#ISSUE 22

THE Aviator AFRICA

Your Number One Source of Aviation News in Africa March, 2024

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Contents

CHIEF EXECUTIVE OFFICER
Ssemawere Oscar
Email: ceo@theaviator. co.ug

EDITOR-IN-CHIEF
Vincent Mwesigye Mupenzi
Email: v.mupenzi@theaviator.co.ug

EDITORIAL & PHOTOGRAPHIC CONSULTANTS
Ssemawere Oscar, Daniel Bakalangudde,
Vincent Mwesigye Mupenzi

AFRICA CORRESPONDENTS
Paul Mwangi - East Africa
Evans Kimani - East Africa
Harriet James - East Africa

DESIGN & LAYOUT
Daniel Bakalangudde
B.Daniel@theaviator.co.ug

CREDITS
- Astral Aviation
- IATA
- Cellumation
- GE, Roll Royce, Pratt & Whitney
- Bombardier
- EDGE Group

Advertising and Editorial Equiries

+256 393 515 148
info@theaviator.co.ug
www.theaviator.co.ug
The Aviator Africa
@theaviatorafrica
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The Aviator Africa

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FROM THE PEARL

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Headquarters:
Plot 24B, Lugard Avenue, Entebbe, Uganda
Tel:+256 763 001 284

Entebbe International Airport

Office No. PTB. 115, 2nd Fllor,
Passenger Terminal Building
P. O. Box 178, Entebbe, Uganda
Tel: +256 393 515 148
Entebbe International Airport Direct line +256 312-352 000 - Ext: 3072

Email:

info@entebbeairways.com
admin@entebbeairways.com

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NIGERIAN AIR FORCE AT 60:

Leveraging Strategic Partnerships in Aerospace Innovations for Regional Security

Chief of the Air force Staff of Nigerian Air force Air Marshal Hb Abubakar

The Chief of the Air force Staff of Nigerian Air force Air Marshal Hb Abubakar on behalf of officers, airmen/airwomen and civilian staff of Nigerian Air Force warmly welcomes all Participants to the Third Edition of the African Air Forces Forum. This year's edition coincides with the momentous Sixtieth Anniversary celebration of the Nigerian Air Force. These historic events will attract several Chiefs of Air Staff and many aerospace industry leaders from across the world.

The Conference and Exhibition of the Third Air Forces Forum will hold in Abuja, Nigeria from 23 to 24 May 2024 while the Ceremonial Parade and Air Show will take place in Kaduna, Nigeria on 25 May 2024. To you our dear guests, we are highly delighted to host you.

The theme, "Nigerian Air Force at 60: Leveraging Strategic Partnerships in Aerospace Innovations for Regional Security" was carefully selected to afford us the opportunity to collaborate and tap into the innovation potentials of the ever-evolving aerospace industry for enhanced national and regional security.

The Third Edition of the African Air Force Forum will feature conference, discussions and International exhibition that will showcase the latest equipment and solutions that will contribute to enhanced security in the continent. The event will also feature multidisciplinary discussions and aviation demonstrations, which makes it one of the foremost gatherings of air forces, aviation authorities and key solution providers in Africa.

Event Overview

Following the huge success of the first two editions, 3rd Africa Air Force Forum returns on the 23 – 25 May 2024 in Nigeria, hosted by the Nigerian Air Force. This edition of the Forum coincides with the Nigerian Air Force (NAF) 60th anniversary celebrations and will honor its history and accomplishments.

This milestone stands as a tribute to the commitment of the air force in safeguarding Nigeria's sovereignty, ensuring national security, and contributing to peacekeeping missions both regionally and globally.

This edition of the forum is hosted under the theme Nigerian Air Force at 60: Leveraging Strategic Partnerships in Aerospace Innovations for Regional Security; and shall highlight the continuous advancement of air force capabilities, technological innovations, and strategic developments that contribute to enhancing Africa's aerial defense and peacekeeping capabilities.

The forum will emphasize on the importance of unity and collaboration among African nations in leveraging airpower capabilities to promote stability and to shape the development of air forces on the continent more broadly.

The forum serves as a regional platform for advancing air force capabilities and building pillars of bilateral partnerships. With the key motive of accelerating air force superiority. The forum brings you a variety of discussions on the prospects of air power in Africa, its impact on internal security operations. importance of air force in counter-terror operations, along with a showcase of key technology capabilities required to optimize every mission.

The forum will feature Africa's key Air Force Chiefs and top leadership, International and regional industry experts and government officials to explore avenues for strengthening air-power capacities, fostering cooperation, and addressing common security challenges for the betterment of the entire African region.

IN THE NEWS

Kenya Airways resumes nonstop flights to Mogadishu

Kenya's Flag career, Kenya Airways has resumed nonstop flights to Mogadishu, Somalia signaling a milestone in regional air connectivity. The initial suspension of the route was due to Covid19 pandemic.

The flight plan will ensure that Kenya Airways flys three times weekly to Mogadishu, Somalia operating from terminal 2 at Kenya's Jomo Kenyatta International Airport.

Kenya Airways had initially launched flights to Mogadishu in December 2018 but had to suspend the route due to the pandemic. In August 2023, bilateral air services agreement between Kenya and Somalia were signed paving the way for direct flights to resume highlighting the significance of this development.

Airway's Group Managing Director and CEO, Allan Kilavuka noted that the introduction of three time's weekly flights will undoubtedly enhance trade and economic opportunities between our connected regions, stimulate tourism, and strengthen cultural and social ties.

Group CEO went ahead to note in his statement that apart from passenger services, the recently acquired B737-800 Freighter has started ferrying cargo directly between Sharjah and Mogadishu with a weekly flight and plans to increase this to twice weekly by April 2024.

RwandAir
Fly the dream of Africa

Suspends Mumbai Flights

RwandAir, Rwanda's national flag carrier has suspended Mumbai flights effective 15th of March 2024, in a statement issued by the airline on its social media platforms in line with its continuous service improvement strategy.

In the statement, passengers holding RwandAir tickets after this date were advised to contact the airline or their preferred travel agents for refunds or rebooking options.

Commenting on why the national carrier plans flight suspension to India's most populous city, RwandAir 's acting Chief Commercial Officer (CCO) Andrew Best Owie told Rwanda's leading daily, The New Times that: "RwandAir started this route seven years ago, and has continuously sought new ways to improve on its service delivery on the route.

"Hence, the need to source and deploy the right product to serve our esteemed passengers on the route has necessitated our action for now.

Our present constraint to operate a non-stop flight to India is a major challenge which the airline hope to resolve in the nearest future with the right product in place."

Rwandair operates domestic and international services to East Africa, Central Africa, West Africa, Southern Africa, Europe, the Middle East and Asia, from its main base at Kigali International Airport in Kigali.

Ethiopian Airlines honored with Ethiopian Institutional Achievement Award

The Award was presented to Ethiopian Group CEO, Mr. Mesfin Tasew by His Excellency the Prime Minister of Ethiopia Dr. Abiy Ahmed.

Ethiopian Airlines Group, the national flag carrier of Ethiopia, is proud to announce that it has been honored with the prestigious 'Ethiopian Institutional Achievement Award' today by the Federal Government of Ethiopia. The Award was given by His Excellency Prime Minister Dr. Abiy Ahmed and was conferred to Ethiopian Group CEO, Mr. Mesfin Tasew.

Group CEO of Ethiopian Airlines, Mr. Mesfin Tasew, reaffirmed the airline's dedication to maintaining its status as a leader in the aviation industry saying, "The Award is a testament to the relentless dedication and hard work of all Ethiopian Airlines employees who have worked tirelessly day and night.

This accolade is dedicated to every member of our staff, whose commitment has propelled us to new heights of operational excellence and customer service. It is also a salute to the unwavering commitment and industriousness of every Ethiopian Airlines employee, whose collective efforts have ensured operational continuity and excellence even amidst the most challenging times."

Ethiopian Airlines extends its heartfelt gratitude to the government of Ethiopia for this honor and reaffirms its commitment to serving the people of Ethiopia and its passengers worldwide with even greater dedication.

Among others, Ethiopian Airlines is a global award winner including Skytrax 'Best African Airline' for six years in a row.

Niagara Helicopters renews fleet with order for six Airbus H130 Helicopters

Niagara Helicopters has placed an order for six H130 helicopters, confirming a full fleet renewal for the tourism company based in Niagara Falls, Ontario. Each year, the company welcomes more than 100,000 customers from all over the world, providing a nine minute, 27 kilometre sightseeing tour over Niagara Falls.

"In order to continue to deliver a first-class visitor experience, we felt it was time to upgrade our aircraft," says Denis Pilon, Chief Operating Officer for Niagara Helicopters. "After nearly 10 years of working with Airbus Helicopters, we are confident that the H130 continues to be the ideal aircraft for our operation. We are pleased to be working with the Airbus team again. We look forward to many more years of cooperation and collaboration."

"We're honoured that Niagara Helicopters has once again put their trust in Airbus, as they work to deliver exceptional experiences for visitors to the Niagara region," says Dwayne Charette, President and COO of Airbus Helicopters in Canada. "They are an esteemed partner and we are delighted they have chosen Airbus as their exclusive helicopter provider since 2015."

The aircraft of choice for tourism, the H130 has a wide, unobstructed cabin which accommodates the pilot and up to seven passengers, providing outstanding visibility through a large wrap-around windscreen and wide windows. Its state-of-the-art technologies, materials, systems and avionics make it a quiet and powerful helicopter.

A single-engine helicopter, the H130 is known for its widespread use with sightseeing services, charter operators and emergency medical services.

Flynas takes delivery of two new A320neo Aircraft

Flynas, Saudi Arabia's privately owned low-cost airline has received two new A320neo aircraft to help enhance its operations.

The airline has also increased its seat capacity during the month of Ramadan this year by 25% to more than 1.2 million seats compared to the same period last year, to meet the demand for flights during the holy month.

The two A320neo arrived at King Khalid International Airport in Riyadh on March 07 and March 14, increasing the share of this modern aircraft in flynas fleet. Six A320neo new aircraft in total are scheduled to be delivered to flynas during 2024
Meanwhile, flynas has increased seat capacity on its flights during the month of Ramadan for the year 2024 by 25% to 1.2 million seats for the international and domestic flights compared to the same period last year, enhancing the leading LCC's ability to provide diversified offerings and an outstanding travel experience to its guests of the Umrah performers and visitors of the Kingdom of Saudi Arabia during the holy month.

This growth in the new aircraft and increasing the seat capacity comes within its strategic plan launched under the title (We Connect the World to the Kingdom), in parallel with the objectives of the Pilgrims Experience Program (PEP) to facilitate access to the Two Holy Mosques and the National Civil Aviation Strategy to enable national air carriers to contribute to connecting KSA with 250 International destinations and to accommodate 330 million passengers and to host 100 million tourists yearly by 2030.

Flynas is the first low-cost airline in Saudi Arabia.
The company's headquarter is located in Riyadh. It operates more than 1,500 flights per week to more than 70 domestic and international destinations in the Middle East, Asia, Europe and Africa.

Riyadh Air celebrates historic first year anniversary

Saudi Arabia's second flag carrier Riyadh Air, is celebrating its first year anniversary following its inauguration on 12th march 2023.
During its first year in operation Riyadh Air, which is set to fly to 100 countries by 2030, dominated industry conversations signing major agreements and partnerships with partners, both in Saudi Arabia and around the world.

Riyadh Air's first anniversary comes as the airline is accelerating its journey to take off in 2025, and as it aims to become the world's most forward-thinking carrier, embracing the best sustainability practices., elevating air travel and setting a new standard for reliability, comfort, and hospitality.

As a catalyst for the National Transport and Logistics Strategy and National Tourism Strategy Riyadh Air is playing a key role in contributing to Saudi Arabia's wider economic diversification and jobs creation, toward realizing Vision 2030 goals, while contributing to KSA's non-oil GDP growth by USD 20 billion and directly and indirectly creating over 200,000 new jobs globally and locally.

Looking back on a colossal first year CEO Tony Douglas said: "2023 was a monumental year for Riyadh Air and we're immensely proud of the progress we've made in the last 12 months as we celebrate our first anniversary - but we're only just getting started.

This year is set to be an even bigger one for us and we can't wait to reveal more as we continue to accelerate towards our maiden flight in 2025, as we become the most forward-thinking carrier in the skies."
The CEO in his statement thanked his, stakeholders and team for supporting the airline in its vision to disrupt the aviation industry and delivering an airline experience like no other.

AFRICA'S ONLY ALL CARGO PLANE RISE TO FAME

By Evans Kimani

Astral Aviation is a licensed cargo airline that acquired its Air Operators Certificate (AoC) and Air Service License (ASL) from the Kenya Civil Aviation Authority in 2001, and subsequently designated as a cargo airline, by the Ministry of Transport of the Republic of Kenya in November 2006.

Flying the blue skies of Africa for 23 years, Astral Aviation provides reliable and cost-effective airfreight solutions using a combination of schedule and charter flights within its Intra-African, Middle East, Asian and European Network.

