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The Evolution of Private Jet Interior Design – Part 3

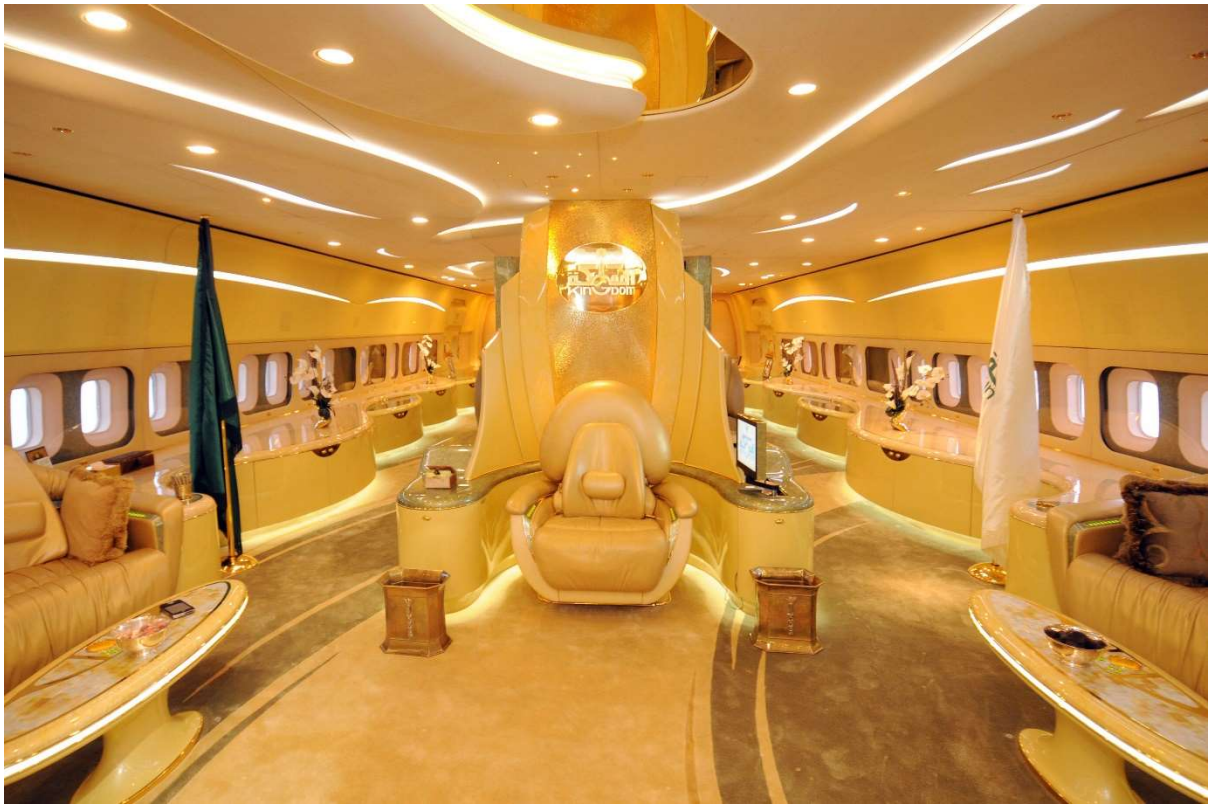
By Tom Chatfield, CEO, Camber Aviation Management

Since the 1950s, owning a private jet has come to represent success and affluence for celebrities and the super-rich, with well-appointed interiors that offer comfort and relaxation with a beautiful, luxurious finish.

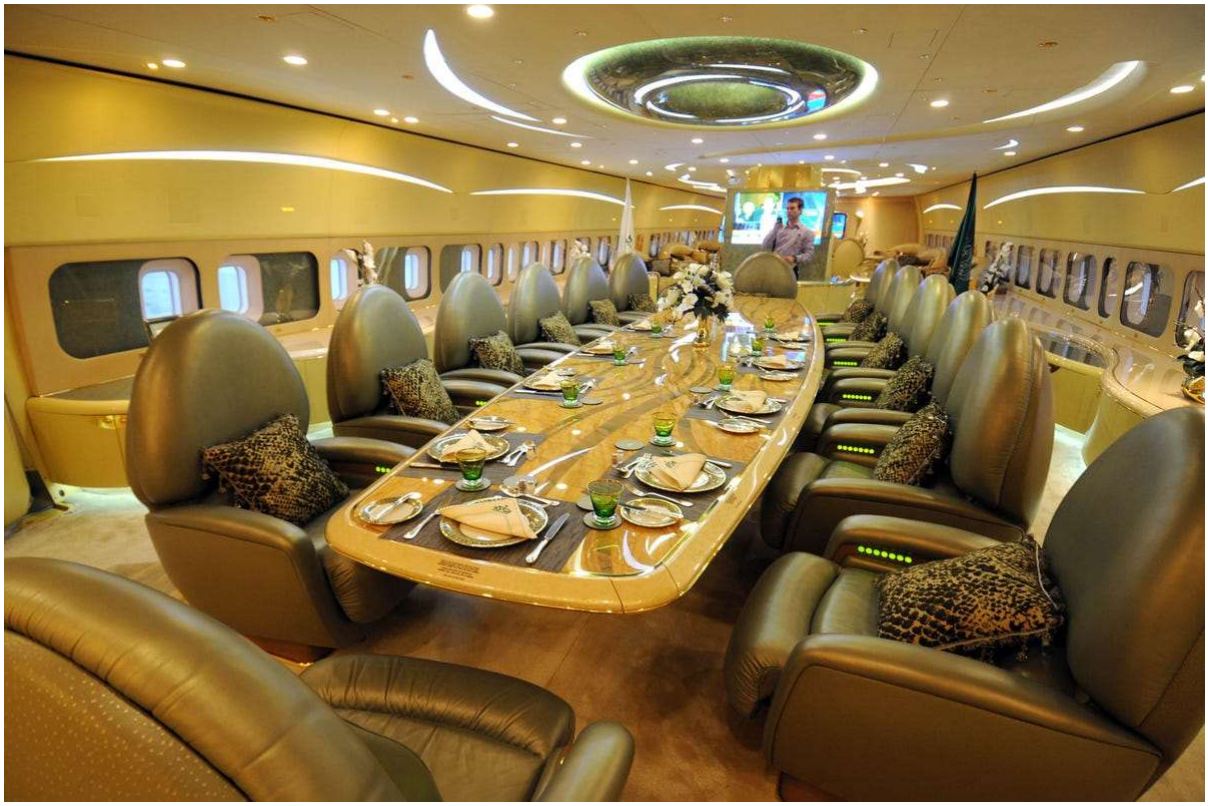
Whilst interior design trends have always varied according to the type of aircraft, the size of the cabin and the needs of the passenger, the turn of the century saw a sea-change in the industry. The new millennium introduced huge changes in material development, with light and strong composite materials becoming standard in aircraft manufacture, along with advanced alloys offering improved strength and flexibility with superior corrosion resistance. In addition, the huge increase in technological capability meant that aircraft were being developed with vastly superior aerodynamics, increasing performance and fuel efficiency whilst maximising cabin space.

Commercial operators took advantage of the new developments to increase their service offerings (and their profit margins) but super rich private jet owners were able to benefit from the improvements by creating ground-breaking interiors that offered comfort far beyond what was possible a few decades before.

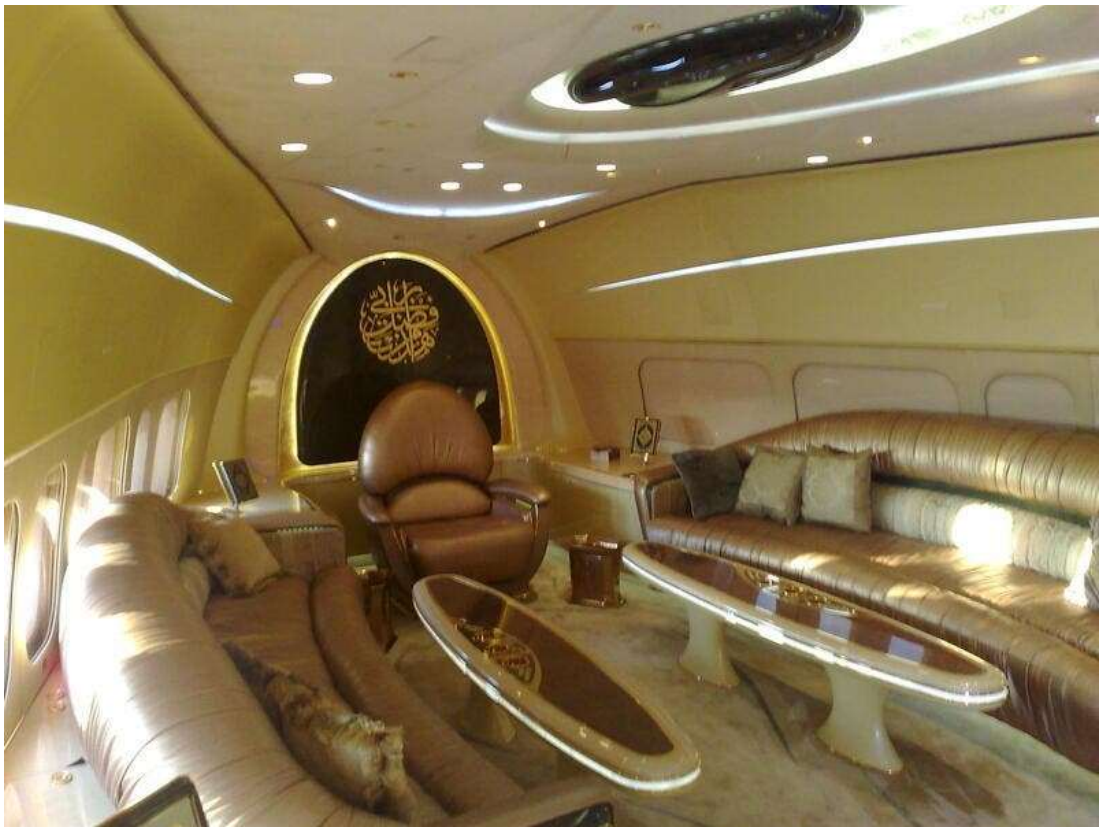
In 2003, Prince Al-Waleed bin Talal – a member of the Saudi Royal Family – spent an unprecedented $500 million buying and outfitting a 747-400 in gold splendour for the ultimate in decadence. Where normally upwards of 371 passengers were divided into first, business and economy seating, here was a private Boeing 747-400 spaciously designed for less than a quarter of the number of passengers an airliner would carry, with considerably more legroom and comfort.



The jet is fitted with several lounges, a 14 seat dining room, a conference room and private quarters. The lounge areas are elegantly furnished with plush sofas, armchairs and ottomans, providing a comfortable and relaxed space to entertain guests or unwind. The dining area features a large table surrounded by comfortable chairs, making it ideal for formal or casual meals.

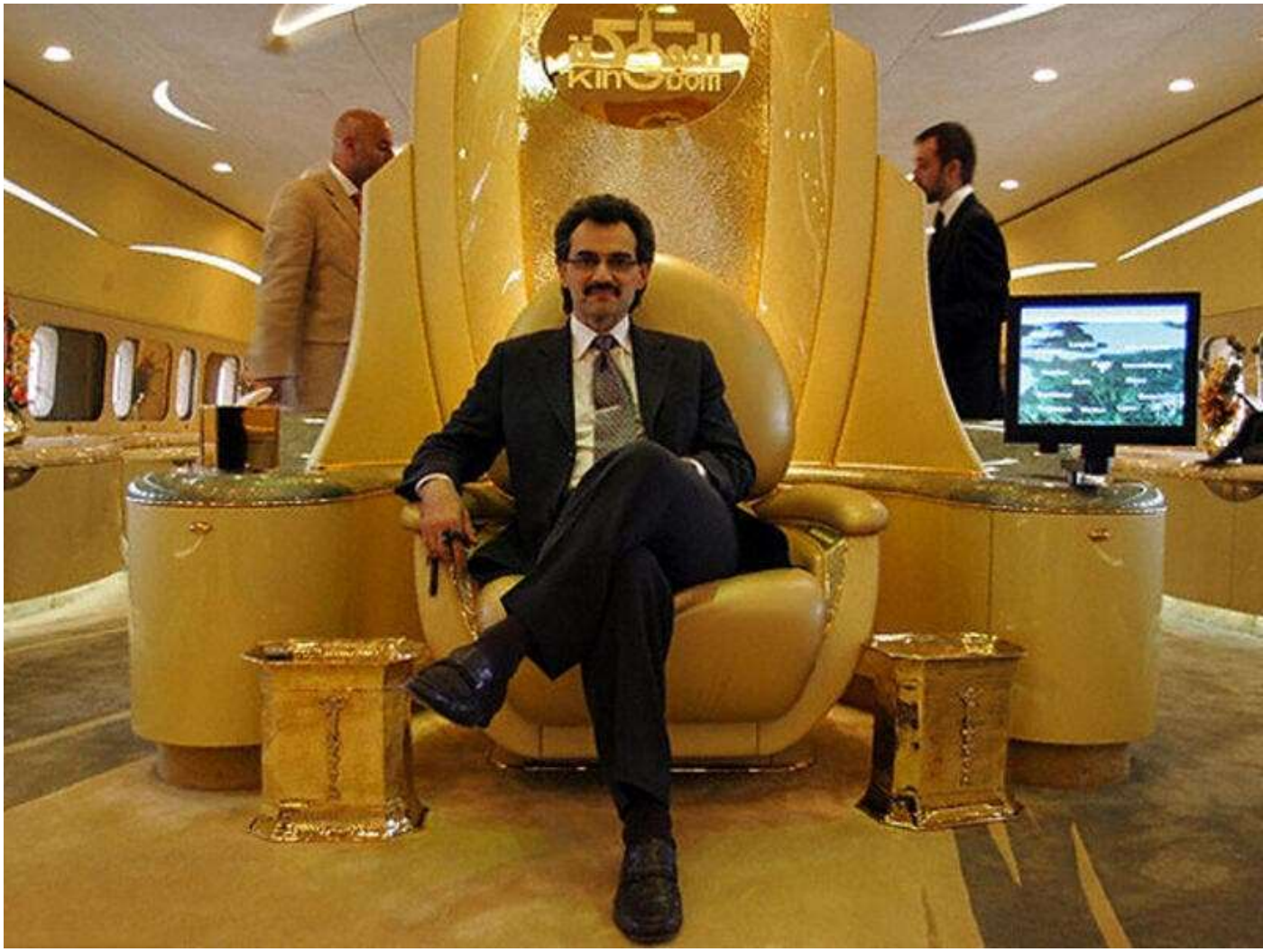


The conference room is equipped with a state-of-the-art audio-visual system, making it ideal for conducting business or hosting meetings in flight.



