an instructor with CAE.

What first attracted you to a career as a pilot? Who were your influences? Was there one defining moment?

My dad worked in the old Kai Tak Airport, and as a kid I would go to the Checkerboard



Choi caught the aviation bug during visits to Kai Tak airport, where her father worked

[hill] for plane spotting and picked up my dad after his shift. Then I joined the air cadets once I was old enough. But the defining moment was when I received my first flying scholarship and attained my first solo on a Cessna 172. After recognising my ability and passion for flying, I just kept going.

Are you confident that the industry can attract more young women to become commercial pilots?

Definitely. Everyone is unique in terms of his or her strengths and potential, regardless of gender. The industry definitely needs inclusivity and diversity to grow and be better. With the ever-expanding scope of social media and technology, everyone can easily get all the information they need. With a better understanding of the industry

beforehand and the airlines' determination to attract more female pilots, a lot more young women will be physically and mentally prepared for the challenges and opportunities of the flightdeck.

What advice would you give a girl or young woman in high school thinking about a career as an airline pilot?

Do a lot of research and gain a better understanding of what it takes to develop your career. Know your strengths and weakness and resolve to keep getting better. Acknowledge your unique capability and keep yourself motivated. Never fear about failing and learn from your failures. Be confident in yourself, be resilient, and never give up on your dream. ■

One of the few

Kathy McCullough flew 747s for Northwest until her retirement on medical grounds. An active member of ISWAP, she explains what she learned in more than 30 years as a pilot

What got you interested in being a pilot?

It started in high school in Florida. I had a great physics teacher and when he was going to teach a class on aviation, I took it more because I liked him as a teacher as much as I had an interest in aviation. But I became hooked and, as a result of a field trip we did, took a weekend job at our local airport in Gainesville. I had a chance to take some flying lessons. When I went to college my mum told me: "You are not using this money for flying. It's for a real education." So I stopped flying for a while. Also my eyesight was 20:30 and the airlines at that time wanted 20:20 vision. However, after graduating in 1976, I managed to start flying again. I did some flight instruction and flew turboprops, and accumulated 2,000h. By 1981, the airlines had changed their eyesight rules and were recruiting again, and I managed to get onto a training course with Northwest to become a second officer. I was their fourth woman pilot – the first two had joined in 1979.



McCullough was one of only four pilots with the airline when she began her career

Kathy McCullough

What was the training like?

It began with psychological and medical assessments followed by a simulator ride to see if you really could fly, and then two months in ground school to learn the rules of the company and the systems on board the [Boeing] 727. I loved that part, learning the aircraft inside and out. Nowadays that sort of training tends to be computer based, but there is a lot to be said for being in a classroom with a whiteboard where you could practise turning things on and off. It was very interactive.

What were the attitudes to women?

There were two of us in the class of about 15. Both of us suspected we might be the token women and were very nervous, but my experience put me right in the middle of the class. Some had more hours, but others, such as guys who had come from the military, had less, but they were good hours. Once I joined Northwest, the culture was not what you'd describe today as politically correct, but the male pilots were fine once they realised you

could do the job. Some former military guys were dismissive of those of us who had flown light aircraft, but the men who had come from that background got it just as badly. The passengers were often the funniest. One time, an elderly couple walked past and the woman said: "I didn't think they allowed women pilots." Her husband retorted: "Dora, where have you been, locked in a closet?" If there was a hard landing, the "woman driver" often got the blame. One time, the captain made a hard landing and I told him: "Don't worry, they will all assume it was me." After a few comments from departing passengers, he felt bad and started telling everyone it was him.

How did your career progress?

After a few years as second officer on the 727, I became a second officer on the [McDonnell Douglas] DC-10. The job was not unlike a flight engineer, managing the systems and engine instruments as the third pilot on the flightdeck. You had to do three take-offs and landings in a sim once a year to make sure you could take over in an emergency. In 1986, I became a co-pilot back on the 727, and then, despite vowing I'd never fly as a second officer again, moved to Oregon as a flight engineer on the 747. I finally made it to captain on the 747 in 2004.

What was Northwest like as an employer and how do you think conditions are now for women pilots?