Astral operates a fleet of F50 (7 tons), DC9F (15 tons), B727-200F (22 tons), B757F (30 Tons) and B767-200F (42 Tons) within its Intra-African, Middle East, Asian and European network.
Within its intra-African network, which comprises of 50 destinations, Astral operates a combination of scheduled and adhoc charters along with value-added leasing services. Its interline agreements with over 30 Interline Partners; along with preferential agreements with the leading global and local freight forwarders; and partnerships with over 25 global GSA's, facilitate the consolidation of cargoes at the freighter-friendly Jomo Kenyatta International Airport, Dubai, Johannesburg and Liege Airport.

Astral Aviation is a member of:-

- African Airlines Association (AFRAA)
- The International Air Cargo Association (TIACA)
- Kenya Association of Air Operators
- Kenya Private Sector Alliance (KEPSA)
- Kenya National Chamber of Commerce & Industry (KNCCI)
- Neutral Air Partner (NAP)
- IATA ICH (Non-Airline Member)
- American Chamber of Commerce – Kenya
- Pharma-Aero
- Humanitarian Logistics Association

- British Chamber of Commerce Kenya (BCCK)
- International Stability Operations Association (ISOA)

Astral Aviation has been a recipient of International Award in Excellence in Air Cargo, African Carrier of the Year in 2011, 2013, 2015, 2017 & 2019 by Stat Times.

Fleet:

- McDonnell Douglas DC-9-30CF
- Boeing 767-200F
- Boeing 757-200F
- Interline partners
- Air France Cargo
- Singapore Airlines Cargo
- Emirates
- Coyne Airways
- Saudia Cargo
- Kenya Airways
- Ethiopian Airways
- Qatar airways
- British Airways
- Lufthansa Cargo
- Turkish Cargo
- South Africa Airways cargo
- China southern Airlines
- Cargolux
- RwandAir
- Etihad cargo
- Egyptair
- Air Tanzania
- DHL Aviation
- Air India
- FlyDubai
- Lynden International
- Silkway West Airlines
- Oman Air
- FeDex
- Airlink

Products;

Astral Express;

- Premium air-cargo product for urgent and time-sensitive shipments to the Astral network.
- A guaranteed-uplift service based on the highest priority to give you an assured and reliable delivery to your destination airport.
- Late booking and acceptance in the NBO hub (subject to customs clearance).
- Personalized handling by Astral staff and Flight Manager at origin and destination.
- First – Out Service which allows expedited delivery at destination airport.
- No weight restrictions.
- SMS Confirmation of delivery.

Astral Protect

- Value-added product suitable for shipments such as mobile phones, computers, bank-notes, precious metals and gemstones (legitimate), election materials and telecom-cards, which require a higher level of security and attention.
- Late acceptance at NBO hub
- Specialized storage area at NBO hub
- Security escort to the flight
- SMS Confirmation of delivery

Astral Pharma;

- Highly reliable service for time / temperature sensitive pharmaceutical and life- science products on the Astral network
- Special handling at NBO hub
- Late acceptance in the NBO hub
- Guaranteed-uplift service based on high priority
- Suitable for vaccines and all types of pharmaceuticals
- SMS Confirmation of delivery

Astral DGR;

- Specialized product to cater for dangerous goods shipment
- Expert acceptance, handling and loading by qualified DGR personnel in accordance with IATA Regulations
- Astral Fresh
- A complimentary service for the carriage of perishables such as Cut Flowers, Fresh Fruits, Vegetables, Meat and Fish
- Specialized handling of perishables in NBO hub
- Cool-chain care

Awards

The airline has won the "Africa All-Cargo Carrier of the Year" six consecutive times in 2011, 2013, 2015, 2017, 2019 and 2023, and the "Best All-Cargo Airline in Africa" in February 2023, by STAT Times International Award for Excellence in Air Cargo during Air Cargo Africa 2023 event held at Johannesburg, South Africa, from 21–23 February 2023.

HIGHLIGHTS AFRICA'S POTENTIAL FOR GROWTH

By Evans Kimani

Willie Welsh, IATAs Director General highlighted Africa's Potential for growth during his address at the 2024 Changi Aviation summit in Singapore.

During his address, he noted that the progress and recovery of the industry continued strongly during 2023. Full year 2023 was at just over 94% of where the industry was in 2019. And that consisted of very strong performance in domestic markets, almost 4% ahead of 2019, with international markets lagging at just over 88%.

Looking forward, IATA estimates that over the next 20 years, the industry will grow at about 3.3% per annum. That is significantly lower than the growth witnessed during 2010 to 2019. But it does reflect some of the challenges that IATA as an industry is facing and will face going into the future.

Some of the Industry's growth hindrances

- Infrastructure constraints both in the air and

Mr. Welsh, IATAs Director General

"Now if we look at this region, the situation was slightly less than that, overall at 86% of where the region was in 2019. The strong performance in domestic markets over 2% ahead, but international travel in the region still lagged behind at about 73% of 2019. It is important to point out that there was a strong recovery as we went through the year, moving from about 57% in January to almost 83% in December".

on the ground.
- Supply chain issues which have now been a feature of the industry for a number of years and are likely to continue for a few more years
- The delay and delivery of new aircraft
- Problems in relation to engines
- Labour shortages in some parts of the world
- Significantly the cost impact of Industry's transition to net zero in 2050.

IATA looks at six major geographic regions when assessing economic performance, and these are reported on a monthly basis. That's Africa, Asia-Pacific, Europe, Latin America, Middle East and North America.

In 1990, African airlines contributed 2.2% of global aviation. Asia-Pacific carriers were 19.7%, Europe 28%, Latin America and Caribbean 5.4%, Middle East carriers 2.4% and a lot has been written about what has happened in the Middle East. But significantly North American carriers 42% of the global markets.

Now rolling forward and looking at 2019, Africa continued to be at 2.1%. But significant growth in the Asia-Pacific region, reaching almost 35% of the global market in 2019 was seen. Europe remained pretty static at 27%, Latin America 5%, the Middle East has grown from 2.4% to 9.1%, and North American carriers had reduced from 42% to just over 22%.

The figures for 2023 are broadly similar. Asia Pacific, reflecting the fact that the recovery has been slightly slower in international markets at about 32%.

It is disappointing for the industry to reflect on the fact that Africa remains in the doldrums at just over 2%. The potential for growth in Africa is huge. But there has to be change to enable consumers in the African region to take advantage of the opportunities that aviation provides.

The Aviation industry is absolutely committed to achieving net zero CO2 in 2050. The industry cannot fail or falter in efforts to achieve that goal. It is absolutely essential that the industry works together to ensure that it can credibly provide people with confidence that have a pathway to decarbonize the industry.

Looking at the CO2 produced by the industry in 2000, and compare that to what was done in 2019 just before the pandemic, the CO2 footprint increased by almost 54%. But during that same period, passenger traffic grew by 175%. So, there is complete disconnect between passenger growth and C02 growth. It's confident to say that with the measures put in place, with the advances in new technology, there are opportunities for the industry to address this critical issue.

The industry has shown strong demand for this product. Every single drop of sustainable aviation fuel that has been produced has been used by the industry. In 2020, 2021, 2022, during the height of the pandemic, the industry continued to invest in this expensive product.

There's need to see governments providing the incentive for production to significantly increase and with that increase in production, It's guaranteed that the airlines will use all of the fuel produced despite the cost impact that will represent.

Technology, labour issues, all of these are fascinating opportunities for the industry going forward. But looking at the future of this industry, there's confidence that the industry can overcome all of the challenges that it's likely to face.

We can take confidence in our ability to overcome some significant challenges in recent times. Working together, with the right policy frameworks in place from governments, the industry has a very credible path to achieving all of the necessary measures to ensure the much needed net zero target.

The independence of Africa's air transport since colonial times

By Namukasa Joan
joannamukasa2015@gmail.com

Until the period of independence, air service in Africa was operated largely by airlines based in Europe and the United States, or by colonial governments. As new nations attained their independence, the establishment of national airlines soon followed.

These airlines served important functions in connecting regions underserved by rail and road infrastructure with the transport of people and goods. Equally as important, they served as symbols of national identity, economic expansion, modernity, technological advancement, and a place on the world stage, carrying the flags of newly independent nations within their borders and abroad.

Before the 1960s

Commercial passenger aviation was introduced in Africa in the 1920s, with European Operators Air France, Imperial Airways, and Deutsche Lufthansa. The earliest passenger airlines were established in Africa in the 1930s with South African Airways, and in the 1940s with Ethiopian Airlines, Liberian National Airways, and Egypt's national airline, Misrair.

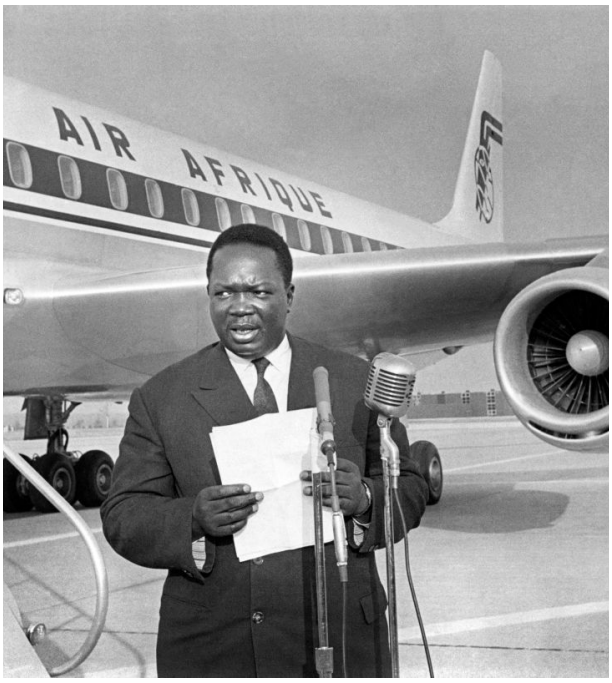
However, through the 1950s and into the 1960s, much of the African continent continued to be served by operators from overseas, including British Overseas Airways Corporation (BOAC), Sabena Belgian Airlines, Pan Am, and Trans-World Airlines (TWA). In some cases, European colonial governments formed multinational airline operators including Central African Airways, East African Airways, and West African Airways corporations.

Independent Airlines

The establishment of national airlines went hand-in-hand with independence in many cases, with new nations creating national airlines within their first year of becoming independent, or shortly thereafter. Initially, this was in partnership with international carriers from Europe and North America including BOAC, Pan Am, and TWA, who provided funding and consulting support.

National Pride

Following independence in 1957, Ghana withdrew from the former West African Airways Corporation and established Ghana



President and first CEO of Air Afrique Cheikh Boubacar Fall delivering a speech

Airways, a national airline with a 40% share owned by BOAC. By February 1961, the country had purchased the remainder of BOAC's holdings, making the airline an entirely government-owned operation.

The country's Prime Minister, Kwame Nkrumah, expressed his country's feeling of pride in the airline in a 1964 speech: "Naturally it increases our self-confidence to observe our own people helping to control the intricate mechanisms involved in the functioning of our airways services, and we certainly experience a glow of pride in seeing our flag flying on planes and ships traveling to other countries."

After winning their Independence from colonialists, many African countries started forming alliancies to join together with a motive of forming thier own airlines.
The rise and fall of Air Afrique mirrors the hopeful age of postcolonial liberation and Africa's subsequent neoliberal regression

Multinational Airlines

Air Afrique was a second approach to African-owned airlines. Pooling resources and expertise, eleven heads of state in Francophone West Africa signed the Yaoundé Treaty in 1961, creating a cooperative African airline.

The airline was founded by the newly-independent nations of Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Gabon, Mauritania, Niger, the Republic of the Congo and Senegal, which together owned a majority stake in the airline, with smaller shares held by Air France, the French Development Agency, and private stockholders.

Africanization of Operations

Alongside the tangible national pride derived from displaying one's flag domestically and internationally, working to train employees at all levels from among a nation's own country people was also a goal. As the last of the East African countries attained independence and East African Airways became an independently operated airline, training and employing African staff became a stated priority.

Starting in the early 1960s, annual reports included a section with updates on efforts towards Africanization. Members of the airline's executive management team were pictured in the 1964 annual report. Chief Abdullah Said Fundikira of Tanzania became the airline's chairman in December of that year, the airline's first African chairman since its inception in 1946.

Expanding Networks

The 1960s were a time of growth for national airlines throughout Africa. Timetables and route maps illustrate expanding networks. Air Congo, which was formed in 1961 with majority ownership by the Congolese government, published the route map of its short haul operations shown here in 1962, one year after the airline was formed.

Air Rights and South Africa

South Africa was among the first African nations to establish a national airline, creating South African Airways in 1934 and expanding its networks in the decades that followed. As nations throughout Africa emerged as independent and acquired rights to their own airspace, they were given a tool to oppose South African apartheid.

Starting in 1963, air rights were revoked by much of the rest of the continent, preventing South African Airways from operating in their airspace and suspending SAA service within their borders, forcing flights to be routed over sea, rather than directly over land.