The private quarters include a master suite with a king-sized bed, a private lounge, and an ensuite VVIP bathroom with a shower. There are also additional bedrooms, each with its own private bathroom and entertainment system, ensuring that every guest on board has the utmost privacy and comfort. The interior of the jet is finished in high-quality materials such as wood panelling, marble, and fine fabrics, creating a warm and inviting atmosphere. The cabin is also equipped with state-of-the-art entertainment systems, including flat screens, a sophisticated sound system and, of course, Wi-Fi.

Overall, Prince Al Waleed bin Talal's 747-400 private jet represents the ultimate in luxury air travel – one that hasn't yet been beaten for cost or size. Prince Al Waleed also commissioned a customised Airbus 380 private jet, which – had it been completed – would have been the largest private jet in the world.



Although Price Al Waleed was born into luxury and privilege, many others have risen – against all odds – to a level of success and wealth that enabled them to join the exclusive ranks of private jet owners.

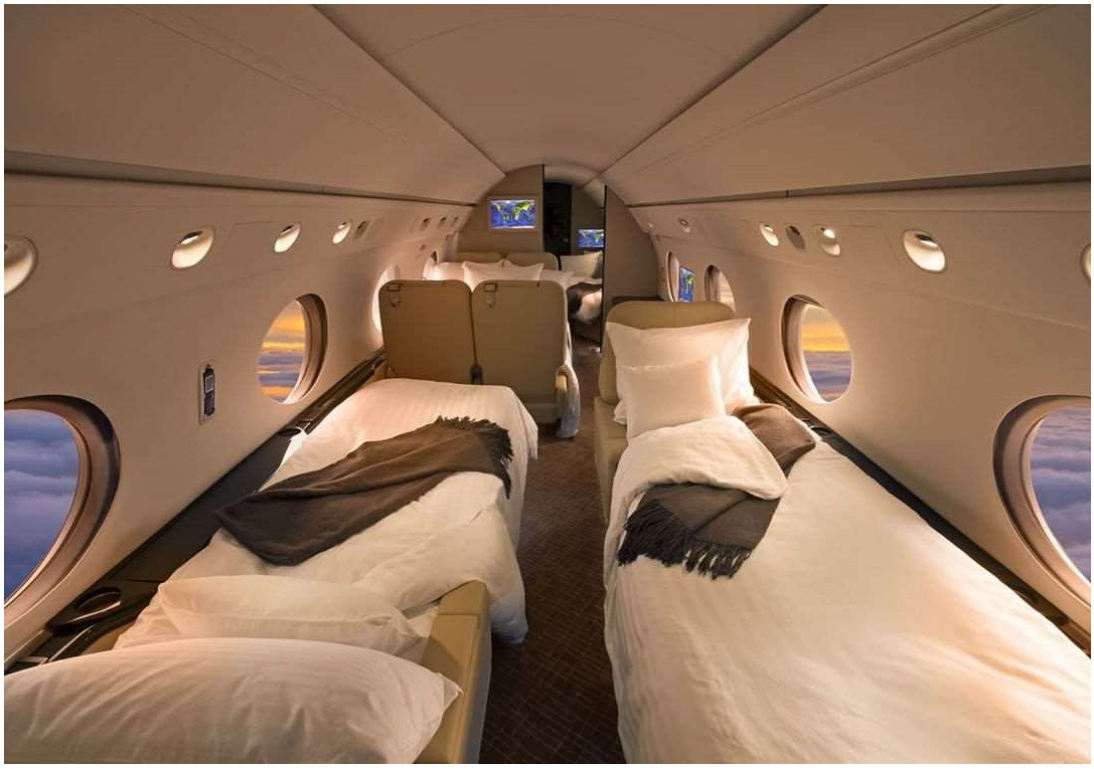
Jim Carrey was 12 years old when he became homeless after his father lost his accountancy job, forcing the family to live in a van. Jim and his brother also spent months living in a tent in Ontario until his father was able to get a new job and afford a more stable home. The moment he was 16 he dropped out of school to help his father support the family.

Despite a rough start, his comedic timing and acting talent gave him a head start in the stand-up comedy circuit. His determination and hard work led to him moving to LA and getting numerous small bit-parts in 80s TV shows and movies. In 1994 he finally landed a leading role in his break-out movie "Ace Ventura: Pet Detective" and, over the next decade, became one of the most famous actors in the world.

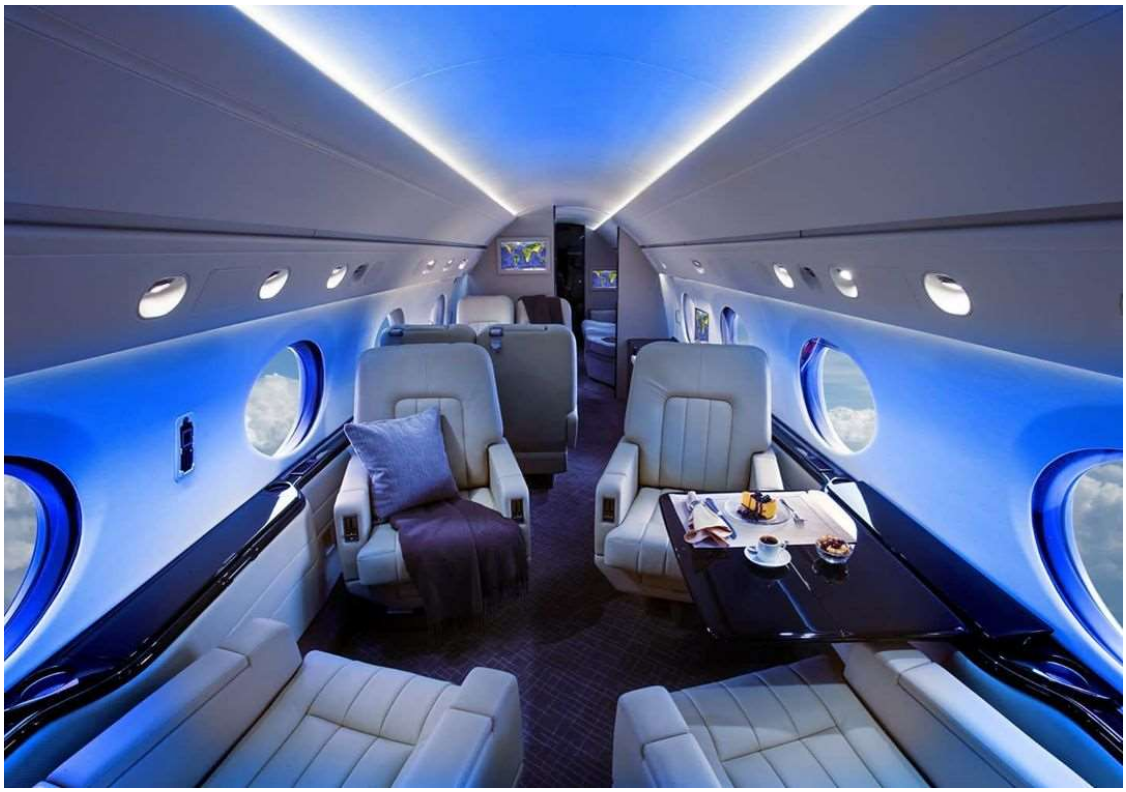
In 2006, at the height of his career, he was able to celebrate his success through buying his own private jet for about $40 million – a Gulfstream V.

Unlike the opulent 747 BBJ, the interior of Carrey's Gulfstream V was designed with a clean, minimal look. Beige leather seating, dark veneered monuments and with discreet gold fittings conveys an elegant and unpretentious style.

The jet is configured with three cabin zones – the forward cabin has four lounge seats and a large satellite TV for entertainment and relaxation. A middle cabin has additional seats and a leather couch, while the aft cabin has four chairs that convert into comfortable beds for longer flights.



With space for two flight attendants, the well-equipped galley comes into its own, allowing freshly prepared meals to be served to hungry passengers. Mood lighting changes from cool to warm depending on the schedule or time of day – this can support the passenger's circadian rhythms to help reduce the impact of jetlag.



The large, rounded windows add space and light to the cabin, completing the atmosphere of quiet luxury.

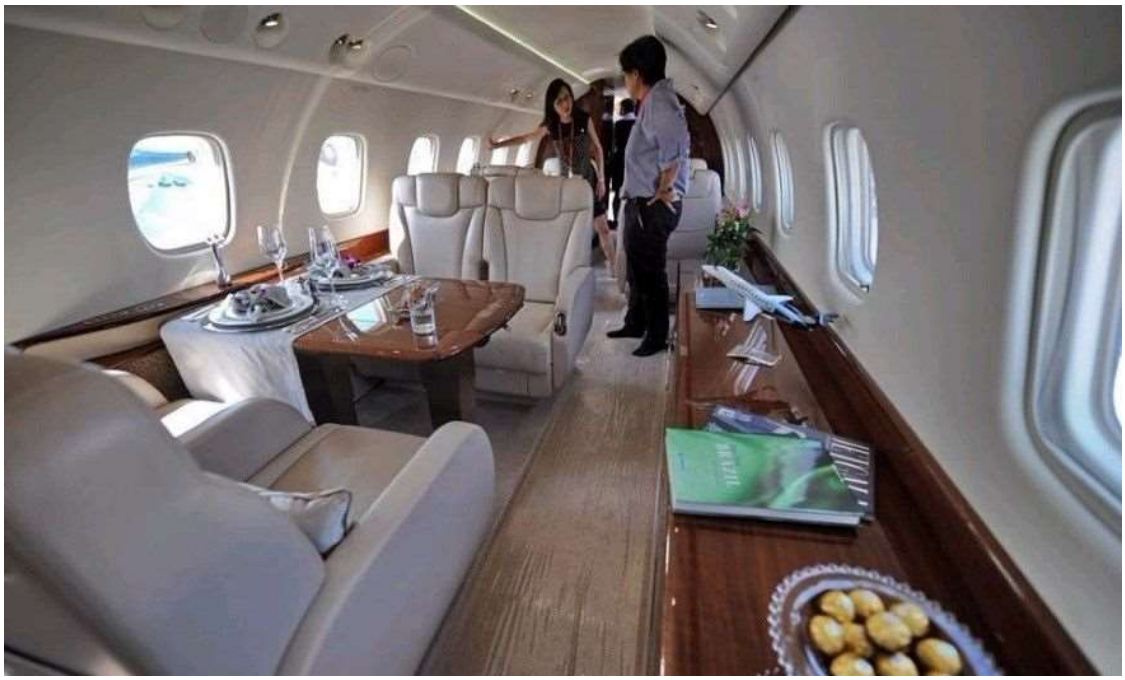
Buying his own private jet cemented a pivotal moment at the very height of Carrey's career. For a boy that spent his teenage years homeless, the ability to buy a symbol of success and wealth like the Gulfstream V must have been a very satisfying and momentous one.

Regardless of how hard a celebrity has to work to gain recognition and success - once someone has reached a certain level, fame brings its own reward.

In 2011, Jackie Chan had had a career spanning 40 years, appearing in about 120 movies that had been filmed in over 30 countries. By the end of the 90s, he was the most famous action hero of all time, with a global reputation for being both hard-working and an all-round nice guy. At the same time, Embraer were looking to get into the Chinese market - making Jackie Chan their Brand Ambassador was an easy decision.