Northwest were excellent. When I had kids, they were very flexible on maternity leave, giving me six months off with each of my children, but I could have taken more. I think in some ways we have gone backwards. You hear these days of women being forced back to work after six weeks. Northwest let you keep your seniority. Some months I would only fly seven days, which was ideal. I could do three transpacific crossings and be done for the month. 9/11 made a big difference. You are locked up in the cockpit now, away from a bathroom. I had a girlfriend who was pregnant and didn't use the bathroom as often as she should, and ended up with bladder ulcers. Putting bathrooms back on flightdecks [on long-haul aircraft] would make a big difference. ■



Hawthorne's goals include working in training and recruitment and helping young cadets

From cabin to cockpit

After starting in the back of the aircraft, Alex Hawthorne completed an MPL with easyJet and became a first officer with the airline two years ago. She is based in Venice

What is your role with easyJet?

In day-to-day operations, I support the captain in flight preparations, such as preparing the weight and balance forms, supervising refuelling, and conducting pre-flight inspections to ensure all navigation, safety and operating systems are working correctly. I generally fly four sectors per day, especially during our busiest season of summer, to various destinations – mainly in Europe. In terms of flying tasks, I share equally the workload with the captain. On each sector, one will perform the pilot flying, and the other pilot monitoring. We work as a team and assist each other to always ensure the safety of our passengers and crew.

What was your path into aviation?

I emigrated from Ireland to Canada in 2007, and began my career by obtaining my private pilot's licence at Waterloo-Wellington flight school in Ontario. But once I discovered what my stepdad and other pilots in Canada had to go through to make it in the airlines (building thousands of hours bush flying or instructing), I decided my best option was to go back home to the UK and try to gain direct entry into an airline via a cadet programme. While I explored programmes and courses to apply to, I took a position that I thought would give me some insight into the business – I became cabin crew for British Airways. This experience was very rewarding, though short lived – after only one year of being cabin crew, I

was accepted into the easyJet MPL scheme to train at CAE Oxford. After an intense two years of training, I had the qualifications to fly Airbus 320s.

Why did you want to become a pilot? Who were your main influences?

The influences that led me to my current career path were my parents and grandfather. My mum was the one who first introduced me to the world of aviation. Growing up in Northern Ireland, I saw her do what seemed very uncommon – she would jet off in style to various destinations around the world as cabin crew. I was in awe of her stories, and her apparently glamorous lifestyle. My grandfather was an aircraft engineer in the British Royal Navy. His stories of the aircraft and how they worked intrigued me. This led me to join the Royal Air Force cadets at the age of 13. My idea was to become a fighter jet pilot, after seeing Tom Cruise in Top Gun! However, I learned that even if you did make it in this side of the industry, with that one-in-a-million chance, flight hours per year were low. Meanwhile, and apparently at just the right time, my Canadian stepfather came into my life. He is also a commercial airline pilot – currently a captain on A320s with Air Canada. He made me see that this was a viable option to aim for, at a time when female commercial pilots were becoming more common in the industry too.

What are your career aspirations?

The natural progression for a first officer is to become a captain, and that is definitely my goal. To be in absolute control of a jet has been my dream since I was a young girl. I would also consider getting into the training side of things, and perhaps the recruitment process for pilots. I would like to support and guide cadets into this magnificent and fulfilling role, as I was.

What advice would you give to any young woman or girl considering a career as a pilot?

When it comes to being a good pilot, gender is irrelevant. Don't discount this career path simply because you're a woman. Historically, it was merely a matter of young girls not being aware that this career option is open to them. Thankfully, that stereotype is slowly changing, and more young women are choosing to become commercial pilots. Previously, there were a lack of female role models in this industry, but that is no longer the case. Women are also typically very good at juggling and prioritising heavy workload scenarios, which is absolutely essential in this role. So my advice would simply be to go for it – women are every bit as capable as men. ■

CAE Women in Flight



Ready to pursue and achieve your dream of becoming an airline pilot?

CAE is committed like no other training organisation to the advancement of women in aviation. Our CAE Women in Flight scholarship programme offers five full scholarships worldwide, covering the entire cost of a cadet's training. In addition, our scholarship comes with the opportunity of securing your first pilot job with one of our airline partners.

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