After the 1960s

By the end of the 1960s, over 70 African airlines were in operation, representing rapid growth from the beginning of the decade. Several additional airlines were founded in the following decades as independence was achieved throughout the continent, including Air Zimbabwe in 1980.

This growth proved unsustainable in many cases, however, with financial, political, and operational instabilities resulting in the transformation, merger, or cessation of services by some airlines in the following years. Ethiopian Airlines remains today as a shining example of a commercially and operationally successful airline founded in this era, with 125 destinations around the world.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AVIATION EXPERTS ON:

Expectations of African Aviation Industry in 2024

The Aviator Africa interviewed Aaron Munetsi the Chief Executive Officer of Airlines Association of Southern Africa, Kevin Markette the General Manager East Africa at the Lufthansa Group and Sean Mendis, an Aviation Consultant and offered their views on expectations of African Aviation in 2024.

Qn; what are your recommendations for the challenges we face?

First, there should be cost containment whereby the operating costs for airlines must be contained at the lowest levels possible. Robust engagement with the airlines must be the norm for the mutual benefit of the economies in the region, as opposed to the arbitrary increases of costs that always come without any justification. Second, connectivity must be enhanced via the implementation of the Single Africa Air Transport Market by all the countries.

Airlines will be able to operate additional frequencies to existing routes or increase capacity on the same routes. The third bit is to allow free movement of people by the removal of non-physical barriers to travel such as the complete and total eradication of visa requirements for Africans to travel to other African countries.

We do not agree with the counties that make the "travel without visa" announcement and yet they implement a pre-travel authorisation policy which in effect is worse than the visa regime because this is a money-making gimmick. This goes against the spirit of opening Africa to Africans.

There should also be improvement in operating efficiencies through adoption of digitalisation and incorporating Artificial Intelligence wherever possible. This will result in lower costs of operations which are then passed on to customers thereby stimulating traffic. When it comes to aviation policies, I believe that they should be standardised and harmonised policies to enable level playing fields for all airlines. The practice by some countries of restricting or delaying approval of permits to airlines that compete with their own is anti-competitive. This is protectionism and must be denounced at the highest level.

Qn; How will the aviation industry grow in 2024?

The upward trend of increase in passenger and cargo growth will continue as long as the enablers as mentioned above are put in place by the authorities. Intra-Africa travel will increase as more African airlines open new routes using 5th Freedom traffic rights which are a must for the SAATM to be effective.

Aaron Munetsi, Chief Executive Officer, Airlines Association of Southern Africa.

Intra Africa Cargo will grow as more countries implement the AfCFTA. The issue of SAF is going to hog the headlines although in Africa we are still far from producing any SAF.

However, Africa has the potential to enter the SAF production field and contribute significantly but that will need to be supported with the requisite investment for facilities that are required. EVTOL will still be an idea that will come to Africa later, although there are technology entrepreneurs that are already active in this space.

I also for see privately owned airlines will continue making progress and demonstrating that airlines can be profitable and sustainable businesses. In addition, Low Cost Carriers will continue to be an opportunity but the regulatory environment does not always support this business model because they compete with national carriers. The infrastructure does not support LCC operations because there are hardly any secondary gateways in most countries where the costs of operation could be lower.

Kevin Markette General Manager East Africa at the Lufthansa Group

Qn; What are some of the expectations that the aviation industry has for 2024?

We expect the strong demand for air travel to continue into 2024. Speaking for the Lufthansa Group in my region (East Africa), we are expecting a very promising 2024, as we are keen to open new connections to East Africa, and increase existing ones soon. The launch of Brussels's Airline's new flight connecting Brussels to Nairobi from 3rd June is eagerly awaited by the market.

2023 was also a good year for the Lufthansa Group in East Africa where we were able to further increase our frequencies on select routes including Nairobi and Mombasa. The demand for air travel for both short-haul and long-haul flights remains high, especially among leisure travellers. In this context, the trend toward more bookings in premium classes, meaning Business Class, continues. For 2024, we continue to expect an increase of global capacity to around 95 percent of pre-crisis levels.

Lufthansa Group continues to invest over €2.5 Billion per year into fleet renewal, with a total orderbook of more than 200 next generation aircraft that will dramatically reduce carbon emissions in line with our goals to cut carbon emissions in half by 2030. In the summer of this year (2024) we will launch our brand-new long-haul product ("Allegris") with new seats in all classes on the Airbus A350 and Boeing 787-9. In Africa we expect a further growth in demand which we will support by our increased capacity to the region."

Talk about Mombasa and the open sky policy. How is your airline aligning to tap into the region this year?
"Our Leisure carrier "Discover Airlines" purposefully chose Mombasa as the first long-haul flight to restart in 2021. Mombasa is a very important market for the Lufthansa Group and I am proud that we have been able to continuously increase our frequencies.

4. What are some of the challenges that will affect aviation in 2024 and your recommendations on them.
In East Africa we are already facing strong competition which will only continue to increase in the years to come. That is why we are introducing several projects to ensure a stable and reliable operation globally, and across the continent.

The fact that we will be launching a new Brussels to Nairobi route, and increasing flights to Kigali to daily, both from June 3rd this year is a clear signal of Lufthansa Groups strong commitment to East Africa. While these are exciting new route developments, we hope to continue growing connectivity to Africa in the years to come.

Sean Mendis Aviation Consultant

Qn; What are your expectations for the aviation industry in 2024?

2023 was the first year since 2019 where travel in Africa was not affected by pandemic related restrictions of some sort, so we saw a recovery of air traffic to pre-pandemic levels on a continental level. However, this was not an even recovery - we saw one of the largest markets, ie. South Africa, continue to lag the continent in recovery as it reinvents both the domestic and international traffic flows following the exit and restructuring of its two largest pre-pandemic players (ie. Comair and SAA, and their subsidiaries Kulula and Mango).

I expect to see a continuation of growth in 2024 in all major markets and by all major players. Ethiopian Airlines will be particularly aggressive as they take delivery of additional new aircraft during the year and will launch new routes as well as additional frequency on existing routes. Kenya Airways is a bit constrained on its growth because of legacy debt and uncertainty on how they can exit that debt trap.

South African Airways is a wild card as their situation of being in limbo between a state-owned enterprise and a nominally privatized entity leaves them uncreditworthy, unaccountable and conflicted between commercial and political objectives.

As SAATM continues to expand its adoption, we will probably see a two edged sword as smaller players struggle to compete with better funded competitors that enter their markets.

The trend in immediate post-COVID recovery has been an increase of traffic from Africa to the Middle East and India, somewhat displacing traffic to Europe and China. As China opens up, it will be interesting to see if that traffic bounces back seamlessly or whether the other markets maintain their footholds. Intra-Africa traffic will continue to increase as more countries speak of liberalised visa regimes for fellow Africans and the African Continental Free Trade Agreement grows in stature.

THE PONTENTIAL OF AFRICAN AIR TRANSPORT MUST BE EMBRACED

By Wanyana Maureen
wanyanamaureen2015@gmail.com

There are only so many times it is possible to highlight the prospects for growth in aviation across the African continent while still maintaining enthusiasm that the huge potential can be realized.
Africa represents the last frontier for aviation development, but impotent government transport strategies and ongoing protectionism practices continue to limit its success. There is a mild hope of regulatory progress, while perhaps the greatest optimism attaches to some very persistent attempts to expand LCC operations in the region.

The high taxation that almost all African governments impose on aviation fuel means that the operating costs of the local airlines are among the highest in the world, while costly monopolies among service providers at the different airports continue to blight the industry.
However, airline failings across the continent cannot simply be dismissed on those grounds. Poor management practices and government restrictions on operational freedoms have severely impaired the natural progression of the industry.

African aviation industry must industry works closely with governments to break the barriers that are restricting the continent from reaching the levels of which it really should be capable of.

There has been progress though. While governments continue to push for their own flag carriers, increasingly these are being facilitated through partnerships with an established airline partner - a model that has already been demonstrably successful in some markets. Airlines are also starting to look beyond national borders and work on wider regional growth.

As with all regions, the COVID-19 pandemic has altered the continent's aviation landscape, But Africa was quick to recover its air services and from around mid-2022 capacity was within small margins of pre-pandemic performance. In 2023, capacity has consistently been ahead of 2019 levels and advanced schedules suggest this will continue through the remainder of the year.

South African Airways may have the same name but now has a very different prognosis. But its sabbatical has provided a void that others have been quick to fill. Still, Ethiopian Airlines remains the standout performer and is growing rapidly with its cross-border model.

Royal Air Maroc has also emerged stronger, supported by its membership in the oneworld global alliance. Ethiopian Airlines is the market leader in Africa, accounting for more than a 9% share of total seat capacity and a figure that continues to grow.

Ethiopian Airlines is now more than 50% larger (based on seat capacity) than EgyptAir and more than double the size of all other African operators. At the beginning of the last decade Ethiopian was smaller than all these airlines.

Africa's current commercial aircraft fleet consists of 2,900 aircraft, according to the CAPA Fleet Database, and there are only just over 150 aircraft on order from African airlines. And it is Ethiopian Airlines that has the largest order book, ahead of the Nigerian Operators Air Peace and Arik Air.

An opportunity to grow the LCC sector in Africa is obvious. In half a decade, LCC share of seat capacity within Africa has almost doubled, according to CAPA and OAG data, and as of early August 2023 accounted for around one in five seats.

This is still a modest figure and consists almost entirely of services connecting North Africa with Europe, albeit growing across many markets. There are still several major markets in Africa that have no, or virtually no, LCC presence.

The capital of Côte d'Ivoire, Yamoussoukro, is still less known for its aviation connectivity than for giving its name to the declaration that promised so much for aviation in Africa but has ultimately delivered so little.

The January 2018 launch of the Single African Air Transport Market (SAATM) is certainly progress, but it threatens just to be yet another unfulfilled landmark in African aviation, unless the industry works closely with governments to break the barriers that are restricting the continent from reaching the levels of which it really should be capable.

SAATM is a fine expression of goals, but now, over five years since its launch, it unfortunately is being compared with the supposedly liberalizing Yamoussoukro Decision long before: It could simply turn out to be yet another unfulfilled landmark of aspirations in African aviation.

To recite the decades-old painful cliché, Africa's potential remains massive. But until governments recognize the wider benefits an efficient aviation system can bring, with its impact on economic development, that persistent situation will continue. An important first step would be to remove counterproductive taxation systems, but much remains to be done on the essentially protectionist regulatory front.

Africa remains a market of huge potential but even larger challenges. The outlook for the future appears to be mostly more of the same, but with some glimmers of hope.

Credit: Rob Finlayson

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AFRICA'S TOP FIVE LARGEST AIRLINES BY FLEET SIZE

Africa is becoming one of the largest aviation growth market, particularly after the pandemic-related disruptions. Major airlines of the continent are playing a major role in expanding their networks, replacing older aircraft with new-generation fleets.The Aviator Africa has compiled a list of the largest airlines in Africa in terms of fleet size, based on the data from Planespotters.net.

By Wanyana Maureen
wanyanamaureen2015@gmail.com

1. Ethiopian የኢትዮጵያ

The Star Alliance network member Ethiopian Airlines is hands down the continent's largest airline, with a fleet size of 133 narrowbody and widebody aircraft. Founded in 1945 by Haile Selassie, the airline was his hope of modernizing and shaking off the country's previous image.

Since its inaugural flight between Addis Ababa and Cairo in 1945, the airline has grown to become Africa's dominant carrier. The airline has its hub at Addis Ababa Bole International Airport (ADD) and it operates to 155 passenger and 68 cargo destinations worldwide.

Aircraft	Fleet Size
Airbus A350	20
Boeing 737	30
Boeing 767	3
Boeing 777	20
Boeing 787 Dreamliner	29
De Havilland Canada DHC-8 Dash 8	31

2. EGYPTAIR

The runner-up on our list is the Star Alliance network member Egypt Air, with a current fleet size of 82 narrowbody and widebody aircraft. The operator of some of the most modern aircraft, Egypt Air operates to over 100 destinations worldwide.

The airline also operates one of the largest air cargo services in Africa.

With its roots dating back to the early 1930s flying under the name "Misrair" and "United Arab Airlines," the airline was renamed Egyptair on October 10, 1971. The state-owned flag carrier of Egypt is based at Cairo International Airport (CAI). With an excellent mix of Airbus and Boeing aircraft, the airline aims to further expand its fleet and services.

Aircraft	Fleet Size
Airbus A220	12
Airbus A320	10
Airbus A321	7
Airbus A330	11
Boeing 737	29
Boeing 777	6
Boeing 787 Dreamliner	7

3. الخطوط الجوية الجزائرية AIR ALGÉRIE

Number three on our list is the national flag carrier of Algeria, Air Algérie, with a current fleet size of 55 aircraft. The airline operates scheduled passenger services to 78 domestic and international destinations in 28 countries.

Founded as Compagnie Générale de Transports Aériens (CGTA) in 1946, when Algeria was still a French Overseas Territory, the plan was to offer flights to Europe for the thousands of Europeans who had immigrated to Algeria.