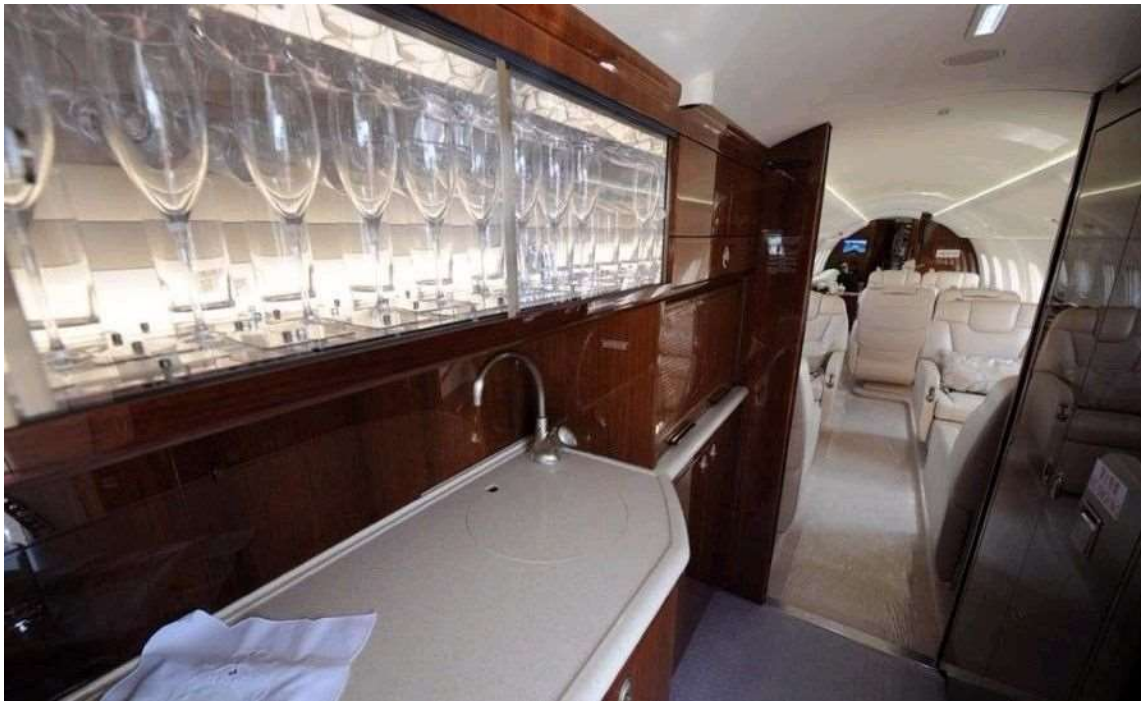
In 2012, Jackie Chan took ownership of the first Embraer Legacy 650 ever to be delivered to China. With a striking livery of intertwined red and yellow dragons, the jet paid homage to Chan's birthplace of Hong Kong while alluding to the 2012 year of the Dragon.

Embraer designed the interior with a decidedly western influence, using light neutral colours on the leather upholstery and soft furnishings complemented with fine wooden accents throughout.



Similarly, to the Gulfstream V, Chan's Legacy 650 had a three zone cabin, split up into a forward section with club seating followed by a four place mid-cabin conference set up across the aisle from a credenza and an aft section with an entertainment system and long sofa for relaxing with guests.

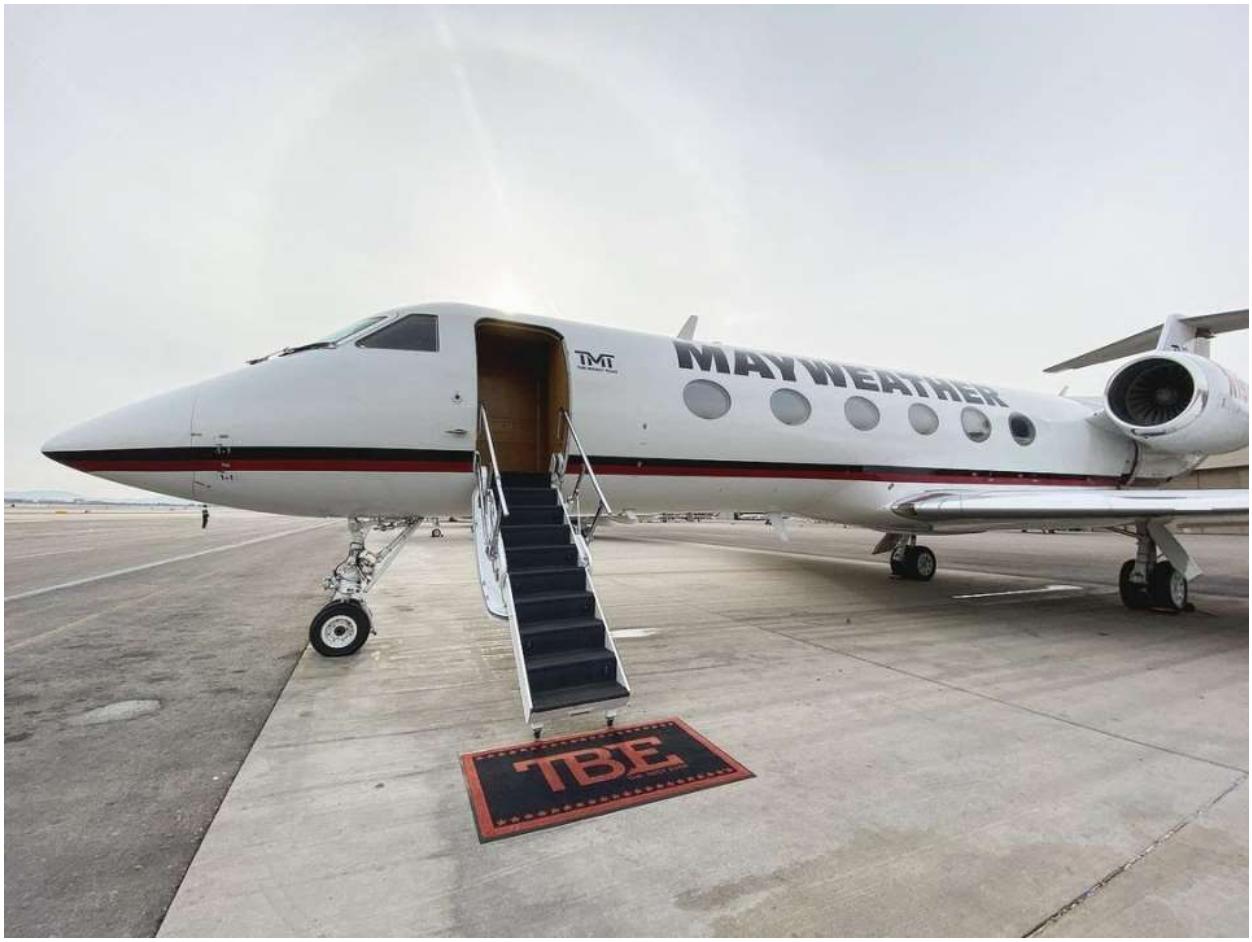
The galley includes a fridge, microwave and a convection oven but also doubles as a bar area where passengers can enjoy refreshments.



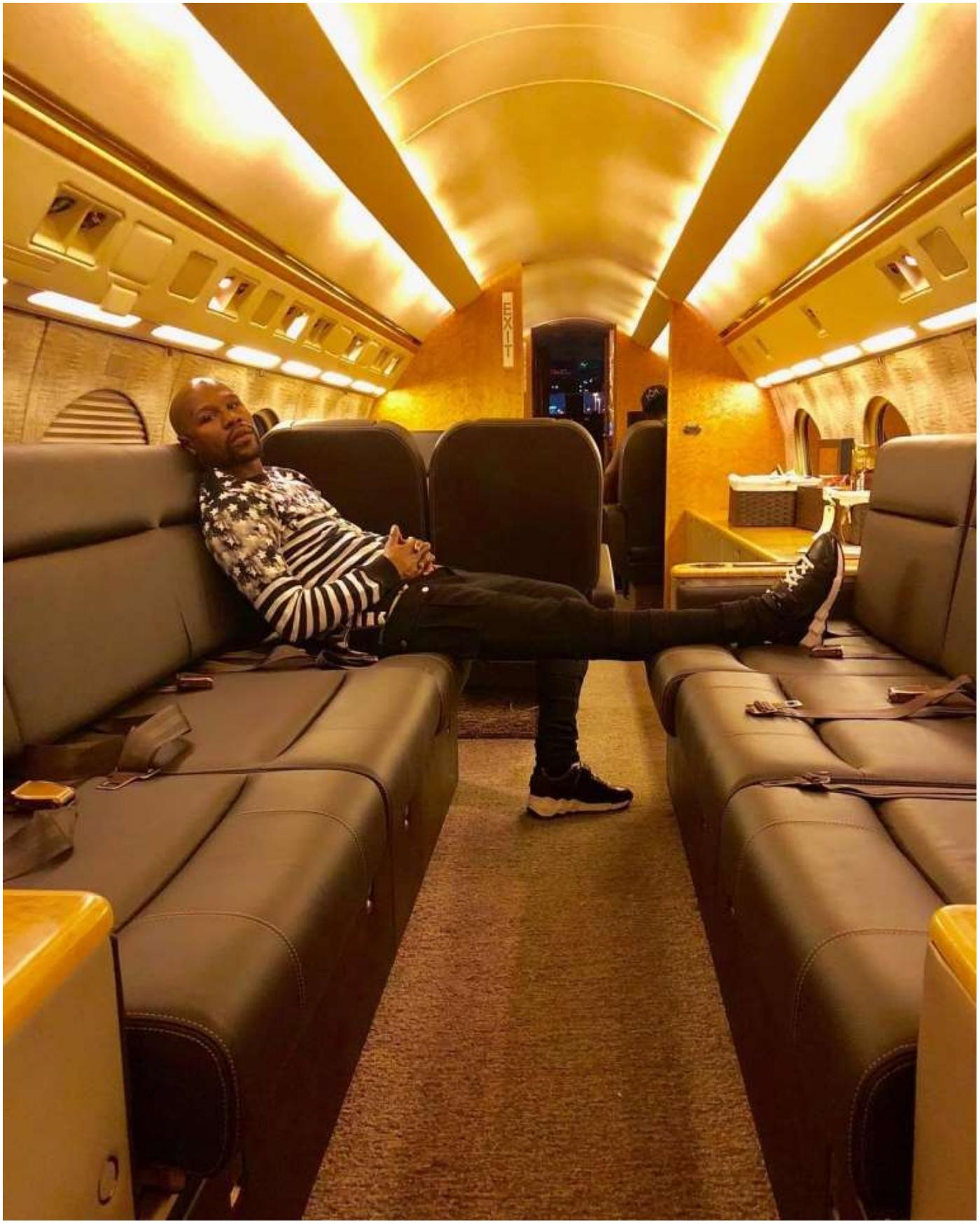
Although Chan still owns the Legacy 650 in 2016 Embraer presented him with another first – the Legacy 500, once again the first aircraft of its type to be delivered to China. "I'm so thrilled to receive this Legacy 500, a state-of-art executive jet," said Jackie Chan. "In the past few years, my Legacy 650 has brought me fantastic traveling experiences and great convenience, allowing me to do more acting and philanthropic works around the world. I'm sure that the performance of the new Legacy 500 will again exceed my expectations and become a comfortable mobile home and office for me."

It doesn't look like Jackie's hectic schedule is going to slow down any time soon, but he'll be travelling in comfort – whichever aircraft he chooses to take on his next trip. Being one of the biggest celebrities in the world certainly has its advantages!

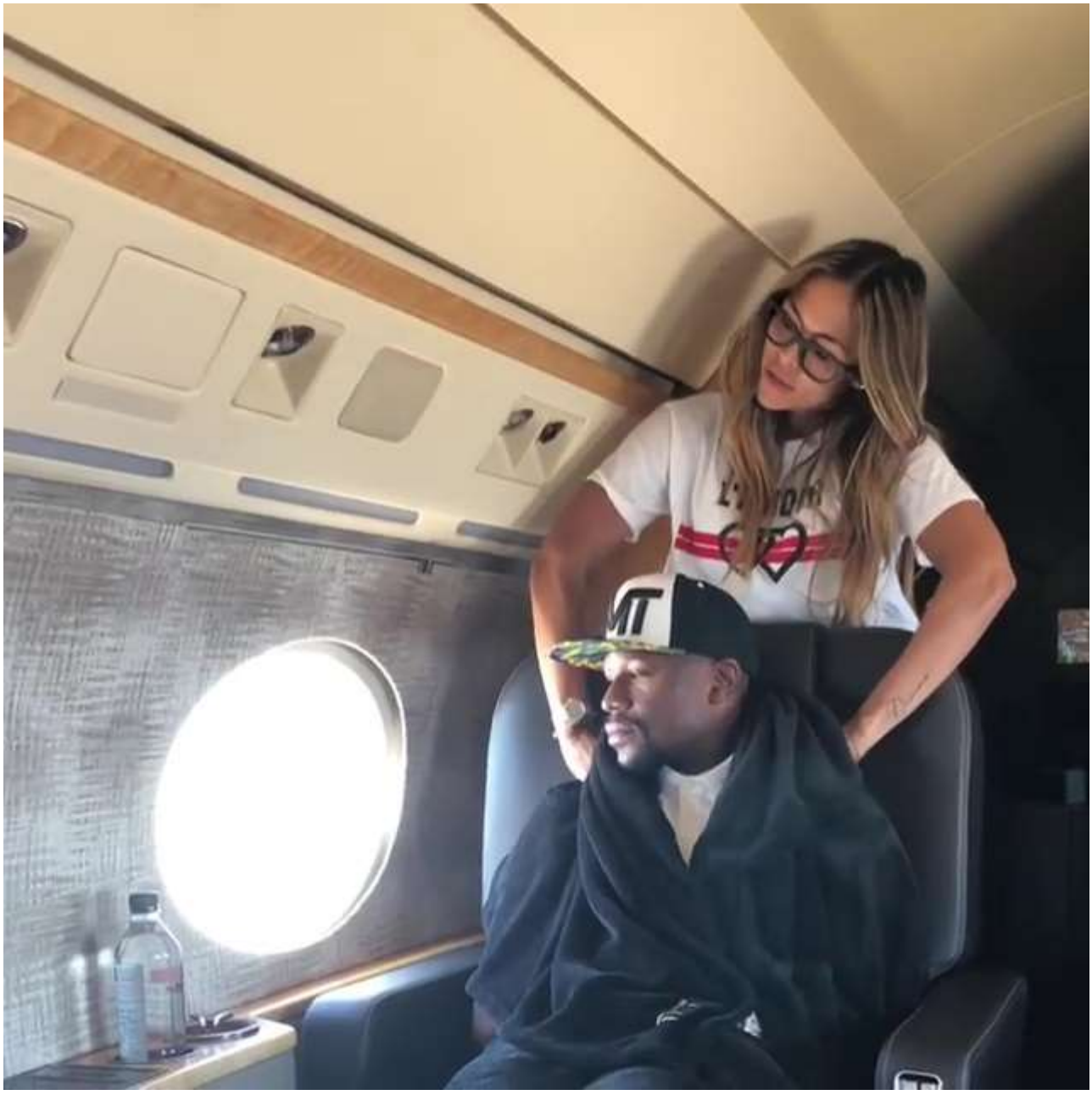
From world-famous action heroes to legendary boxers – if you've reached the top of your game, a private jet becomes almost necessary as a status symbol, proving your success. Floyd Mayweather, one of the greatest boxers of all time – can certainly afford a prestigious jet to fit his image.



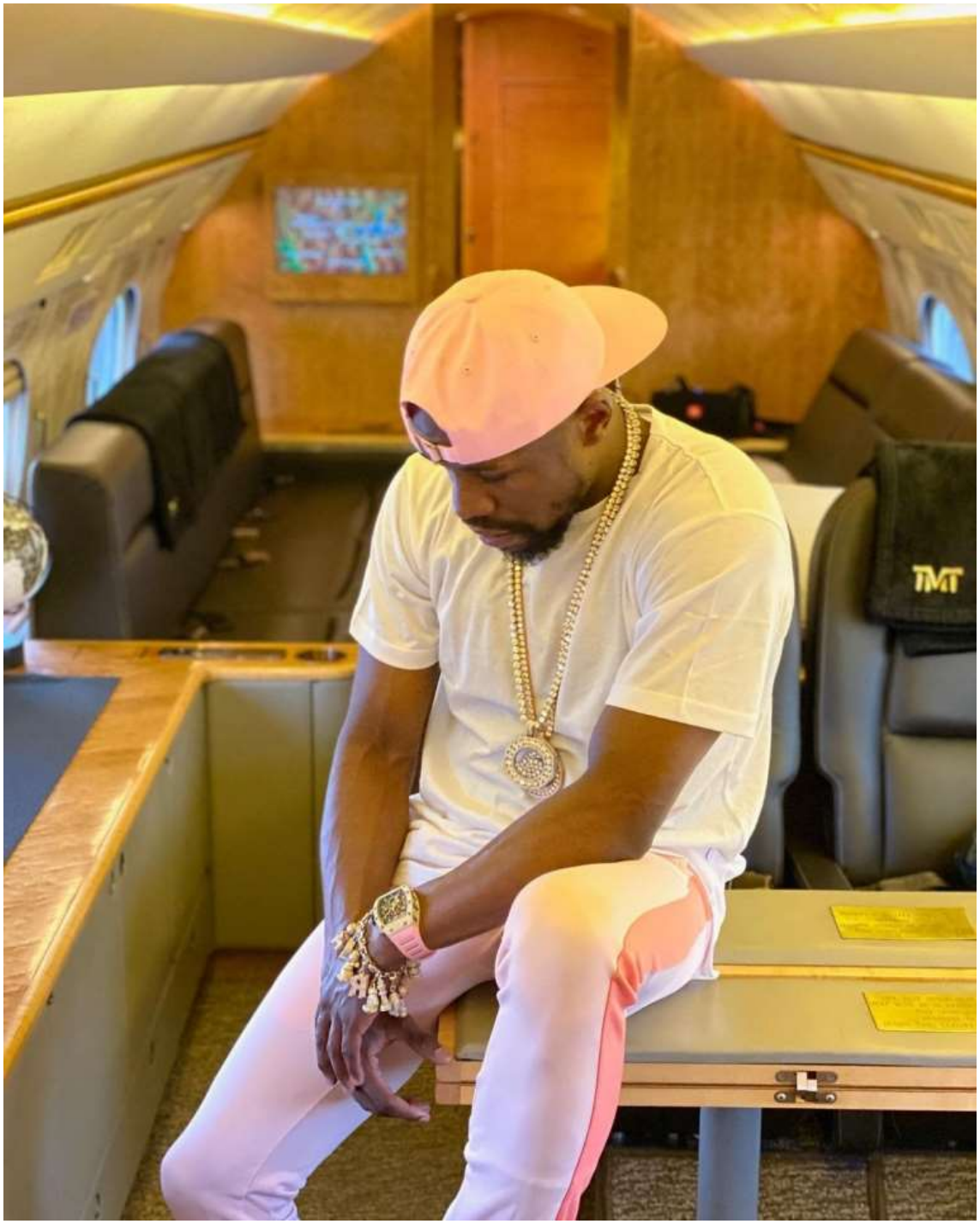
In 2017, Mayweather officially retired (for the third time) with a perfect 50-0 record after beating UFC star Conor McGregor. In 2018, having earned over $1 billion in pay-per-view revenues, he decided to buy himself a 41st birthday present – a Gulfstream 650.



Mayweather certainly lives up to his 'Money' nickname when travelling, having visited places such as Monte Carlo, Hong Kong, Bali, Fiji, and Tokyo among many others. For these trips he has not spared any expense in making them comfortable, with the interior of his Gulfstream G650 jet - dubbed Air Mayweather - boasting luxurious leather seats and even a bed. An in-built entertainment system provides a welcome distraction on long flights and the former multiple weight world champion has been known to get a haircut or massage on board with the help of a masseuse!



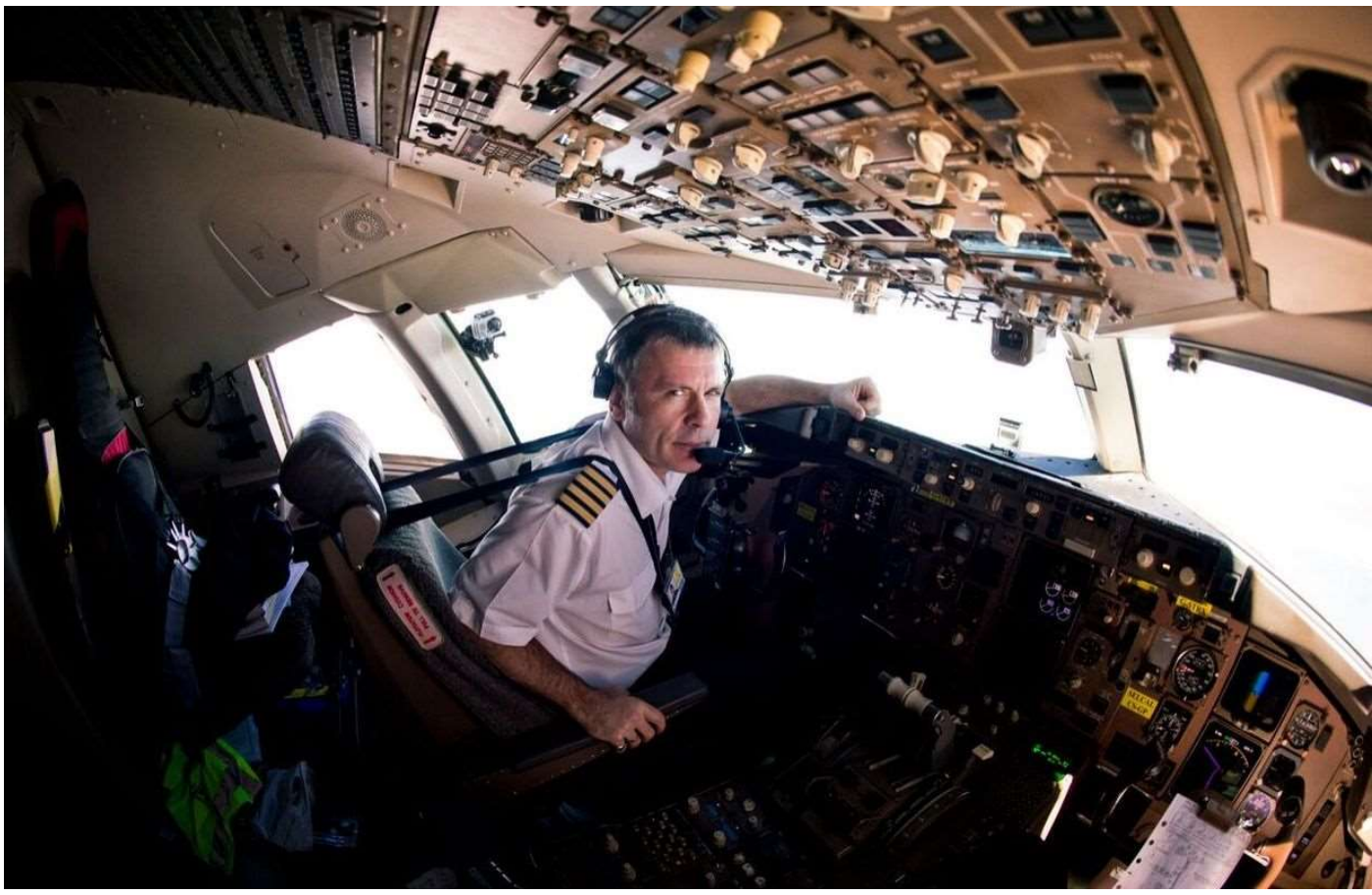
Mayweather has also engaged in high-stakes poker games aboard his jet and loves sharing snaps of it online - its exterior proudly bearing his name alongside 'TBE' (The Best Ever).



To ensure a pleasant environment, fresh air is also pumped into the cabin every two minutes. Although he has retired from professional boxing, Mayweather is still open to fighting in exhibition-style bouts - provided the price is right!

But even the most famous people sometimes need to stretch their wings and try other careers once in a while. You'd assume that Iron Maiden frontman, Bruce Dickinson, wouldn't have much free time in his schedule (considering the band have been touring and releasing albums consistently since 1980) but he achieved another aspirational career path alongside his music – that of commercial pilot.

In 1993, Dickinson made the decision to leave Iron Maiden for a time to concentrate on solo projects. Shortly afterwards, he learned to fly recreationally in Florida but soon found himself bitten by the aviation bug. After accumulating enough hours he achieved the highest level of piloting certification - Airline Transport Pilot license (ATPL) - requiring a minimum of 1,500 hours of flight experience. He even assumed the role of captain for now-defunct charter airline Astraeus, where he flew a Boeing 757.