Following independence in 1962, the Algerian government controlled the airline, establishing its central hub at Houari Boumediene Airport (ALG) in the nation's capital, Algiers. The airline recently began services to Ethiopia's Addis Ababa (ADD) Airport. The airline only operates a single widebody aircraft type, the Airbus A330-200

Aircraft	Fleet Size
ATR 42/72	15
Airbus A330	8
Boeing 737	32

4. الخطوط الملكية المغربية Royal Air Maroc

Number four on our list is the national flag carrier of Morocco, Royal Air Maroc, also known as RAM. The country's largest airline has a current fleet size of 51 aircraft and operates scheduled services to 89 destinations in Africa, Asia, Europe, and the Americas. The airline also operates occasional charter flights, including Hajj services to and from Saudi Arabia.

The airline was founded in 1953 and the name "Royal Air Maroc" was adopted in 1957 after the Moroccan government acquired a 67.73% stake in the airline. With its central hub at Mohammed V International Airport (CMN) in Casablanca, the oneworld alliance member operates an extensive domestic network together with flights to Europe and the Americas.

Aircraft	Fleet Size
ATR 42/72	6
Boeing 737	31
Boeing 767	1
Boeing 787 Dreamliner	9
Embraer ERJ-190	4

5. Kenya Airways The Pride of Africa

Number five on our list is the national flag carrier Kenya Airways, with a current fleet size of 32 aircraft. Largely owned by the Government of Kenya (48.9% stake), the airline operates scheduled services 44 destinations worldwide. Founded in 1977, after the dissolution of East African Airways, Kenya Airways became the first African non-government-controlled airline.

Kenya Airways became a member of the SkyTeam alliance in 2010 and operates from a central hub at Jomo Kenyatta International Airport (NBO) in the nation's capital Nairobi. Apart from the SkyTeam alliance, the airline has codeshare agreements with numerous large airlines, including Etihad Airways, British Airways, and KLM Ryal Dutch Airlines.

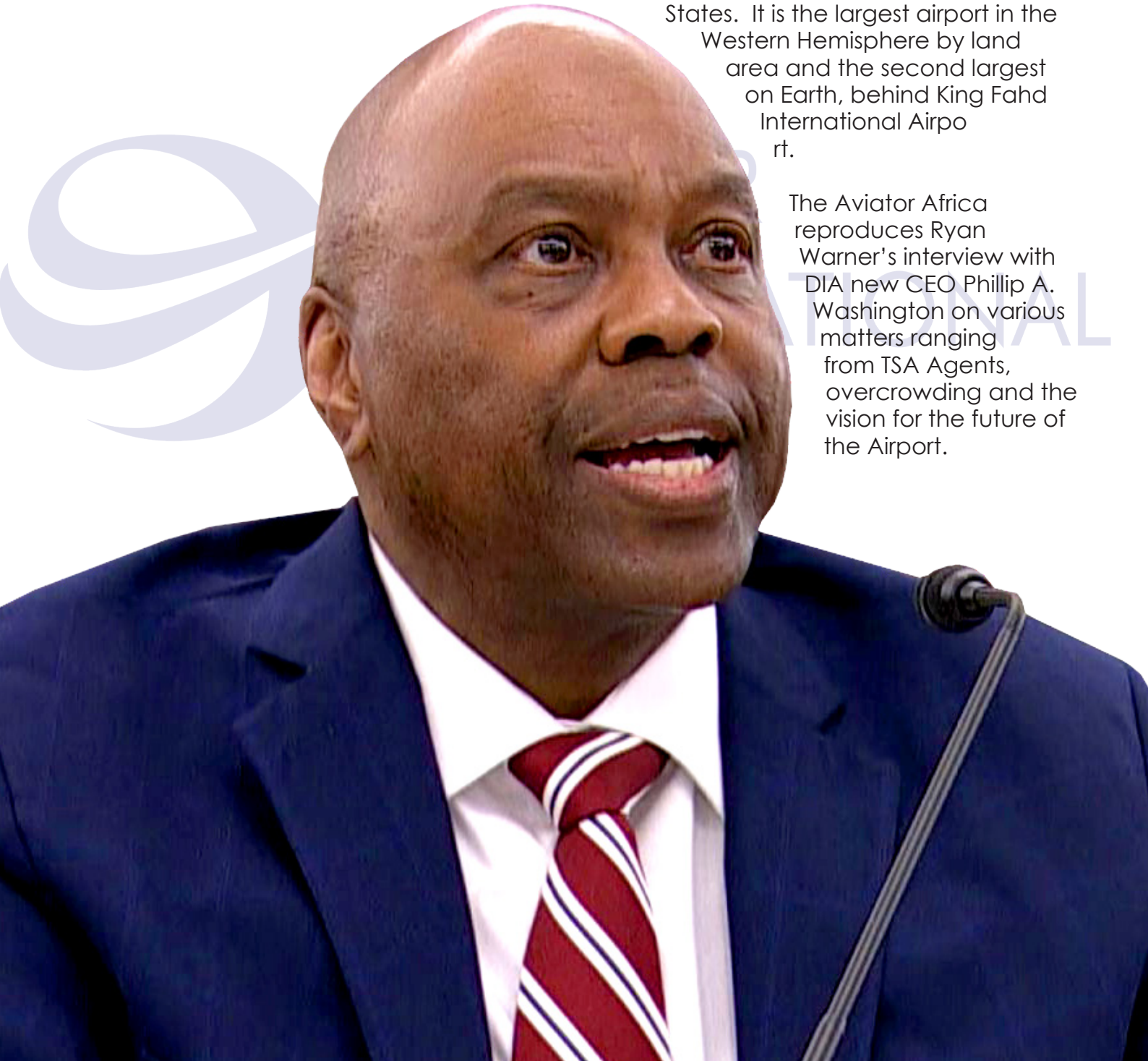
Aircraft	Fleet Size
Boeing 737	10
Boeing 787 Dreamliner	9
Embraer ERJ-190	13

A ONE ON ONE WITH | PHILLIP A. WASHINGTON

CEO; DENVER INTERNATIONAL AIRPORT

Denver International Airport locally known as DIA, is an international airport in the Western United States. It is the largest airport in the Western Hemisphere by land area and the second largest on Earth, behind King Fahd International Airpo rt.

The Aviator Africa reproduces Ryan Warner's interview with DIA new CEO Phillip A. Washington on various matters ranging from TSA Agents, overcrowding and the vision for the future of the Airport.



Qn: Have security lines at DIA gotten longer? Why would there be fewer TSA agents and more passengers?

During times of the day, the lines are long. We are in conversations with the TSA (U.S. Transportation Security Administration), who we don't control, and we have been talking to them about our resource allocation for this airport. Ironically, we have fewer agents in 2023 than we had in 2019.

Well, we're trying to find out. We had a great meeting with the TSA administrator. He came out here to Denver. If technology advances, then the idea from TSA is that that could facilitate fewer agents. The training of agents could be another factor that goes into the model that determines how many agents are here. We're looking at all of those things.

The layout of the airport is part of it. If you go to some airports, you might have seven terminals with seven separate security areas. That's the layout in places like Chicago and LAX (Los Angeles). We're different. We primarily have one terminal with right now two large security areas.

Qn: Are you lobbying for more TSA agents?

Absolutely.

Qn: Why couldn't Denver's airport look more like those other models?

The architecture and the design of this airport is unique. Building seven different security areas would be a daunting thing, but I will say there will be great improvement at the completion of our west security checkpoint that we're building now. We'll open it up permanently in February 2024 with new equipment and 17 new checkpoints.

It will go from something like 150 people per lane per hour to something like 250 per lane per hour.

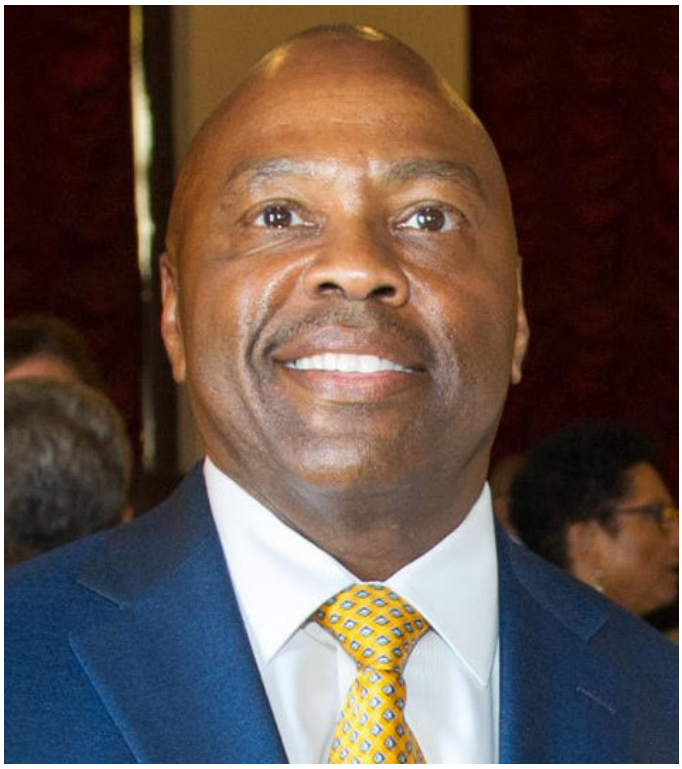
Qn: Will the experience of feeling like this is a construction zone get better anytime soon?

It's getting better already. The worst is behind us, and now I believe passengers will see a vast improvement when we open up that new checkpoint. Phase One was done ahead of schedule.

Qn: Why is the airport so crowded?' Can you put a finer point on it?

I think the first thing is people have prioritized travel. We are seeing numbers that are extraordinary. We are retrofitting this airport to fit probably 30 million more people than it was designed for.

It's a mix — I would say about 60 percent of flights are originating and ending here, and 40 percent of flights are connections through Denver. So there are people coming and going, there are people connecting, and I think there are a lot of reasons. Denver is very, very popular, the Rocky Mountain region is too, and so that leads to an increase. Business travel has not come back completely from the pandemic, but we see that inching forward.



And Denver is geographically placed in the middle of the country, which makes it very, very attractive to airlines to fly and connect here in Denver.

Qn: Let's talk about the underground train between the terminal and concourses. You've asked for proposals for an alternative, a backup. What are the most promising alternatives you've seen?

We asked for ideas. We received some extraordinary, innovative ideas, like pedestrian bridges from concourse A to B, concourse B to C. These are massive spans. Planes would have to go under them. They'd have to be long and high, with the possibility for concessions on those bridges. We're doing more detailed analysis, but these are costly.

Qn: You've been involved with diversity, equity, and inclusion efforts here and in other roles, like when you were running the Los Angeles metro system. There are many documented incidents of racism on airplanes or in U.S. airports, from the way pat downs are done at security or how passengers are treated by airlines.

What are a couple of specific things you and your staff can do to make Denver's airport a more welcoming place for BIPOC

passengers and employees?

We have an ecosystem out here. We communicate often. We talk to the 40,000 employees here all the time, and we deliver the same message, that we want people treated respectfully. I think you have to constantly state what your priorities are around equity, diversity, inclusion, and accessibility.

Signage has to be tied to that — signage that says we treat everybody with respect at this airport, and that you can call a number if you experience someone not respecting folks. The number is 720-730-IFLY. So we do our best to make sure that people feel like this is an accommodating place and we'll continue to do that.

Qn: You recently unveiled the vision for the future of the airport. In about 20 years, you plan to add new concourses, beyond A, B, and C. The new ones would be walkable from the security area and the terminal. How else do you expect the experience for travelers to be different in 2045 compared to now?

We have projections that say we will be at 120 million travelers going through this airport by that time — in an airport that was designed for 50 million. What that means is we need to start thinking about additional concourses. We have the ability to build 11 additional gates on the C concourse, and once we do that, we are tapped out with the existing concourses.

We will begin now to lay the foundation for additional ones that are walkable and do not require the shuttle train. They will be off the Great Hall, is what we're thinking.
It's my job to improve as best we can. This will be one of the greatest airports in the world when we're done.
Source: cpr.org

About Phillip A. Washington.
Phillip A. Washington is the new CEO of the Denver International Airport. He is also former CEO of the Los Angeles County Metropolitan Transportation Authority (Metro) from March 2015 to May 2021 and is also former CEO of the Denver Regional Transportation District (RTD) between 2009 and 2015.

Washington is a 24-year veteran of the U.S. Army, where he held the rank of Command Sergeant Major, the highest non-commissioned officer rank an enlisted soldier can achieve. He holds a B.A. in Business from Columbia College, an M.A. in Management from Webster University and is a graduate of the Harvard University Kennedy School for Senior Executives in State and Local Government.

Washington was recently appointed by U.S. Department of Transportation Secretary, Pete Buttigieg, to serve on its Advisory Committee on Transportation Equity and in March 2024, Phil was nominated to serve on FAA's Management Advisory council (MAC).

THREE LEADING AIRCRAFT ENGINE MANUFACTURERS AND THEIR GLOBAL MARKET SHARE

Jet engines are essential for aircraft, providing power, thrust, and determining efficiency. Within the aircraft engine industry, GE leads the market with a 55% share, followed by Pratt & Whitney at 26% and Rolls-Royce at 18%.

Jet engines are complex machines that are precisely engineered and tailored to the requirements of aircraft and their operators. While there are many makers of jet engines worldwide, some of the largest engine manufacturers are GE Aerospace (GE), Pratt & Whitney, and Rolls-Royce. These companies design and produce some of the most efficient commercial jet engines available.

While some engine models cater to various aircraft types of similar size and thrust classes, others may be specific to only one type of aircraft. For example, The GE CF6-80 engine is installed on Airbus A330, Boeing 767, and Boeing 747, among others.

On the other hand, the GE9X engine is solely applicable to the Boeing 777X. Irrespective of the engine applications, both aircraft and engine manufacturers work closely during the early design and concept phase to align their requirements.

The engine is, not surprisingly, an essential part of a plane. It provides the power and thrust required to lift an aircraft off the ground and keep it in the air. Engine characteristics also determine aircraft efficiency, a critical factor in reducing fuel burn and subsequent greenhouse gas emissions.

The engine market is highly competitive, with companies pushing to make the most potent yet efficient engines. Regarding types that are in service, widebody aircraft have more powerful engines, currently topped by the Boeing 777 and the Airbus A350. Meanwhile, the GE9X, purpose-built for Boeing 777X, holds the Guinness World Record title for thrust, officially known as 'the most powerful commercial aircraft jet engine (test performance).

For narrowbodies, manufacturers are constantly trying to make more powerful engines that are still small enough for the planes, such as the efficiency improvements made for the A321neo (CFM International's LEAP-1A or Pratt & Whitney's PW1100G-JM) and 737 MAX (CFM International LEAP-1B).

General Electric

CFM International is a highly successful joint venture between General Electric and French engine maker Safran. When including CFM products, GE leads the aircraft engine market globally. While things have shifted somewhat since the latest figures from Statista in 2020, it lands at around 55%, well ahead of its competitors. However, 39% of the total is down to CFM, whereas GE by itself holds 16%.

CFM manufactures the CFM56 and LEAP engines, which can be found extensively on the A320 and 737 families of aircraft. GE has also partnered with P&W to form the Engine Alliance, which, as previously mentioned, made the GP7000 engine for the A380.

GE's engines can be found on every popular commercial jet to date, barring the A350 (for now). This means GE engines (including joint ventures) can be found on Boeing's 777, 747, 787, and 737, as well as Airbus' A320, A330, A340, and A380. If you're flying on a narrowbody, especially the Boeing 737, chances are high there's a GE powerplant under the wing.

Pratt & Whitney

Coming in at number two is Pratt & Whitney. The American engine maker holds a 26% share of the engine market. P&W engines can be found on the Airbus A220, A320 family, and A330, as well as the Boeing 747-400s, 767, and Embraer E-jets. In recent years, the manufacturer has seen its narrowbody aircraft engines do well and, as a result, has been focusing on those.

P&W previously partnered with GE for the GP7000, which Gulf carrier Emirates ended up choosing for a majority of its A380s. The manufacturer has also partnered with the Japanese Aero Engine Corporation and MTU Aero Engines to form International Aero Engines (IAE).

Pratt & Whitney's most recent engine has been for the A220 family, as the company was awarded the exclusive contract for Airbus' popular project inherited from Bombardier. Last year, the PW1500G geared turbofan reached the one million flight hour milestone.

The manufacturer ran into some trouble a couple of years ago, as variants of its popular PW1000G have experienced engine failure issues. This has forced the manufacturer to replace many engines, resulting in significant financial losses. Nonetheless, P&W remains a dominant player in the engine market, especially with the future focus on narrowbody jets and a committed relationship with Airbus.

Rolls-Royce

British and highly eponymous brand Rolls-Royce comes in third place, holding around 18% of the engine market share. The manufacturer, which has made a name for itself in automotive circuits, makes engines exclusively for widebody aircraft, with the Airbus A330, A340, A350, and A380, as well as Boeing's 777 and 787 all featuring RR engines.

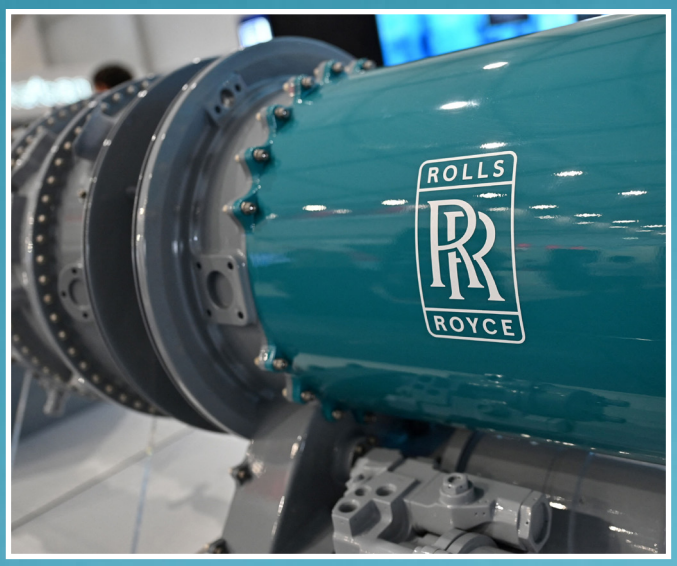
In fact, the Airbus A350 exclusively features Trent XWB engines. In November last year, Rolls-Royce delivered its 1000th Trent XWB engine since the Trent XWB-84 entered service alongside the Airbus A350-900 six years earlier.

Rolls-Royce jet engines currently go by the name of Trent - the Trent XWB, powering the A350, and the Trent 1000, powering the Boeing 787. That is until its newest and biggest engine yet comes to market.

Supply chain issues dominate

As the globe faces shortages of essential components, engine makers have felt the bite particularly hard. These powerplants require thousands of parts, ranging from screws to titanium, meaning even slight disruptions can throw the whole supply chain into disarray. This is precisely what has occurred since 2022, with airlines struggling to keep planes flying now.

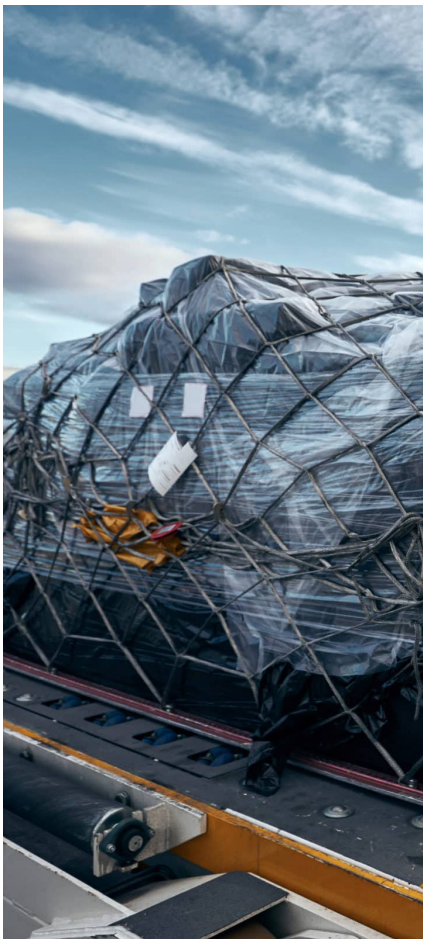
Pratt & Whitney has been the worst hit with delays,



with Indian giant IndiGo forced to ground 30 planes at the peak of issues, or 10% of all aircraft. At Go First, the lack of replacement engines was a huge factor in the airline grounding operations, which are yet to resume.

KLM's Embraer E195-E2 fleet has been another casualty of Pratt & Whitney's engine delays, with the brand-new jets stuck on the ground, as was the case with Iraqi Airways' shiny new fleet of four A220s. However, all suppliers face the crunch, slowing down the industry just as passenger numbers start growing to pre-pandemic numbers.

WHAT TO KNOW ABOUT AIR CARGO HANDLING



By Evans Kimani

Air cargo handling is the binding link in the airport area to transfer air cargo from aircraft to truck, and also from truck to aircraft.

Shipping by air is a fast and efficient means of transport for goods. Airlines transport over 52 million metric tons of goods a year, representing more than 35% of global trade by value but less than 1% of world trade by volume.

That is equivalent to $6.8 trillion worth of goods annually, or $18.6 billion worth of goods every day. However, the effects of COVID-19 on the industry dramatically affected the air industry including air cargo. Available cargo tonne-kilometers fell industry-wide by 21.4% year-on-year in 2020. However, by the end of the year, industry-wide cargo tonne-kilometers had returned to near pre-COVID values.

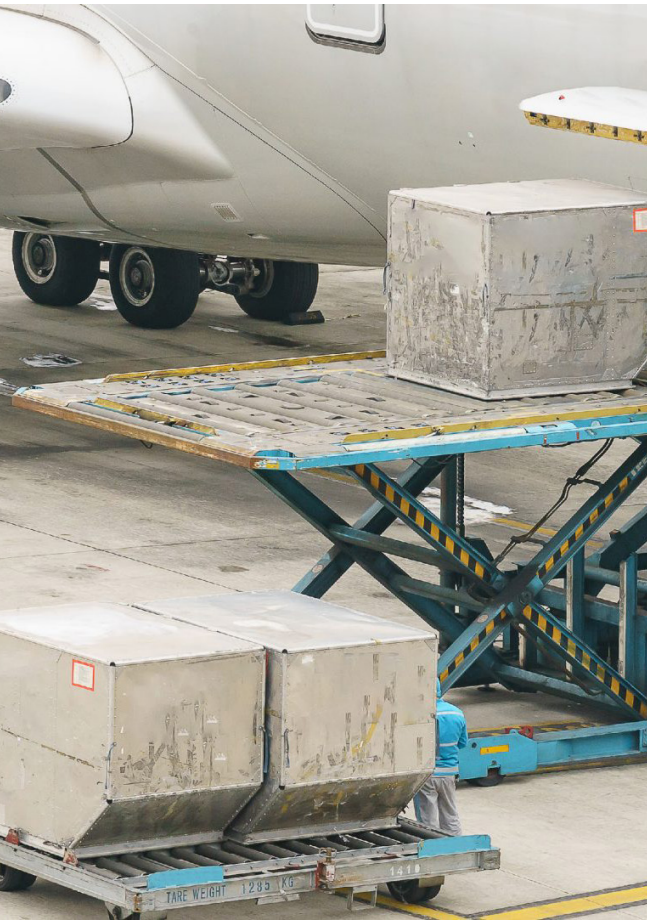
Once the truck has collected the goods from the carrier's domain, it is transferred to the freight forwarder hub where it's unloaded and checked. Often before goods are dispatched via a Forwarder Branch Facility before being handed to the Consignee and then they are finally delivered to the final customer.

Cargo handling is the segment of the supply chain which processes goods landside in the cargo facility. From the delivery at the airport of origin until it is ready for loading on the plane, to the unloading at destination and handover to the consignee/freight forwarder, many steps are involved with cargo handling that must be closely followed to ensure shipments are delivered safely and securely. These steps are found in the cargo Master Operating Plan (MOP).

What is the cargo Master Operating Plan (MOP)?

The Master Operating Plan (MOP) describes the key processes and sub-processes involved in transporting air cargo from shipper to consignee in a systematic and harmonized manner. It provides the air cargo supply chain with the first, industry-endorsed, standard description of the end-to-end process for transporting cargo by air.
As a result, the MOP comprises 19 main processes and 78 sub-processes split into five categories of activities as follows:

- Origin Forwarder
- Origin Carrier



- Transport Carrier
- Destination Carrier
- Destination Forwarder

The primary objective for air cargo acceptance and handling is to ensure that consignments are ready for carriage in compliance with operator and IATA regulations, as well as with export and import rules of the countries through which the cargo will transit.

The process of cargo handling begins with booking and planning shipments, there is much to be done before the shipment even leaves the facility. These activities also include the steps handled by freight forwarders as listed below:

- Receive shippers' requests and check the security status
- Receive shipper freight information
- Plan the routing-direct or consolidation
- Request capacity against forwarder or carrier inventories
- Confirm capacity
- Arrange pick up of freight
- Picked up from the shipper

How Air Cargo is Received and Accepted for Shipment

The next step in logistics is how air cargo is received and accepted for transport. This is a multi-step process that includes various stockholders including trucking companies, as well as cargo and ground handling service providers amongst others.

Throughout the shipment process, safety remains a priority for all parties of the air cargo supply chain. For instance, it's important to ensure clear and correct labeling and identification of packages. In addition, the packages themselves must be suited to the content and be able to protect the goods from any damage.