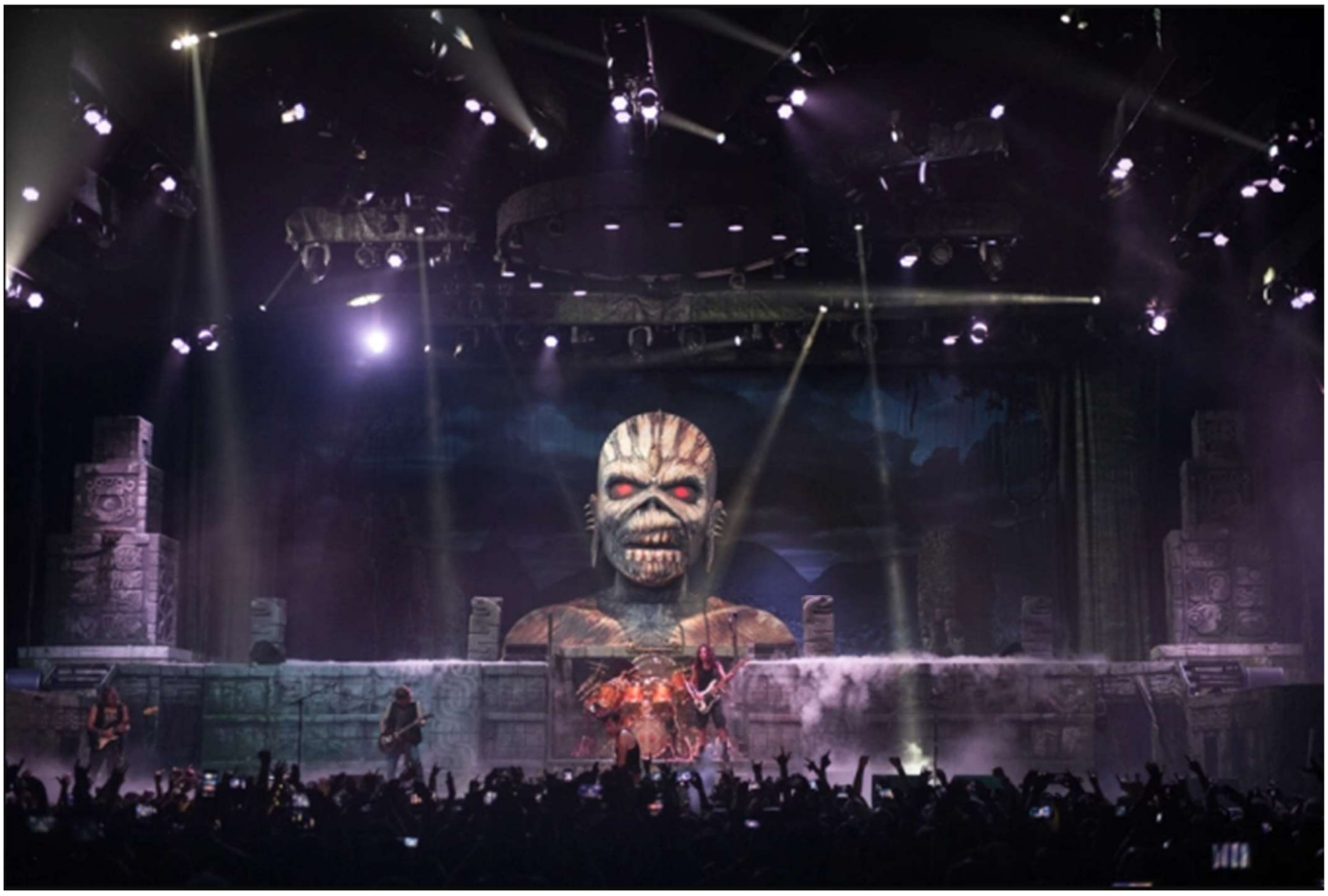
And if that weren't enough, he helped bring back 200 British citizens from Lebanon during the 2006 Israel/Hezbollah conflict, saved 180 tourists stuck in Egypt after XL Airways UK ceased operations in September 2008, and brought home a group of British RAF pilots from Afghanistan the same year. He also found time to become a world-class swordsman – winning two World Championship silver medals and ranking no 5 in the 2000 Olympics. Oh, and he owns his own brewery.

But, most importantly for our story, Dickinson was responsible for flying his Iron Maiden bandmates across the world on the group's tours.

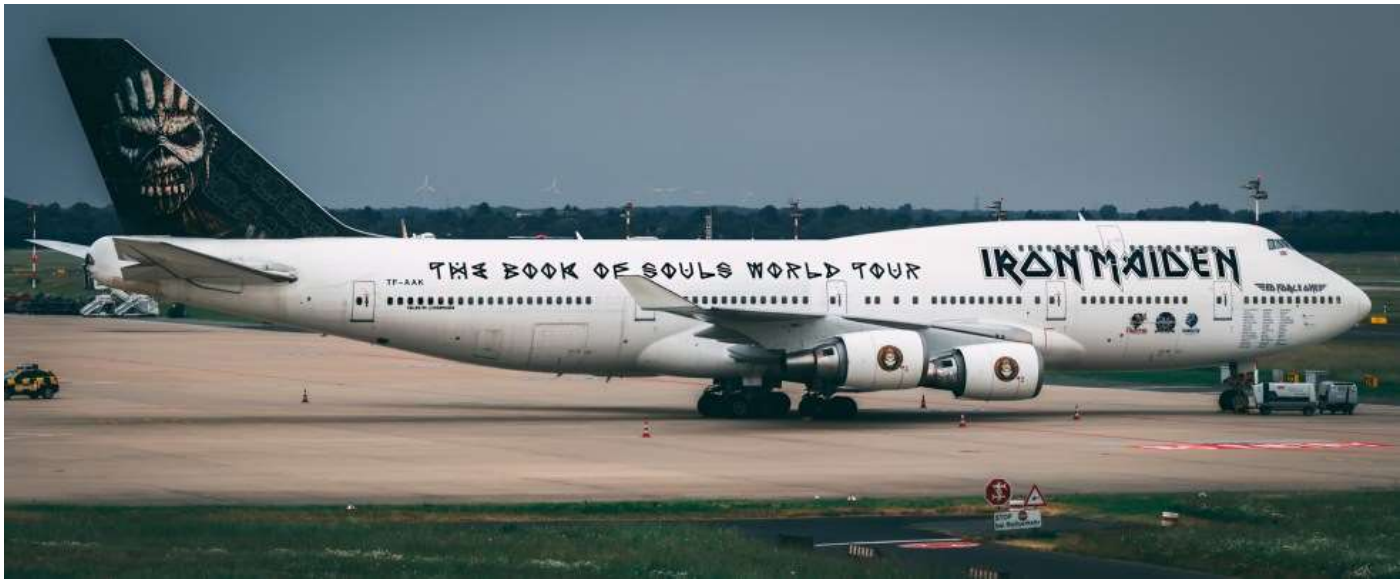
On return from his hiatus, the band began to plan their 2008 tour wanting to reach as many of their fans as possible. However, Iron Maiden are well known for their larger-than-life concerts and elaborate special-effects – all of which requires a huge amount of equipment, scenery, pyrotechnics and costume changes, plus a large team of roadies to make the magic happen. The band were told that it wasn't viable for them to perform in countries like India, Serbia or Colombia and they'd need to either scale back the concert or drop some of the planned locations.

Dickinson came up with a plan: they'd be able to load everything – the band, the scenery, the equipment and all the support staff – onto one large aircraft that he could then fly to concert locations with a reasonable itinerary. The "Somewhere Back in Time" World Tour took off in a customised Boeing 757 dubbed "Ed Force One" with Dickinson in the cockpit. The plan worked and the band visited 87 different locations over the tour, playing to more than 2 million people worldwide, so a second 757 was used for their 2011 tour.

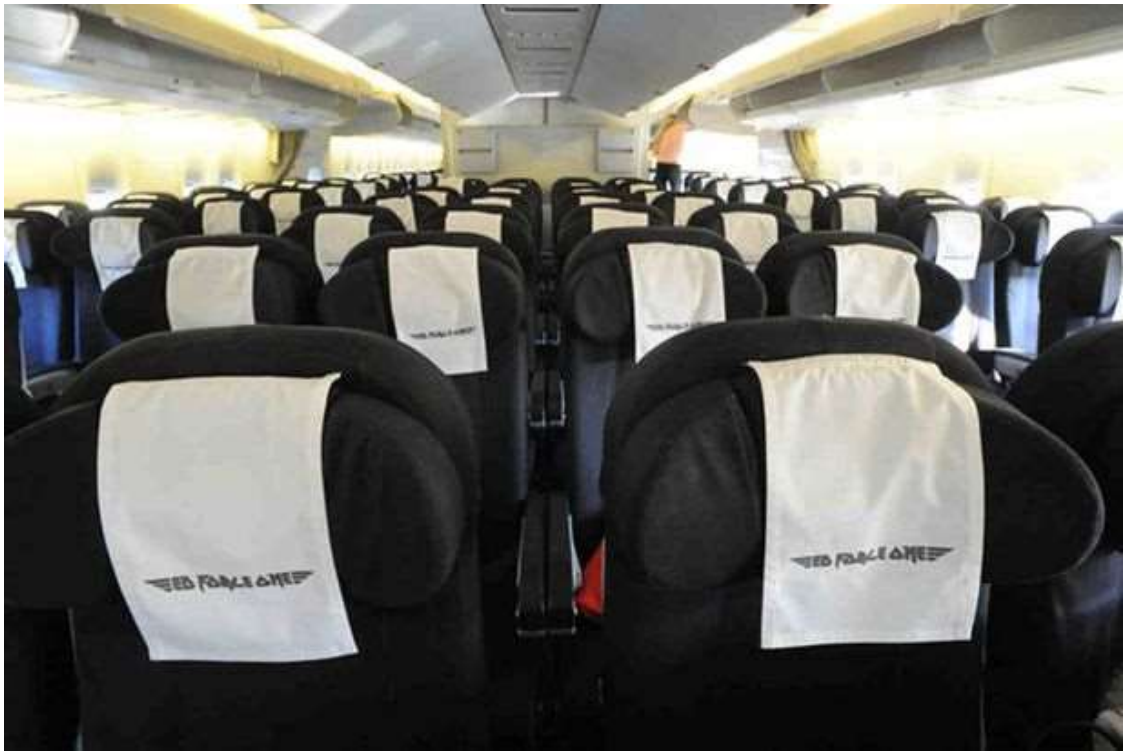
However, their 2016 tour was an even bigger deal. The band wanted the tour to feature one of the loudest sound systems in the world and take their set design to a whole new level.



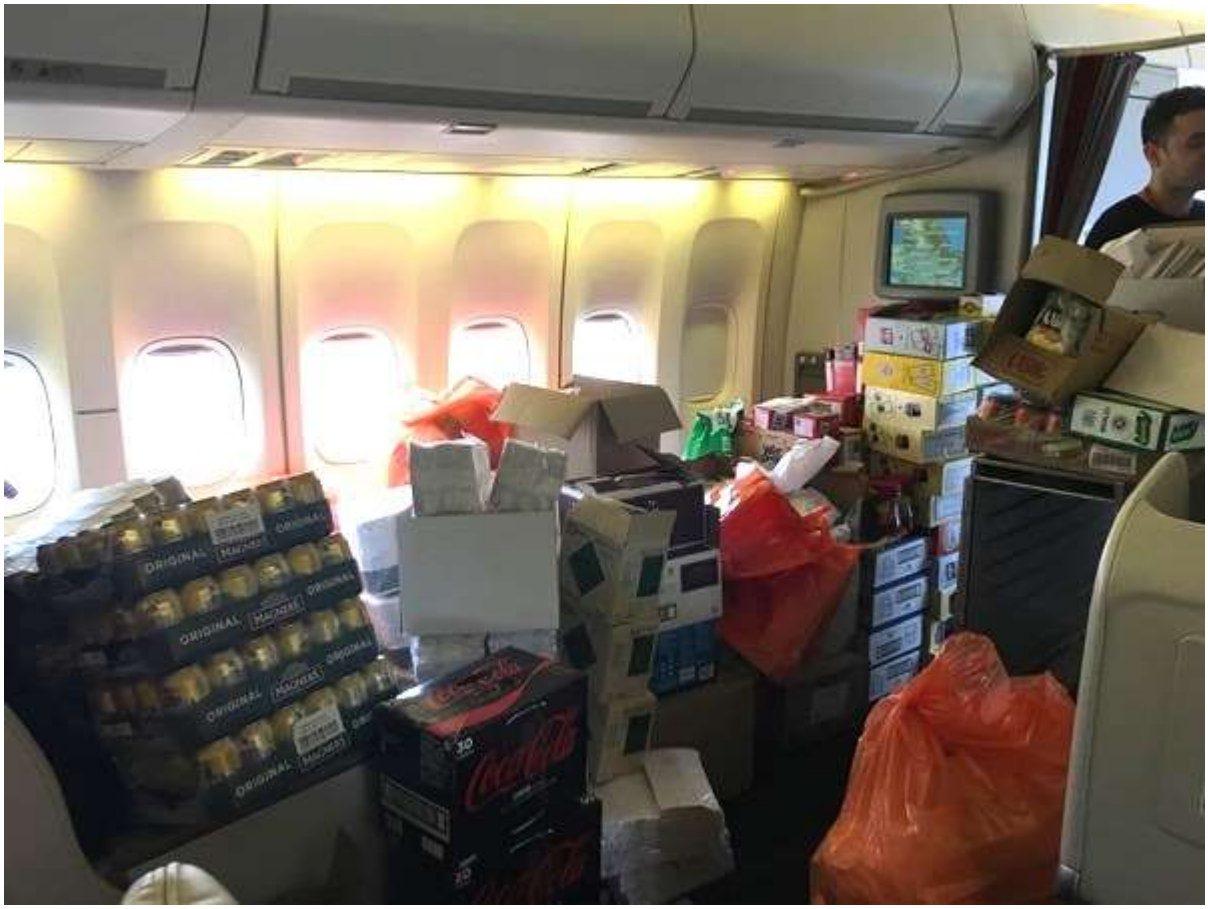
The 757 was too small to transport everything so, in 2015 Bruce Dickinson obtained his ATPL to allow him to pilot a customised Boeing 747-428 became "Ed Force One" – the tour jet for their biggest and most ambitious tour yet.