Receive Shipments into Carrier Domain;

Once the freight forwarding truck arrives at the carrier's domain and the truck driver has informed the Cargo Handling Agent of their arrival, the carrier domain can receive the goods. They should have received the following information in advance, which is why filing electronically is always recommended:

Electronic air waybill information;

- Electronic house waybill information for consolidated shipments
- Truck number and type (if available)

- Estimated arrival time (if available)
- Security screening needs (if known/available)

Once the information has been received, and the truck has arrived, an unloading slot and position will be assigned to the driver. Different slots are given according to needs, such as dangerous goods, live animals, ULDs, healthcare products, and more.

Accept Shipments as Ready for Carriage;

When accepting shipment as ready for carriage, airport cargo and ground handling personnel must take several steps to meet the requirements to ship goods by air. First, they must verify if the shipments are security cleared. Then they must perform a ready-for carriage check. The primary objective is to ensure the consignments are in compliance with;

- Carrier requirements
- Local export rules and regulations
- Rules and regulations of the transit airport(s) and air spaces (if any)
- Import regulations of the destination country

Prepare Cargo for Flight;

After accepting shipments ready for carriage, airport cargo and ground handling personnel can prepare the air cargo for flight. The goods in transit must be received and security cleared once again. Goods left on the aircraft that are in transit are considered transit cargo.

Cargo and ground handling services must give this transit cargo security checks, including x-ray and Explosive Trace Detection (ETD) screening. A detailed exam of the e-AWB, integrity of the cargo, and piece count is made.

Once the pre-plan details are received from the carrier, a build-up plan must be prepared, which indicates what air cargo is to be built for flight, and the information is sent to the warehouse.

Send Shipments to Flight;

Now it is time to move the loaded ULDs to a secure flight holding area while being mindful of all sensitive information such as temperature-controlled and dangerous goods. Ensuring no flights are delayed, the ULDs can be lined up in order, if it is known, to prepare for ramp transportation. All ramp safety protocols must be followed.

To avoid accidents being mindful of all ground support equipment during the process of loading and unloading is necessary. This is why proper training in IATA's rules and regulations is imperative for all cargo and ground handling personnel.

At this time, the control of the air cargo passes from the warehouse operator to the ramp handler. The transport of goods from cargo terminal to aircraft is a multi-step process best lined out in the IATA Cargo Handling Manual (ICHM).

After following each of those steps explicitly, you would load the aircraft according to the load plan, making a note of arrangements for special cargo. Once the aircraft is loaded, any discrepancies must be addressed by updating the electronic Flight Manifest.

How Air Cargo is Unloaded

How air cargo is unloaded involves fewer steps for airport cargo and ground handlers than the shipping and loading process. There are still many rules and regulations cargo and ground handling personnel must comply with, however, following ramp safety protocols while performing tasks in a methodical manner help alleviate accidents and keep aircraft turnaround times in check. According to the IATA Cargo Handling Manual, the following are the specific steps to unloading air cargo:

- Unload and dispatch shipment to warehouse
- Check-in shipments
- Arrive shipments
- Hand over shipments to forwarders

What are the Last Steps before Delivery?

Source: IATA

TOP 5 MOST FUEL EFFICIENT PLANES IN THE WORLD

Fuel efficiency is a key concern for airlines, as fuel costs can make up a significant portion of operating expenses. Airlines are constantly seeking ways to reduce fuel consumption and increase the fuel efficiency of their fleets.

No.1 Airbus a350-900

This airplane has a range of 8,000 nautical miles and can fly for up to 17 hours without needing to refuel. It is one of the most fuel-efficient planes in the world, thanks to its lightweight carbon fiber construction and advanced engines.

No.2 Boeing 787 Dreamliner

The 787 Dreamliner is another highly fuel-efficient airplane. It has a range of up to 7,635 nautical miles and a fuel efficiency of around 20% better than comparable planes.

No.3 Airbus a320neo

The A320neo is a single-aisle aircraft that is popular with airlines for its fuel efficiency and low operating costs. It has a range of up to 3,700 nautical miles and can fly for up to 6 hours without needing to refuel.

No.4 Bombardier cseries

The CSeries is a family of narrow-body, twin-engine jets that are known for their fuel efficiency and low emissions. The CS100 and CS300 models have ranges of up to 3,400 and 3,200 nautical miles, respectively, and can fly for up to 6 hours without needing to refuel.

No.5 Embraer e195-e2

The E195-E2 is a single-aisle, narrow-body jet that is known for its fuel efficiency and low operating costs. It has a range of up to 3,400 nautical miles and can fly for up to 6 hours without needing to refuel.

CELLUMATION TECHNOLOGY

Why it's a game changer in Intra-logistics

By James Kamali
Jk2000@gmail.com

Cellumation is an intelligent conveyor technology for production and logistics based on the patented celluveyor technology, cellumation offers powerful automation solutions for material flow systems in intra-logistics.

What is a Celluveyor?

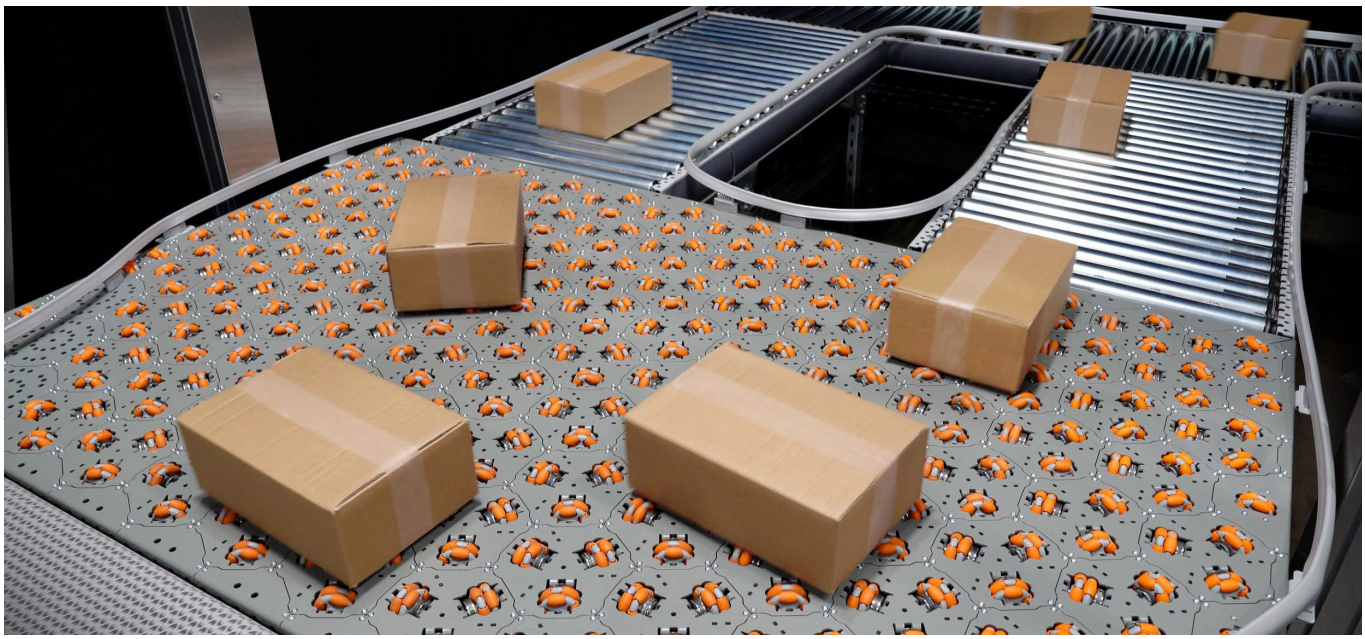
A celluveyor is a modular conveyor technology for flexible material flow. The idea behind the celluveyor is a modular conveying and positioning system that is fundamentally based on a single component – the cell. The hexagonal design of the hardware module promises flexible layout options.

In combination with the three omnidirectional and independently driven wheels per cell, complex material flow movements are possible with minimal space requirements. For this purpose, our intelligent and self-learning software brings the cells to life and individually controls the wheels, so that objects can be aligned or even rotated as desired. The principle is simple: The hardware remains the same, the software defines the function.

Benefits of a Celluveyor

Robust:

A single cell cannot move a product, many cells can



move houses. Thanks to their modular design, celluveyor systems are particularly robust and extremely durable. Of course, they are protected against dust and splash water (IP54).

Redundant:
Due to the hexagonal construction, the cells are 6-fold redundant. If one cell fails, the surrounding cells take over and transport the passenger to the correct location without downtime.

Expandable:
Collaboration is king: Thanks to the cooperation between the robot cells, they can move objects freely and independently over longer distances and perform the most complex tasks simultaneously.

Cellumation Applications

Aircargo Hub:
Reconsolidation & sorting according to ground handling service providers in a cargo hub (transition from ground handling service providers to trucks). In the first step, a typical package lands at the destination airport by airplane. Then, in a second step, it arrives at a ground handler and then continues to the consignee by a freight forwarder.

Currently, there are several ground handlers and several forwarders at each airport, each of which has to pick up the parcels from the ground handlers. The problem with this is the high transaction costs that arise because freight forwarders have to pick up the packages from each individual ground handler. This leads to unnecessary routes and causes delays.

A solution for Air cargo Hub:

Cargo hubs are small, functional logistics centers that take care of sorting in step after ground handlers. Their goal is to reduce the number of routes. Parcels can be delivered, singulated, sorted and redistributed in a climate-friendly manner there. Everyone benefits from this: the environment, the economy, the sender, the recipient and the airport.

A cargo center that uses a cv.SPARCK enables the consolidation of material flows on two different levels. Consolidating the sorting steps (shipper -> carrier -> GHA -> flight) into one (carrier -> flight or shipper -> flight) allows reducing sorting costs and additionally eliminate most of the storage steps, improving timing.

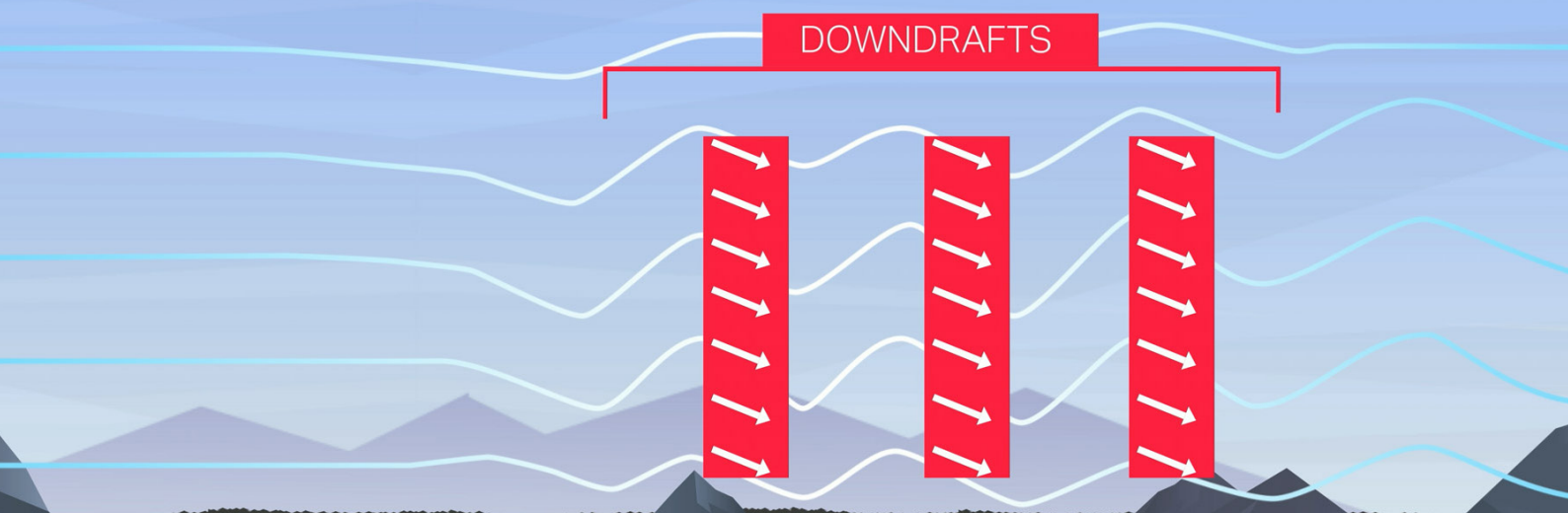
Air Cargo Terminal Sortation:

Reconsolidation & sorting at terminal/ground handlers themselves (sorting in ground handler hangars).
Sorting of ULDs (Unit Load Device) with multiple units based on (main and house) air waybills.

Automation benefits:

- Internal processes are made more efficient
- Space savings for ground handling service providers

MOUNTAIN WAVE TURBULENCE:



WHERE YOU FIND IT, AND HOW TO AVOID IT

There are two primary types of mountain waves: trapped lee waves, and vertically propagating waves.

Trapped Lee Waves

Trapped lee waves are the type of mountain wave that most people think of. You know you're in one when you're maintaining altitude and your plane slowly starts pitching up and down, while your airspeed increases and decreases. It all happens because you're flying through the crests and troughs of the wave.

Trapped Lee waves are also well known for their ability to travel long distances downwind: we're talking 500+ nautical miles downwind. So how does this type of wave form?

There are three key aspects that need to happen for a trapped lee wave to form:

- Cross-barrier flow of at least 20 knots
- A moderately stable atmosphere
- Significant wind shear from the tops of the peaks to 6,000' above the peaks (a ratio of more than 1.6).

Cross-Barrier Flow:

Cross-barrier flow is the angle that an airstream strikes a mountain barrier. When winds at peak height are 20 knots or greater, and they strike the ridgeline at a 90 degree angle, a mountain wave is more likely to form.

Moderately Stable Atmosphere

In order for trapped lee waves to form, they need to occur in a relatively stable atmosphere. A stable atmosphere, in basic terms, means a parcel of air lifted into the atmosphere (in this case up the side of a mountain) will want to return to its equilibrium or starting point.
This alone is one of the main reasons why trapped lee waves are able to travel so far downwind of the barriers that created them.

Strong Shear: How to Determine This
Strong shear (a ratio more than 1.6) yields more pronounced trapped lee waves. Determining the shear ratio is easy. All you need is a Winds and Temperatures Aloft forecast.

First, you want to look at the wind speeds at peak height. In the Rockies this is roughly 12,000' (6,000' for the Appalachians). You then want to take a look at the wind speeds 6,000' above the peaks, which is 18,000' in the Rockies, and 12,000' in the Appalachians.
Divide the wind speed 6,000' above peak height by the wind speed at peak height, and you'll get shear a ratio. Any ratio greater than 1.6 is a good setup for a trapped lee wave.

Two Turbulence Zones
Trapped lee waves create two turbulence zones: the Lower Turbulence Zone, and the Upper Zone.
The Lower Turbulence Zone;
This zone ranges from about 1,000' to 2,000' above peak height, all the way down to the surface. This region tends to be a higher threat than the upper zone.

As the waves travel downwind of the peaks, rotors form underneath the crests of the ascending wave. These rotors can create moderate to severe turbulence. So how can you avoid them? If there's any moisture in the atmosphere, the ascending part of the rotor will form a ragged cloud as it rises and cools.

Upper Turbulence Zone
This zone occurs from about 1,000' to 2,000' above peak height, continuing up to 15,000' above the peaks. In this zone, you'll primarily find the updrafts and downdrafts associated with the trapped lee wave. You'll see your airspeed fluctuate up and down as you maintain altitude through the crests and troughs of the wave.
In most cases, there isn't much turbulence here. However, if the wave it strong enough, rotors can form under the crests of the wave.

Turbulence Avoidance;
On a clear day, you may not have much luck trying to see mountain wave clouds, or even knowing they are there. You'll have to rely on forecast discussions, the Winds and Temperature Aloft forecasts, and PIREPs.

Fortunately, on days that have significant moisture content, you'll see the waves in action through cloud formations. There are three types of clouds you may see that will give you a good idea of where the waves are at, and which spots to avoid.

Cloud 1: Cap Cloud
A cap cloud is formed when a moisture-rich airmass is forced up and over a ridgeline, forming a cloud that 'caps' the mountain peak.

Cloud 2: Lenticular Cloud
Next, a lenticular is formed in a similar fashion, however, the cloud is formed at higher altitudes where the top of the lee wave reaches its crest. Lenticular clouds can form rotors under the peak of the crest, creating turbulence. They also tend to have significant icing in them. When you see a lenticular cloud, it's best to treat it like a rotor cloud and fly around it.

Cloud 3: Rotor Cloud
Rotor clouds are located in the lower turbulence zone and pose a significant threat to aircraft. You can see them as an eddie of rotating air. Depending on the moisture in the atmosphere, you may see a full rotor cloud or just part of one. Again, when you see a rotor cloud, assume it will have moderate to severe turbulence and fly around it.

Read the Forecasts, Then See and Avoid
To avoid mountain wave turbulence, start by reading and interpreting the forecasts. Then visually see and avoid the wave clouds. Doing both gives you a good idea of when mountain wave turbulence is present, and where the turbulence is most like to be.

Source: Boldmethod

A PILOT CHECKLIST

1. Challenge-and-Response Checklists
2. Read-and-Do Lists

By Maximillian Philberth

The term "checklist" is often is used to refer to two different types of documents:

- Challenge-and-response checklists,
- Read-and-do lists

"Checklists" (whether challenge-and-response or read-and-do, whether paper or electronic) constitute tools that support flight crew airmanship and memory and ensure that all required actions are performed without omission and in an orderly manner. Checklists (normal and non-normal) are usually bundled in an easy-to-use Quick Reference Handbook (QRH).

Challenge-and-response checklists usually relate to the normal operation of the aircraft (normal procedures) for each phase of flight. Flight-phase related actions are performed from memory following a cockpit flow pattern. Specific critical items are checked /cross-checked using a

challenge-and-response checklist, whereby the pilot-non-flying/pilot monitoring reads the items to be checked and the pilot flying confirms the proper status/configuration of the appropriate items (e.g., altimeter setting, flaps position, ground spoilers arming, etc.).

On aircraft equipped with electronic checklists, when crew actions are completed the checklist items may be automatically sensed by the system and erased or the colour of the checked item may change. On some aircraft models, activating a prompt allows annotating the item as being "checked".

Read-and-do lists usually relate to non-normal (abnormal and emergency) procedures for which a cockpit flow pattern performed from memory is not suitable. Indeed, non-normal procedures usually include pre-conditions (conditional action steps) that must be assessed and mutually agreed by both crewmembers before proceeding further.

Some non-normal procedures (such as the recovery from an unusual attitude or flight with an unreliable airspeed indication) include "memory items" that could also be called "survival items". These are items that are time critical and must be accomplished from memory before referring to the QRH for the further management of the prevailing contingency.

Better to use checklists

Most pilots use written checklists, while many others don't because they feel they are experienced enough, and/or too busy, and don't need them. Don't let complacency create dangerous conditions. Even if you do a mental checklist on takeoff and landing, it's a good idea to say it aloud, and refer to a written checklist to make sure you didn't miss anything.

The following is a suggested segmented checklist for takeoff and landing, which means it is designed specifically for those times. However, your pilot's operating handbook and/or aircraft flight manual may differ slightly, so be sure to review that for added safety.

Before takeoff checklist

- Altimeter – set
- Auxiliary fuel pump – off
- Directional gyro – set
- Engine idle – checked
- Flaps – as required
- Flight controls – free and correct
- Fuel gauges – checked
- Instruments and radios – checked and set
- Landing gear position lights – checked
- Magnetos – checked
- Parking brake – off
- Propeller – exercise
- Seat belts/shoulder harnesses – fastened
- Trim – set

Final checklist

- Action – engine instruments checked
- Camera – transponder on
- Doors and windows – locked
- Lights – landing, taxi, strobes on
- Mixture – full rich unless above 3,000 feet MSL

Before landing checklist

- Cowl flaps – as required
- Directional gyro – aligned with magnetic compass
- Fuel selector – fullest tank
- Mixture – full rich unless airport above 3,000 feet MSL
- Seat belts/shoulder harnesses – secure

Final checklist

- Flaps – as required
- Landing gear – down
- Propeller – high rpm

Conclusion

Checklists, both normal and non-normal, are important assets that assist the flight crew in the safe and proper operation of the aircraft. Checklists reflect the experience of the aircraft manufacturer and of its operators over an extended period of time and countless flight hours. They should not be altered without referring to the manufacturer's flight operations department.

Indeed, the mere sequencing (order) of action steps or their regrouping into action clusters have an importance that may not be obvious without knowledge of the background for such options. More critically, altering a non-normal procedure might, at best, affect secondary failures (failure conditions resulting from a primary malfunction) and possibly prevent the recovery of an affected system. At worst an altered checklist may further degrade the situation and possibly increase instead of decrease the risk

HOW ICE FORMS ON AN AIRCRAFT

By Paul Mwangi
p.mwangi254@gmail.com

Icing is the formation of ice or the freezing of some surfaces of an aero plane, such as wings, propeller blades, carburetor or pilot probe, amongst others. The formation of ice attached to the external surface of an aircraft or to the surfaces within its engine air intakes, requires that liquid water drops impact the surface involved. Usually, that moisture must be supercooled, meaning it must be in liquid form below 0°C.

issues relating to the difference between the temperature of the aircraft skin and the temperature of the air through which it is, has been or will be passing, especially during climb and descent and in the temperature range +/-10 degrees Celsius;

Issues arising from the temperature and/or pressure difference between the ambient air and air within engine air inlets, most often reductions in air pressure or increases in air temperature.

Ice from Supercooled Moisture

Ice which accretes on the external parts of an aircraft is most often the result of the impact of supercooled water droplets of various sizes on that aircraft. This may happen within cloud or when flying through precipitation. The reason why water droplets do not all freeze as soon as the ambient temperature falls below 0°C is the release of latent heat as water changes state to ice.

So much latent heat is released that the change of state is slowed down so that it takes place progressively as temperature continues to fall. This continues until, by about -20°C, most of the supercooled water has turned to ice. Ice grains which have already fully formed and are dry when they impact an aircraft do not adhere but simply bounce off.

Therefore, the relative severity of ice accretion can be expected to progressively decrease as ambient temperature reduces below 0°C so that little, if any, risk of

accretion remains below -20°C. Two factors are important in respect of supercooled water droplets:

The extent of their presence, which will affect the rate of any ice accretion; and their size, which will affect the severity of that accretion by adversely influencing its rate. Both the quantity and the droplet sizes of supercooled water droplets in cloud are greatest at temperatures just below 0°C and both decrease as temperature falls. The size of the supercooled water droplets is very important in respect of the potential to induce ice accretion.

Larger droplets have greater inertia and are less influenced by the airflow around the aircraft than smaller droplets so they will impinge on more of the aircraft surface than smaller droplets. It is also the larger droplets which produce clear or glaze ice which is well recognized as the ice form of most concern and is often also the most difficult to detect visually.

Clouds and Supercooled Moisture

The majority of supercooled droplets in clouds are between 1 micron (0.001mm) and 50 microns (0.05 mm) in diameter. (For comparison, the thickness of the average human hair is approximately 100 microns). Layer (stratiform) clouds typically contain average droplet diameters of up to 40 microns.

Vertically developed (cumuliform) clouds of moderate scale typically have average droplet diameters of up to 50 microns (0.05mm) but large Cumulonimbus (Cb) clouds often contain much more liquid water, including large quantities in droplets with diameters up to and beyond 100 microns (0.1mm).

Freezing Rain and Freezing Drizzle

Precipitation droplets that are clear of cloud are much larger than those within cloud and, if they are supercooled, they are described as creating Freezing Drizzle where droplets have a diameter of between 50 and 500 microns (0.05mm and 0.5mm) and Freezing Rain where the droplets exceed 500 microns (0.5mm) in diameter. Freezing Rain often has much larger droplets of 2mm diameter or more, although if they get much beyond 6mm in diameter, they will tend to break up.

Freezing rain below cloud forms when rain droplets are supercooled by passage through a layer of air which has a sub-zero temperature. Since air temperatures normally increase as altitude reduces, freezing rain implies the existence of an air temperature inversion. Such conditions can occur below an advancing warm front or a warm occlusion where a relatively warm air mass is overrunning colder air. The existence of freezing rain normally means that there will be warmer air (above 0°C) above.

When, through condensation, some droplets in a cloud grow to approximately 30 micrometers in diameter, they begin to settle, falling fast enough so that they collide with some smaller droplets. If the droplets then coalesce, a larger droplet is produced and this now has an even better chance of 'capturing' smaller droplets.

Under favorable conditions, this process can produce drizzle-size drops in a supercooled cloud, usually near the top, where the largest droplets generally are found in any cloud. Data capture has varied but some studies have reported that freezing drizzle in non-convective clouds forms more than 80 percent of the time by the collision-coalescence process.

Icing Severity

The term 'icing severity' is essentially about the rate at which significant ice accretion occurs. The descriptions of supercooled water droplets so far have been in terms of their size. These comparative diameters are important - typical drizzle droplets have a diameter 10 times that of typical cloud droplets and typical rain droplets have a diameter 100 times that of typical cloud droplets. Size as described by diameter is, though, not what matters most in terms of the potential for ice accretion through impact.

This latter point is of considerable importance since large droplets may impact far beyond the leading edges in areas which are not anti-iced or de-iced and may also turn to ice as they are flowing aft in contact with the surface initially hit.

Therefore, if 20 microns (0.02 mm) is taken as a typical diameter for a cloud droplet and 2000 micrometers (2mm) is taken as the typical diameter of a freezing rain droplet, then although the diameters of these droplets differ by a factor of only 100, their volume, and therefore their mass, differ by a factor which is of the order of 1,000,000.