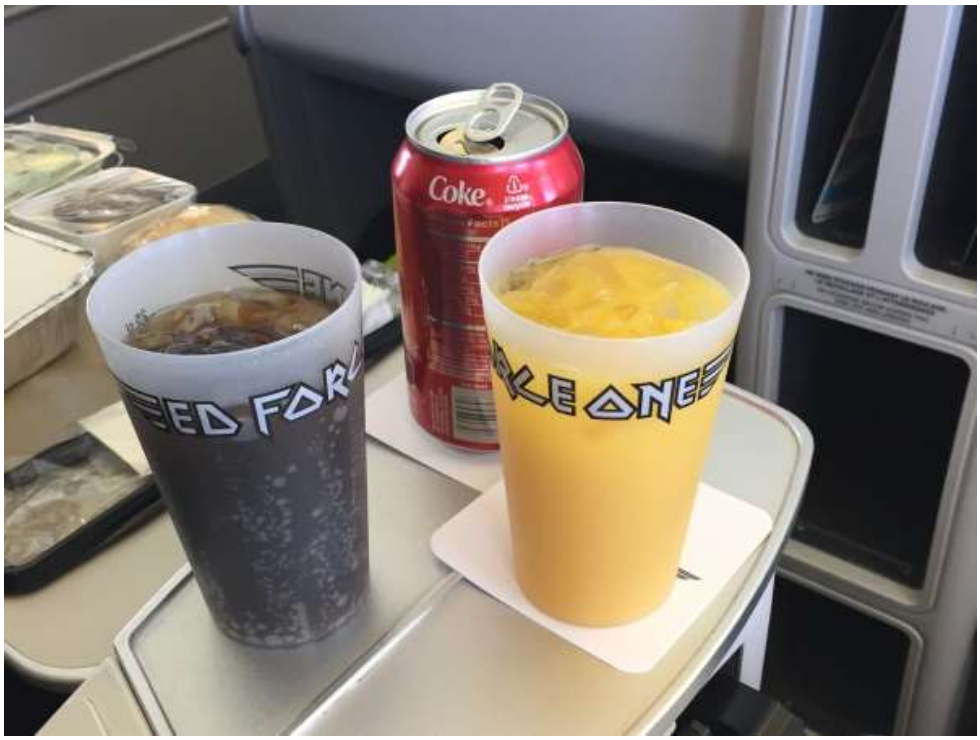


But Ed Force One wasn't a typical party jet – it was designed to carry a lot of people and 20 tons of equipment – meaning that the interior was strictly functional.



The bottom deck consisted of seats for the tour crew with customised head-rest covers and storage space for the supplies, including a large amount of alcohol and branded cups.





The top floor of the 747 was divided up to provide private sleeping areas for the band while all other tour members were able to stretch out across multiple seats.

Here's Bruce Dickinson giving a short tour of the 2016 Ed Force One:

Link: https://youtu.be/nwpvoUYaR9U

The Book of Souls World Tour was extremely well received by the fans who loved the Mayan set designs, the insane pyrotechnics and a 40-foot-tall inflatable Eddie (the band's mascot). Despite the extravagant, over-the-top nature of The Book of Souls, Iron Maiden are still touring, having just finished their Legacy of The Beast Tour in 2022, and currently planning for their 2023 tour "The Future Past", although it doesn't look like the 747-400 will be joining them.

After the Book of Souls tour, the enormous aircraft was leased out to several small private charters – most notably, taking 350 Icelandic football fans to Marseille to watch Iceland play Hungary at the UEFA Cup in 2016, with the 747 still sporting the full Ed Force One Livery. The jet was then operated by Air Atlanta Icelandic until its last flight in April 2022, when it took its final flight to Kemble, UK to await being broken down for parts.

When he was asked about the possibility of piloting again for their (then) upcoming Legacy of the Beast tour, Dickinson said, "Oh, no, no, no, no. We're going to be flying and I'm going to be in the back. Hey, look, I'm 63 — I'm 64 in August. You know, when you get to 65, if you're an airline pilot, they just take you out the back and shoot you, right? So, I'm going to be sitting in the back being the backseat driver."

Even though Iron Maiden may have said goodbye to their tour jets (for now at least) the private aviation industry continues to adapt to ever-changing economic and social pressures, seeing an explosion of activity over the last few years.

With the impact of Covid in 2020 and the rise of social media and ultra-rich influencers private jets have also become far more prominent in the public eye over the last few years. As such, designs are starting to diversify and change based on the owner's requirements - from ultra-luxurious comfort, through to striking aesthetics - all the better to showcase on Instagram. The next part in this series will explore how this has influenced the most recent private jet interior design trends and theorises where this might lead in the future.

Tom Chatfield may be known in the corporate aviation industry as a steadfast expert in completions and refurbishment management, but his true calling is a professional traveler. He is on a continuous journey for 35 years, which gives him immense authority and experience that he incorporates in his day-to-day work. From his early age, Tom wanted to explore aviation. From avionics engineering to aircraft airworthiness, Tom accumulated vast knowledge on design, engineering, fabrication and certification specializing for the ultimate traveler's vehicle, corporate aircraft. Learning everything there is about private aviation, he has started imagining the future - creating exceptional private jet experiences for his clients. He shares his love for the industry, innovating and pushing the barriers of what's possible, delivering the best corporate jet possible, individually tailored to the requirements of ultra-high net worth individuals, corporate and heads of state clientele. Today, Tom is the CEO of Camber Aviation Management, a team of experts that guide and manage corporate jet travelers worldwide. And, with 35 years of experience in aviation and 50+ in professional traveling, one thing is sure, trust Tom. He knows his travels.

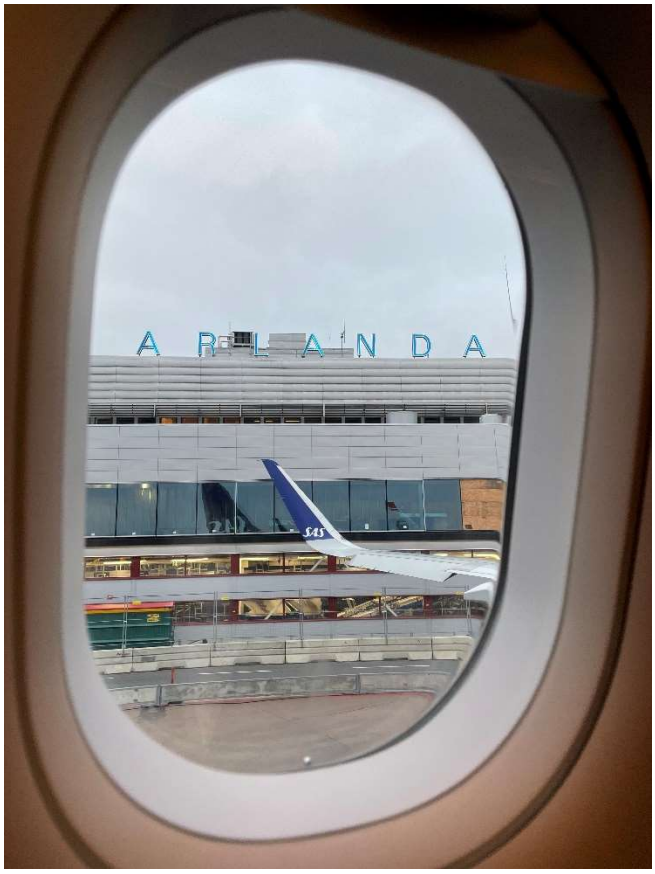
Prepare for Zero-Emissions Aviation

By Fredrik Kämpfe, Director Industry Affairs, Swedish Aviation Industry Group

It's fully known and accepted by the global aviation industry that its infrastructural and operational emissions must come down to net zero, preferably reaching true zero. 2022 has a good chance to be remembered as a landmark year for several decisions to reach that goal.

In June 2017, a broad majority in the Swedish parliament decided on a climate policy framework for Sweden. The Swedish climate goals are far-reaching. Sweden aims to be the first fossil free welfare state in the world by 2045. The target is to achieve net zero emissions of greenhouse gases by 2045 and thereafter negative emissions. Other states and global organizations have since then stepped up their sustainability commitments and programmes but it would seem like Sweden still wears the green jersey.

The air transport sector in Sweden has developed plans and strategies to meet this target. In this article the story of Sweden's commitment for sustainable aviation unfolds. But let's start with a 360-view of the formation of global climate commitment last year.



(Stockholm-Arlanda Airport. Photo: Fredrik Kämpfe)

2022 – a year of setting global sustainability goals for aviation

Although the aviation industry has nurtured climate ambitions for a long time it is fair to say that global commitment on various levels really took-off during 2022

IATA, the global airline body, adopted in October 2021 its goal Fly Net Zero by 2050.

In September 2022 the member states of ICAO the International Civil Aviation Organization agreed the LTAG long-term global aspirational goal for international aviation of net-zero carbon emissions by 2050.

The entire European aviation industry unveiled in October 2022 its flagship sustainability initiative, Destination 2050 – A route to net zero European aviation: all flights within and departing the EU, UK and EFTA realizing net zero CO2 emissions by 2050.

In Europe aviation's emissions will be taken care of within the Fit for 55 package being launched 2022. The ETS political deal struck between the European Parliament and the Council in December 2022 aims to accelerate the implementation of the polluter pays principle by phasing out free allowances for the aviation sector by 2026. The Swedish EU presidency during the first semester of 2023 will try to find political agreement for the Refuel EU Aviation File.

Goals are important, but the magic is in the Making. Thus it's also fully known that reaching these goals rests on further development and implementation of several technologies and fuels. Sustainable aviation fuel (SAF) will play a major role for decarbonization of aviation for quite some time but will increasingly be accompanied by electrification and hydrogen propulsion as well as hybrid solutions mixing those technologies.

Low-emissions is good but zero-emissions better

To advance the prospects of zero-emissions and ensure that air transport in Europe meets Europe's 2050 climate objectives EU launched the Alliance for Zero Emission Aviation (AZEA) in June 2022.[1] AZEA calls on the members of the aviation community to join forces in preparing for the advent of zero emission aircraft.

AZEA aims to prepare the aviation ecosystem for the entry into service of hydrogen- and electric-powered aircraft, to ensure that air transport contributes to Europe's 2050 climate neutrality objective. It will gather representatives of aircraft manufacturers, airlines, airports, energy companies and fuel providers, standardization and certification agencies, passenger and environmental interest groups and regulators.

When AZAE was launched the Commissioner for Innovation, Research, Culture, Education and Youth, Ms Mariya Gabriel, said:

> "I welcome the launch of the Alliance for Zero Emission Aviation, which is an important step to ensure that we can bring our European research and innovation activities on clean aviation to the market. The activities of the Alliance will deliver the framework conditions that will be needed for the successful future deployment of zero emission aircraft in Europe."

[1] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3854

The main objective of AZEA is to prepare the market for the entry into service of zero-emission aircraft.

The novel propulsion technologies used by such aircraft will have a profound impact not only on aircraft design, but also on the fuels and airport infrastructures they require and on the way they are operated. Airline business models may also be affected.

The Alliance will comprehensively identify and prioritize the challenges posed by zero-emission aircraft and propose practical solutions to overcome these.

AZEA has now started working through its six working groups:

WG 1Rollout scenarios
WG 2 Green electricity and hydrogen supply
WG 3 Airports (infrastructure and operations)
WG 4 Aviation regulation (certification, infrastructure and operations)
WG 5 Integration of electric and hydrogen aircraft into European network
WG 6 Incentive mechanisms

The AZEA approach looks very promising but must deliver clear and workable output soon to become relevant.

Alongside AZEA and other EU initiatives the EU Clean Aviation program is a key enabler to develop novel aeronautical solutions that enable growth of a zero-emissions aviation system. Clean Aviation recently presented the 2nd call for proposals with over €350 million to drive aviation towards climate-neutrality by 2050.[2] The call includes over €137 million in EU funding and this will lead up to an overall budget of over €350 million including private contributions.

The focus of the call is innovative fuel systems, more efficient propulsion systems, or novel wing design; these are some of the topics covered in Clean Aviation's. The second call for proposals covers 8 topics in total under the 3 Clean Aviation thrusts, with the following EU funding budget breakdown:

- €65 million EU funding dedicated to hydrogen powered aircraft;
- €32 million EU funding dedicated to hybrid electric regional aircraft;
- €40 million EU funding dedicated to short and medium range aircraft;

In a separate topic, €0.75 million is dedicated to impact monitoring of EU aviation research and innovation. The call for proposals closes on 11 May 2023, 17:00 Brussels time.

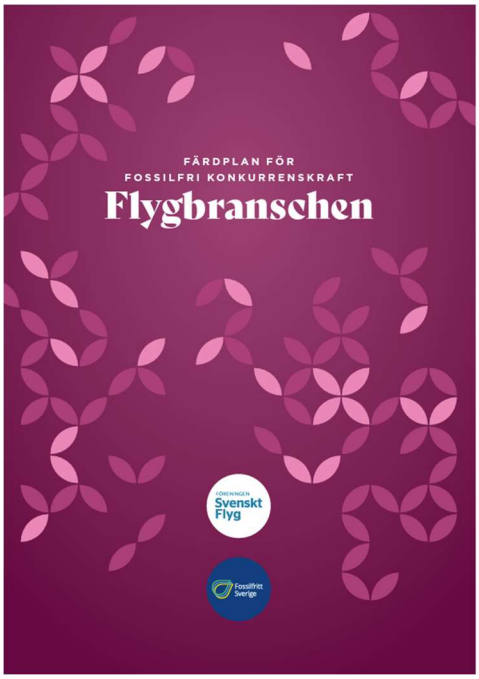
Sweden prepares for zero-emissions aviation

The Swedish aviation scene has since long embraced sustainable aviation with its road map to fossil free aviation by 2045. This road map was presented 2018 to the ministers of environment and infrastructure and contains two main goals:

- 2030: Domestic departures to be fossil free (CO2 emissions from aviation equivalent to domestic flights to be eliminated).

[2] https://www.clean-aviation.eu/clean-aviation-second-call-for-proposals-over-eu350-million-to-drive-aviation-towards-climate

- 2045: Domestic and foreign departures to be fossil free (all flights starting at Swedish airports to be fossil free and thus not to refuel with fossil fuel).[3]



(Cover of the Swedish aviation industry Roadmap to fossil free competitiveness)

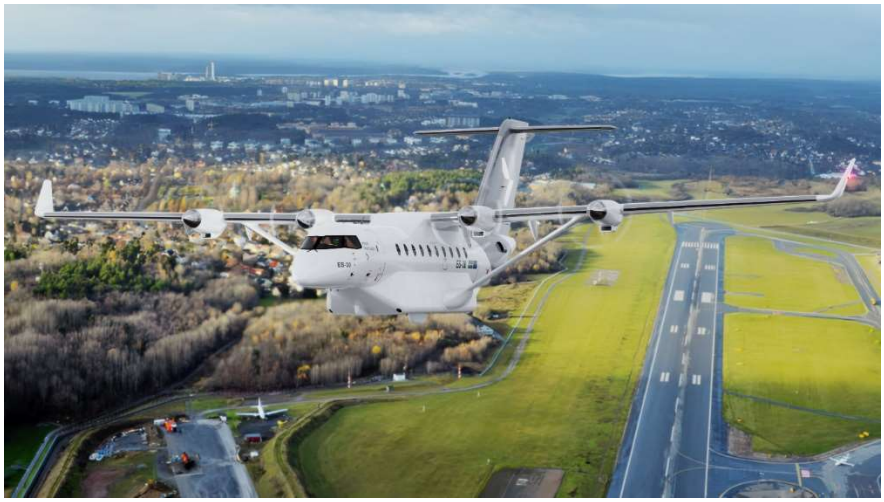
With a great emphasis on sustainable aviation fuel (SAF) the Swedish aviation actors have devoted a lot of resources to support the planned transition to "fossil-freeness".

Braathens Regional Airlines conducted the first flight of a commercial aircraft powered by 100% sustainable aviation fuel in both engines in June 2022, using an ATR 72, as part of certification program to reach 100% SAF in commercial aircraft together with ATR and Neste, and SAS is investing in partnerships with Vattenfall, Shell and LanzaTech to start production of synthetic aviation fuel in Sweden, a project called HySkies which recently was granted 80 million EUR from EU's innovation fund and could be in production by 2027.

The fossil free roadmap which is supported by the entire aviation ecosystem in Sweden stands firmly on increased uptake of sustainable aviation fuel (SAF) as well as fast integration of low- and zero-emitting aircraft powered by electricity and hydrogen.

As a matter of fact, Sweden doesn't only want to fly those low- and zero emitting aircraft but also intends to build them. The fast-growing company Heart Aerospace[4] in Gothenburg is determined to build the first all-electric regional commercial aircraft and have it read for traffic by 2028. The ES30 can carry 30 passengers and luggage 200km all electric and 400km using its two SAF-powered reserve-hybrid turbogenerators. Carrying 25 pax it can even reach 800km, including operational reserves of course.

[3] https://fossilfrittsverige.se/en/roadmap/the-aviation-industry/
[4] https://heartaerospace.com/



(Heart Aerospace ES30 over Stockholm-Bromma airport. Photo: Heart Aerospace)

Heart Aerospace have already some 300 aircraft on orders or options from operators worldwide. United Airlines and Mesa Air Group have 200 aircraft on order and another 100 as option. Air Canada has announced purchase orders for 30 and Swedish aircraft leasing company Rockton has signed letters of intent for another 40. In addition, Air Canada and the veteran Swedish aerospace company Saab have become minority shareholders in Heart, each investing $5 million.

Recently, early February 2022, Air New Zealand selected Heart Aerospace as its partner for the carrier's 'Next Gen Aircraft' mission. The New Zealand airline selected the ES-30 as a suitable replacement for its aging Bombardier Q300 DHC-8 Dash 8, with its first replacements expected by 2030. Air New Zealand has been mulling over the next-gen aircraft, with Heart Aerospace selected alongside Airbus, ATR, Embraer, and Universal Hydrogen.

The entire Swedish aviation system is now gearing up for zero-emissions flight and wants to be ready for early inception of the ES30 and other electric and hydrogen powered aircraft. To that end the government, state administrations, the state-owned airport operator Swedavia as well as the regional airports of Sweden have kicked-off several electrification studies in the past period to find out in more detail what it will take to electrify aviation, especially when it comes to the necessary update of airport infrastructure and power grid capabilities.

Recently the Swedish government decided to invest SEK 15 million per year via the Swedish Transport Administration to quickly get electric aircraft in place in Sweden through research and innovation and through targeted investments to help develop and test technology to electrify aviation. The Swedish Transport Administration is also tasked with investigating the conditions for introducing electric flights on routes with public service obligations. At the press release the minister of infrastructure and housing, Mr Andreas Carlson stated:

> “The Swedish aviation industry is working intensively on electrifying aviation. We are now making a targeted investment to contribute to building knowledge and testing new technology and new solutions. At the same time, the Swedish Transport Administration will investigate how electric flights can become part of the procured air traffic,” says Infrastructure and Housing Minister Andreas Carlson.

Furthermore, several projects have been running in Sweden to pave way for the next era of aviation. For example, ELISE – Electric Aviation in Sweden[5] with the purpose of the project to collect the development and usage of electric aircrafts in Sweden. Heart Aerospace is a spin-off from that project. Another interesting project is ELIS launched in the city of Skellefteå with the ambition of becoming an early adopter of electric aviation and a leading hub in the commercialization of electrified aviation in Sweden and beyond.[6] Yet another important project which was run in the period 2018-2021 is Fossil-Free Aviation 2045 founded by SAS, Swedavia and the Research Institutes of Sweden (RISE) with the aim to "establish and operate an innovation cluster that will manage the process and coordinate value chain stakeholders, from wood to wing, in order to manage the transition to sustainable aviation.[7]

The Nordic countries cooperate for zero-emissions aviation

The quest for zero-emissions aviation if of course not only national but a wider movement. Certainly, in the Nordics the countries have joined forces to speed up accelerate the introduction of electric aviation within the platform Nordic Network for Electric Aviation (NEA). NEA is funded by Nordic Innovation, an organization under the Nordic Council of Ministers.[8] NEA serves to form the platform where Nordic actors come together to accelerate the introduction of electric aviation in the Nordic countries. The project is a collaboration between twelve partners from six Nordic countries. The Nordic countries all have high ambitions to become more environmentally sustainable. January 2019, the Nordic Prime ministers signed the "Declaration on Nordic Carbon Neutrality", committing their countries to strengthen cooperation to attain carbon neutrality domestically. The declaration emphasizes decarbonization of the transport sector.

Organizing the transformation of the aviation system

For the transformation to happen – and to happen fast – cooperation between stakeholders is key. The Swedish Aviation Industry Group (SAIG) is the home of some 90 Swedish companies from the entire aviation ecosystem and contributes to the development by participating in projects, working groups discussions and formation of strategies. With its broad and wide scope of member companies SAIG is also the natural partner and sometimes initiator for new sustainability engagements and initiatives. Fredrik Kämpfe, a former long-term employee of the European Aviation Safety Agency (EASA), is leading SAIGs aeropolitical work since 2018:

> "It is clear that Sweden is well equipped and prepared to tackle the challenges of reaching the sustainability goals of the aviation sector. Within the SAIG family we have some of the most interesting companies engaged in developing technologies and strategies for reaching our goals. Our member airlines SAS and Braathens Regional Airlines are clearly in the forefront of driving technologies and policies for increased production and uptake of SAF as well as early introduction of electric aircraft. Both airlines have by the way signed LOIs for the Heart ES30 aircraft. Furthermore, with Heart Aerospace also in our family

[5] https://www.vinnova.se/en/p/elise---electric-aviation-in-sweden/
[6] https://elisprogram.com/
[7] The final report from this project can be found here: https://www.diva-portal.org/smash/get/diva2:1523447/FULLTEXT01.pdf
[8] https://www.nordicnea.com/

> we have also catered for the next generation of aviation, the zero-emitting flight. I'm very proud to represent companies with such foresighted ambitions for the greening of flight."

To keep abreast with developments, the Swedish Aviation Industry Group is also a member of the EU AZEA and active in WG's 4 and 6.

(Fredrik Kämpfe. Photo: Transportföretagen)

No aircraft will fly without appropriate infrastructure, and one of the challenges of introducing the new generation of zero-emitting aviation is of course to have the ground segment ready by the time the aircraft are ready to fly. With a system still suffering from the consequences of the pandemic, and traffic figures that still are lagging pre-pandemic levels, it will be a challenge to ensure financing of the necessary upgrade to the 'electric age'. Different than electrification of road and rail infrastructure the aviation infrastructure is financed by the system itself and not from tax money. Fredrik believes it is very important that the states now understand the nature and full scope of the challenge ahead and commit to invest also in aviation energy and infrastructure:

> "While the aviation industry is fully willing to commit and invest massively in the green transition this cannot be done without a solid and long-term partnership with governments. When it comes to fuel and energy, it is good and necessary that both individual countries and the EU has committed to actively work for sustainable aviation.
>
> However, I believe the present policies must be accompanied with concrete production goals and funding. For example, we must rapidly increase production of SAF in Europe and I look forward to firm commitments from EU states to share the burden to ensure we reach the common goals. Why not an 'EU SAF production support package' to accompany ICAOs programme ACT-SAF[9]? Especially considering the recent US inflation reduction act I consider it

[9] ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (ICAO ACT-SAF) https://www.icao.int/environmental-protection/Pages/act-saf.aspx

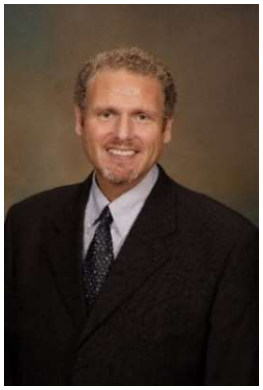
absolutely necessary that European states quickly build up appetite for SAF, as well as for other sustainability technologies.

Furthermore, states should now closely look into the issue of electrification of airports. Since electrification of aviation is part and package of the general strategy to electrify transport, it would be logical that also airports have access to governmental funding mechanisms. That, and more investments in green electricity and a better grid, will form important parts of the next era of aviation: zero-emissions flight."

Fredrik Kämpfe, a Swedish national, worked for several years with the Swedish CAA, first as rulemaking officer, then legal adviser and finally manager for the legal office.
He joined the European Aviation Safety Agency (EASA) in September 2004 as the agency's deputy chief legal adviser and took up the position as manager for the Agreements and External Representation Section in the International Cooperation Department in May 2016 where he stayed until February 2018.
Fredrik came back to Sweden in March 2018 to take up the position as Director Industry Affairs for the Swedish Aviation Industry Group which forms part of the Swedish Confederation of Transport Enterprises.
He is a board member of FlyGreenFund (https://flygreenfund.se/en/) as well as his aviation alma mater the Uppsala Flying Association (https://motor.uppsalaflygklubb.se/).
In addition to his LLM from Uppsala University, where he graduated 1998 with his final thesis EC Air Transport Regulation and the Chicago Convention: a study of possible violations, Fredrik has a second master's degree in International Air and Space Law from the International Institute of Air and Space Law at the University of Leiden (class of 2000/2001); his Leiden thesis looked closely at the procedural and legal feasibility to introduce a truly Global Airworthiness Code and Worldwide Type Certification Process.
Fredrik has also a technical background with an upper secondary school degree in mechanical engineering and Military service as a Battalion Engineer with the Swedish Armed Forces.
He maintains a private pilot licence SE PPL with close to 400 flight hours as pilot in command and has worked several years at Stockholm Arlanda Airport for a ground handling company.
Finally, Fredrik maintains a bus driver's license, diving certificate and is a licensed coastal skipper.
Transport, especially green transport, he says, is part of his life.

Are You Considering Putting your Aircraft on a Part 135 Operator or Program?

By William Mermelstein, Chairman, AMS China



The following is a brief description of the required qualifications that your aircraft must meet to qualify and be put into a Part 135 charter certificate. For a clear and consistent presentation, the focus is on the US FAA regulations. The same situations exist with EASA as well, however some of the regulations are slightly different.

This article is focused on reality, and not a "sales pitch" or promotion of a Part 135 or similar leaseback arrangement. It is designed to give the reader a glimpse of reality into an area that may be of interest, however accurate or direct information may not be readily available. Your aircraft may also not be available to you when you want it, and their can be penalties from the operator to you (the owner) for taking your aircraft off the schedule for your own use.

You should have visibility and understand that there may be a sizeable investment required to bring your aircraft up to Part 135 standards if not currently or previously operated under Part 135.

This list has been edited to provide the details necessary for an owner to be aware of the potential costs and delays in putting their aircraft on a Part 135 certificate.

If you are considering starting your own Part 135 operation, we can provide you more specific information and costs to establish such an entity. However, so you are at least a minimum understanding of the cost and effort to gain a Part 135 Aircraft Operating Certificate (AOC) one can anticipate at least 3 dedicated staff, including experienced post holders, approximately 12-18 months from start to finish, and an investment likely to exceed $150,000 USD at a minimum. Not including legal fees, insurance, office space, etc. if not already included in your flight operation/department. An investment exceeding $250K+ is not at all unusual and can be significantly higher.

While the current market has a huge and growing demand for charter aircraft, the financial results are often not as lucrative as you might be expecting. The cost of maintaining your aircraft to these standards, and the increased requirements, coupled with the need of the operator to make a profit, as well as some potential loss to your own availability of your aircraft can take a big bite out of your anticipated income.

If you are currently paying for aircraft management to others you may be able to save some expense by transferring the operations and management to the Part 135 operator, and they may also supplement or provide your flight crew saving you some of your current flight crew costs and expenses. You should also realize that you and your aircraft may be operated by any number of flight crew members vs. your own dedicated flight crew. So, some loss of convenience and dedication of your flight crew should be expected.

Most operators, especially the most experienced and professional will not allow an owner's aircraft to keep their current crew (prior to Part 135) to remain with the aircraft unless they

work directly for the Part 135 operator to maintain control of the aircraft operations as required by the regulator for the Part 135 operator.

It should also be said that under Part 135 or any commercial regulations you will be exposed to some additional operation restrictions and costs to remain compliant even when you are operating your aircraft for your own non-commercial flights.

Training of crew can be a significant factor to keep in mind as the requirements for Part `135 is much more rigid and depending on the operator may be more frequent as well. The current average annual simulator training for a Part 135 operator is $55 - $65,000 USD per year, per pilot.

Depending on your currently flight operations you may have other options to consider which may be more profitable with much less to no real additional expenses. We can discuss these options with you which may involve “leasing” or “partnering” options with close business associates and does not include charter operations per se, and the related expenses and regulatory hassles.

We will look at and discuss some of these other options in next month’s article.

This list below has been tailored to assumes turbine powered, multi-engine aircraft.

FAA Part 135 - Subpart C - Aircraft and Equipment

§ 135.141 Applicability.

This subpart prescribes aircraft and equipment requirements for operations under this part. The requirements of this subpart are in addition to the aircraft and equipment requirements of part 91 of this chapter. However, this part does not require the duplication of any equipment required by this chapter.

§ 135.143 General requirements.

(a) No person may operate an aircraft under this part unless that aircraft and its equipment meet the applicable regulations of this chapter.

This “equipment” is where some of the added costs may snowball into some added costs and continued increase in maintenance costs by your aircraft being operated under an Aircraft Operating Certificate (AOC) such as Part 135.

§ 135.145 Aircraft proving and validation tests.

(a) No certificate holder may operate an aircraft, other than a turbojet aircraft, for which two pilots are required by this chapter for operations under VFR, if it has not previously proved

such an aircraft in operations under this part in at least 25 hours of proving tests acceptable to the Administrator.

This is an example of some of the additional expenses and regulations which might affect your decision to put your aircraft on an AOC. If your aircraft were to have an hourly operating cost of $5,000 USD this is a $125,000 added surprise which may not have been anticipated or considered into your business case.

§ 135.149 Equipment requirements: General.

No person may operate an aircraft unless it is equipped with -

(c) For turbojet airplanes, in addition to two gyroscopic bank-and-pitch indicators (artificial horizons) for use at the pilot stations, a third indicator that is installed in accordance with the instrument requirements prescribed in § 121.305(j) of this chapter.

(d) [Reserved]

(e) For turbine powered aircraft, any other equipment as the Administrator may require.

While most of the aircraft already meet these requirements, this is an example of regulations that currently exist, and the possibility of changes, additions, and further regulatory requirements in the future which you may be required to comply with and cause additional equipment or upgrades to maintain your aircraft being on an AOC. An example might be a requirement for a more ca[able FDR/CVR system (Black box capabilities) based on new regulations. Or perhaps new avionics or upgrades due to the recent 5G network antenna interference issues. Just be aware that future regulations can come into play and may have a significant impact on costs.

§ 135.150 Public address and crewmember interphone systems.

No person may operate an aircraft having a passenger seating configuration, excluding any pilot seat, of more than 19 unless it is equipped with -

(4) For each required floor-level passenger emergency exit which has an adjacent flight attendant seat, has a microphone which is readily accessible to the seated flight attendant,

except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated flight attendants.

§ 135.151 Cockpit voice recorders.

(a) No person may operate a multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration of six or more and for which two pilots are required by certification or operating rules unless it is equipped with an approved cockpit voice recorder that:

Your aircraft may not meet the specific requirements and parameters required if it was not ordered and built to Part 135 standards at the time of delivery. Delays in equipment and installation can require long-lead scheduling exceeding 3-6 months is typical. (See 135.152 below)

§ 135.152 Flight data recorders.

(a) Except as provided in paragraph (k) of this section, no person may operate under this part a multi-engine, turbine-engine powered airplane or rotorcraft having a passenger seating configuration, excluding any required crewmember seat, of 10 to 19 seats, that was either brought onto the U.S. register after, or was registered outside the United States and added to the operator's U.S. operations specifications after, October 11, 1991, unless it is equipped with one or more approved flight recorders that use a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The parameters specified in either Appendix B or C of this part, as applicable must be recorded within the range, accuracy, resolution, and recording intervals as specified. The recorder shall retain no less than 25 hours of aircraft operation.

Here is a potential for changes in the future which could impose some significant expenses not in anyone’s plans and could add not only expense but significant downtime or lead-time for the components if necessary.

§ 135.165 Communication and navigation equipment: Extended over-water or IFR operations.

(2) The aircraft used in extended over-water operations is equipped with at least two-approved independent navigation systems suitable for navigating the aircraft along the route to be flown within the degree of accuracy required for ATC.

(d) Airplane communication equipment requirements. Except as permitted in paragraph (e) of this section, no person may operate a turbojet airplane having a passenger seat configuration, excluding any pilot seat, of 10 seats or more, or a multiengine airplane in a commuter operation, as defined in part 119 of this chapter, under IFR or in extended over-water operations unless the airplane is equipped with -

(1) At least two independent communication systems necessary under normal operating conditions to fulfill the functions specified in § 121.347(a) of this chapter; and

(2) At least one of the communication systems required by paragraph (d)(1) of this section must have two-way voice communication capability.

(e) IFR or extended over-water communications equipment requirements. A person may operate an aircraft other than that specified in paragraph (d) of this section under IFR or in extended over-water operations if it meets all of the requirements of this section, with the exception that only one communication system transmitter is required for operations other than extended over-water operations.

§ 135.167 Emergency equipment: Extended overwater operations.

(a) Except where the Administrator, by amending the operations specifications of the certificate holder, requires the carriage of all or any specific items of the equipment listed below for any overwater operation, or, upon application of the certificate holder, the Administrator allows deviation for a particular extended overwater operation, no person may operate an aircraft in extended overwater operations unless it carries, installed in conspicuously marked locations easily accessible to the occupants if a ditching occurs, the following equipment:

(1) An approved life preserver equipped with an approved survivor locator light for each occupant of the aircraft. The life preserver must be easily accessible to each seated occupant.

(2) Enough approved life rafts of a rated capacity and buoyancy to accommodate the occupants of the aircraft.

(c) No person may operate an airplane in extended overwater operations unless there is attached to one of the life rafts required by paragraph (a) of this section, an approved survival type emergency locator transmitter. Batteries used in this transmitter must be replaced (or recharged, if the batteries are rechargeable) when the transmitter has been in use for more than 1 cumulative hour, or, when 50 percent of their useful life (or for rechargeable batteries, 50

percent of their useful life of charge) has expired, as established by the transmitter manufacturer under its approval. The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

§ 135.169 Additional airworthiness requirements.

(a) Except for commuter category airplanes, no person may operate a large airplane unless it meets the additional airworthiness requirements of §§ 121.213 through 121.283 and 121.307 of this chapter.

(b) No person may operate a small airplane that has a passenger-seating configuration, excluding pilot seats, of 10 seats or more unless it is type certificated -

(1) In the transport category;

(c) No person may operate a small airplane with a passenger seating configuration, excluding any pilot seat, of 10 seats or more, with a seating configuration greater than the maximum seating configuration used in that type of airplane in operations under this part before August 19, 1977. This paragraph does not apply to -

(1) An airplane that is type certificated in the transport category; or

(2) An airplane that complies with -

(i) Appendix A of this part provided that its passenger seating configuration, excluding pilot seats, does not exceed 19 seats; or

(ii) Special Federal Aviation Regulation No. 41.

(d) Cargo or baggage compartments:

(1) After March 20, 1991, each Class C or D compartment, as defined in § 25.857 of part 25 of this chapter, greater than 200 cubic feet in volume in a transport category airplane type

certificated after January 1, 1958, must have ceiling and sidewall panels which are constructed of:

(i) Glass fiber reinforced resin;

The regulator (CAA Authority) has the ability to make changes to the regulations that can require changes similar to this cargo compartment material requirement. Many of these requirements are based on upgraded design, a result of an accident, or manufacturers changing the design. An extensive example of this was the requirement to install fuel tank inserting systems as a result of the TWA center fuel tank explosion on Flight 800. The average cost was $150K per airliner not including the down time.

§ 135.170 Materials for compartment interiors.

(a) No person may operate an airplane that conforms to an amended or supplemental type certificate issued in accordance with SFAR[1] No. 41 for a maximum certificated takeoff weight in excess of 12,500 pounds unless within one year after issuance of the initial airworthiness certificate under that SFAR, the airplane meets the compartment interior requirements set forth in § 25.853(a) in effect March 6, 1995 (formerly § 25.853 (a), (b), (b-1), (b-2), and (b-3) of this chapter in effect on September 26, 1978).

[1] SFAR stands for Special Federal Aviation Regulation

§ 135.177 Emergency equipment requirements for aircraft having a passenger seating configuration of more than 19 passengers.

§ 135.178 Additional emergency equipment.

The inclusion of AED devices is a good example, and now there is talk of a requirement to add emergency epinephrine autoinjectors (Epi Pens). Many of the required medical kits or supplies have expiration dates that require annual or less replacements, etc. There is also the training and medical equipment annual subscriptions for the kits and equipment and upkeep.

§ 135.179 Inoperable instruments and equipment.

(a) No person may take off an aircraft with inoperable instruments or equipment installed unless the following conditions are met:

(1) An approved Minimum Equipment List exists for that aircraft.

§ 135.180 Traffic Alert and Collision Avoidance System.

§ 135.185 Empty weight and center of gravity: Currency requirement.

(a) No person may operate a multiengine aircraft unless the current empty weight and center of gravity are calculated from values established by actual weighing of the aircraft within the preceding 36 calendar months.

Normally the actual weighing is 60 months, however this is an example of increased maintenance costs for an aircraft operating under and AOC.

It should also be noted that depending on how you negotiate your leaseback to an operator, all additional expenses are billed back to the aircraft owner. And if these items are "included" in the lease by the operator their fees will reflect these expenses. In most cases the operator controls who performs the maintenance and inspections and you are not in the loop other than paying the bills as they come in.

There are sometimes where leasing your aircraft can be a worthy benefit, particularly if you want to have and keep your aircraft but do not fly it enough to justify the costs and letting an aircraft sit is the surest way to have it degrade and lose value. Another example might be if you own your aircraft and do not have (or no longer have) your own flight crew.

However, leasing is not a panacea, and you need to be aware of the costs vs. benefits to make an informed decision as well as avoiding surprise expenses which may not have been made clear or transparent in your decision process.

William Mermelstein has over 45+ years aviation experience, including Senior Management, Commercial Flight Operations, Maintenance, Flight Test, Design, Development and Manufacturing.
A certificated Airframe & Powerplant Mechanic with Inspection Authorization in the US as well as the Kingdom of Saudi Arabia. He previously held OEM authorizations of ODAR and DMIR designations. William has over 20 years in manual development for Part 91, 121, 135, 141/142, 145 & 147 operations, including General Operations Manual (GOM), General

Maintenance Manual (GMM), Safety Management Systems (SMS), Quality Assurance (QA), Quality Control (QC), Hazardous Materials / Dangerous Goods (DG), and Approved Aircraft Inspection Program (AAIP) and course curriculum development, and has authored over 20 such manual systems.

William has served in senior management positions in Part 91, 121, 135, 141/142 and 145 operations over his career, as well as MRO & FBO and commercial fuelling operations. All were direct involvement or management of Operations, Development, Implementation and Oversight. He is a graduate of the FAA Academy in Oklahoma City in Part 145 Certification & Surveillance.

William has significant history with Cessna, Beechcraft and Piper Aircraft, as well as Twin Commander Aircraft, Eclipse Aviation and Adam Aircraft Industries, which he provided for a wide level of experience in Design, Development, Manufacturing and Certification in the primary and advanced materials and processes. He was extended an invitation from the Federal Aviation Administration as a Designated Maintenance Examiner and served over 15 years as a Designated as an Organizational Designated Airworthiness Representative (ODAR), and a Designated Manufacturing Inspection Representative (DMIR).

He is an accredited Aviation Lead Auditor, IBAC/IS-BAO auditor. Mr. Mermelstein holds an associate degree from the Spartan School of Aeronautics in 1981, as well as an extensive list of OEMs, Flight Safety, and the FAA.

William served several years on the Executive Board of the Gulf Flight Safety Council, as served two terms as Deputy Chairman of the Board.

William now lives in Chengdu City in Sichuan Provence and his in charge of our new charter airline operations in China.