WHY AIRCRAFT WEIGHT AFFECTS CLIMB PERFORMANCE

By Paul Mwangi
p.mwangi254@gmail.com

If you've ever flown an airplane at max gross weight, you've definitely noticed a decrease in climb performance compared to when you're light. The following is what happens;

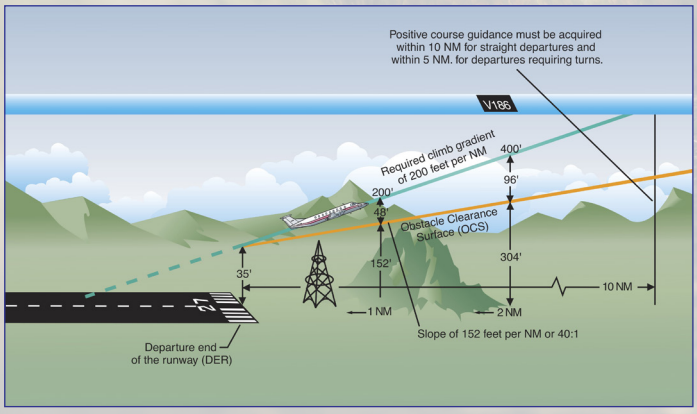
Several Factors Affect Climb Performance
For propeller-driven aircraft, climb performance is directly dependent upon your plane's ability to produce excess power.

For the purposes of this article, excess power means any reserve power your engine has above what's required to maintain level flight. Excess power can also mean converting kinetic energy (airspeed) into potential energy (altitude), but we'll save that for another article.
Excess power is affected by weight, altitude, and aircraft configuration. Depending on how you plan your flight, all of these factors work in combination, resulting in an increase or decrease in climb performance.

According to the FAA, "an increase in weight, an increase in altitude, lowering the landing gear, or lowering the flaps all decrease both excess thrust and excess power for all aircraft. Therefore, maximum Angle-of-Climb (Vx) and maximum Rate-of-Climb (Vy) performance decrease under any of these conditions" (FAA PHAK 11-8).

Weight Makes a Big Difference

Aircraft weight is one of the most significant factors for decreased performance, but the reason isn't as simple as "the airplane is heavier, so to overcome gravity you need more power."



Increasing an aircraft's weight affects its climb performance in two ways:

- A change in weight changes the drag and power required.
- A heavier aircraft needs to fly at a faster speed to achieve Vy.

Higher Weight = Higher AOA

When weight is increased on an aircraft, it needs to fly at a higher angle-of-attack to produce more lift, opposing the aircraft's increase in weight. This increases both the induced drag created by the wings and the overall parasite drag on the aircraft. It's the same principle as increasing the AOA through flap extension, as pictured below.

How increased drag affect climb performance;-
Power is needed to overcome any increase in drag. This trade-off means there's less reserve power available for climbing in a heavy aircraft.
The Heavier You Get, The Faster You Need To Fly
For Vy. Vy is your best rate of climb speed, and it changes with weight. Most aircraft POHs only publish Vy for max gross weight, and admittedly, Vy doesn't change significantly with weight in most aircraft.

The heavier your plane is, the faster you need to fly to truly achieve Vy. Keep in mind though, your POH most likely published Vy for max gross weight. So if you're under max gross, you actually need to fly slower than your published Vy to achieve your weight-adjusted Vy speed.
How many knots does Vy change with weight? It takes some relatively complex math to figure that out, but a general rule-of-thumb is that for every 100 pounds under max gross weight, decrease Vy by 1 knot.

Weight and Climb Performance

When aircraft weight increases, climb performance decreases. And it decreases because you have less reserve power to climb.

Source: Boldmethod

HOW TO SAFELY STOP DURING A REJECTED TAKEOFF

By Paul Mwangi
p.mwangi254@gmail.com

While there are plenty of reasons why you should reject a takeoff, the key is having a solid plan in place every time you advance the power for takeoff. The following is how to prepare for a rejected takeoff, and how to execute it.

Reasons for Rejection; Emergency and Abnormal Situations
Whether you're flying a Cessna Skyhawk or an Airbus A320, there are dozens of emergency and abnormal situations during the takeoff roll that could require you to perform a rejected takeoff. Here are some of the most common:

- Loss of Engine Power
- Door Popping Open
- Runway Incursion
- Pressurization Failure
- Low Oil Pressure / High Oil Temperature
- Stall Protection / AOA Failure
- Inadequate Acceleration
- Engine Vibrations
- Windshear
- Any Kind of Fire
- Loss of Directional Control
- ATC Takeoff Cancellation

If something seems wrong or out of place during any takeoff, reject the takeoff as early as possible at a slow speed.

Brief Your Takeoff Plan
Whether you're alone, flying with a friend, or flying with a crewmember, brief your rejected takeoff criteria. It's something every airline requires of its pilots, and something that every GA pilot will benefit from.

Verbalize the points at which you plan to take the aircraft airborne vs. reject the takeoff and stay on the runway. While you can't possibly name every possible scenario, highlighting these criteria will make it easy to make a go/

no-go decision during takeoff.
If you're flying a piston airplane, you don't have the same high speed reject concerns that pilots flying jets face. Generally speaking, if you haven't lifted off the ground in a piston airplane and something goes wrong, your best bet is to stay on the ground.
Only take a problem airborne in small aircraft when you don't have runway remaining, or if it's a minor issue that you know can be easily dealt with.

Concerned About Runway Length? Here's What the FAA Suggests

The FAA says in Chapter 5 of the Airplane Flying Handbook: "Prior to takeoff, the pilot should identify a point along the runway at which the airplane should be airborne. If that point is reached and the airplane is not airborne, immediate action should be taken to discontinue the takeoff. Properly planned and executed, the airplane can be stopped on the remaining runway without using extraordinary measures, such as excessive braking that may result in loss of directional control, airplane damage, and/or personal injury".

How to Execute a Rejected Takeoff

The general procedure for a rejected takeoff is simple: Power Idle, Maintain Directional Control, and Maximum Necessary Braking.

Keep in mind, however, that you should always follow the procedure your aircraft manufacturer recommends. And if you reject a takeoff due to an engine fire, you may need to bring the mixture control to idle cutoff to stop fuel flow to the engine. Then, once you're stopped, follow the procedure for an engine fire on the ground.

There are a few things you should take into consideration when performing "maximum necessary braking." If you're taking off on a runway with thousands of feet remaining, you probably don't need to aggressively brake as you reject the takeoff. With aerodynamic braking, you might not really need to use your brakes at all. Just use enough braking action to safely stop the aircraft before the end of the runway.

Why don't you want to aggressively brake? When you're near rotation speed, there isn't much weight on your tires, because your wings are generating lift. That means it's easier to lose directional control if you're aggressive on the brakes during a rejected takeoff.

On top of that, locking up a tire at high speed due to aggressive braking could cause a brake to lock or a tire to pop, making your situation even worse. When the FAA recommends "maximum necessary braking," you should only brake as much as required for the runway distance remaining.

Communicate Your Intentions

Once you've slowed down and the imminent threat has been avoided, communicate your intentions to ATC or other aircraft on the CTAF frequency. Let them know that you've rejected the takeoff, where you plan to exit the runway, and if you need any additional assistance. Never rush to exit the runway if you've just rejected a takeoff. Take a deep breath, slow the airplane to a controllable speed, and find a safe place to exit the runway.

ARTIFICIAL INTELLIGENCE

It's Importance in Aviation Industry

James Kamali
Jk2000@gmail.com

What is AI and why is it important for aviation?

AI, or artificial intelligence, is the ability of machines to perform tasks that normally require human intelligence, such as learning, reasoning, and decision-making.

AI has the potential to transform the aviation industry in many ways, such as improving safety, efficiency, and customer experience. For example, AI can help airlines optimize their pricing strategies, predict and prevent maintenance issues, and enhance flight operations and air traffic management.

AI can also help airports streamline their operations, security, and passenger services, and provide travelers with personalized and seamless journeys.

What are the main challenges for AI adoption in aviation?
However, harnessing AI in aviation is not without challenges. The aviation industry is one of the most complex and regulated sectors in the world, where safety is paramount and data is critical.

Some of the key challenges that AI faces in aviation are:
Data management: Aviation generates huge amounts of data from various sources, such as aircraft sensors, air traffic control systems, weather reports, passenger information, and more. Integrating and harmonizing these diverse datasets into a unified and reliable source for analysis is a major challenge for AI applications.

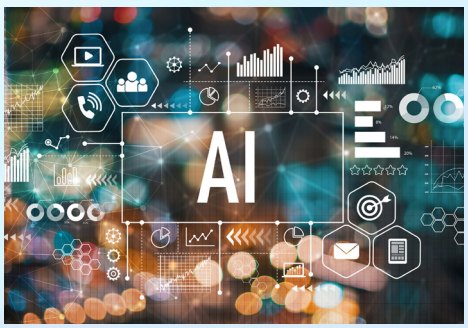
Scalability and safety: Aviation systems involve human decision-making potentially alongside AI, and require rigorous validation and verification processes to ensure safety and compliance.

AI systems must be able to explain how they reach their decisions and recommendations, and be audited and monitored for their performance and behaviour.

Reward functions and side effects: AI systems can be driven by complex reward functions that define their objectives and motivate their actions.

Data distribution shift: AI models are trained on specific datasets, but may encounter different real-world data when they are deployed. This can lead to a mismatch between the expected and actual behaviour of the AI system, and compromise its accuracy and reliability. For example, an AI system that sets ticket prices based on historical demand may fail to account for second order behaviour change by the actors in the system – such as customers responding to a pricing strategy.

Despite these challenges, the drivers for change go beyond cost or productivity: The well documented acute skills shortage, exacerbated during the pandemic as many experienced professionals retied early, including Air Traffic Controllers, Pilots and other technical roles may necessitate the faster adoption of supportive automation and analytics Ai systems.



How safe are the oldest passenger planes in the sky?

Namukasa Joan
Joannamukasa2015@gmail.com

In 1974 a Boeing 737-200, with the serial number 20836, made its maiden flight for Transavia Airlines, based in the Netherlands. Fifty years on, Wilson has shuffled off this mortal coil, as has Freddie, while Nasa is hoping to start a colony on Mars. But 20836 is still going strong in the services of Nolinor Aviation, a Canadian charter airline, under the registration C-GNLK.

Its journey from Holland to Quebec has been a circuitous one, covering five continents. After leaving the low-cost Dutch airline in 1977 it went to Saudia, then Aerolineas Argentinas.

Next up was the now-defunct Australian Airlines, followed by Air Florida, another former carrier. MarkAir, based in Alaska (also deceased), came next, before a stint as a cargo plane. In 2004, it went to Peru. In 2006, it was bought by the short-lived Italian outfit Voliamo. In 2008, CityLine Hungary – which ceased trading in

A 36.3year old 757 Jet2 fleet G-LSAI is the oldest plane in the world

2015 – snapped up the well-travelled 737.

Since 2014, however, it has been in the services of little Nolinor Aviation, based in Mirabel, a suburb of Montreal, which serves a handful of domestic destinations using a fleet of 18 aircraft. At 49.7 years, it is, according to the database of Airfleets.net, the world's oldest passenger plane still in service.

The reliability of elderly aircraft is occasionally raised, such as in 2017 when a 31-year-old Jet2 plane, also a 737, made two emergency landings in as many weeks.

Passengers were never at risk, Jet2 said, but commentators were quick to point out the age of the aircraft. Registered as G-CELI, it was manufactured in 1986 for Lufthansa. And those problems signalled the end of its many years of service – two months after the incidents, G-CELI was placed in storage and then scrapped in 2020 "due to failures on board the aircraft" and "failed" repairs.

The oldest plane in the Jet2 fleet is currently G-LSAI, a 36.3year old 757. On April 10, 2017, with 238 people on board, it bounced on landing at Alicante Airport, suffering a tail strike and extensive damage on what was the co-pilot's final training flight, but was back in the sky in June of that year. So are older planes any more likely to suffer problems? The resounding answer from airlines and aviation experts is "no" – as long as they have been looked after.

Airlines will, of course, upgrade their fleets at regular intervals – but economics, not safety, is the motivating factor. "Age itself does not force aeroplanes into retirement," said Harteveldt. "Two other things do:

John Strickland
an aviation consultant

"Maintenance increases as an aircraft ages, taking more time on the ground and adding more cost for operators. This may become uneconomical and an airline may simply decide to retire and scrap the aircraft. Another consideration is that older aircrafts are also noisier and may therefore incur financial penalties at some airports."

bad fuel efficiency and low availability of spare parts."

So it's certainly rare to maintain and operate an aircraft as venerable as Nolinor's 737. According to Airfleets.net, which carries records for 43 models, the only older jets still active are in the hands of cargo firms and air forces. Caspian Airlines, for example, has a 54-year-old 747 (registration: EP-CQB) that once belonged to TWA – but it is used for transporting goods, not people.

Nolinor Aviation was r comments.

"It's not the age of the aircraft that matters, it's the maintenance," said Henry Harteveldt, a US-based aviation analyst for Atmosphere Research Group. "There are DC3s built in the 1930s and 1940s that are still flying safely in various places around the world. Delta still operates Boeing 767s that were built 30 or more years ago. Granted, the cabins may be a little long in the tooth, but the aircraft themselves operate reliably and safely."

Nolinor Aviation is notable for its venerable fleet, including this 40-year-old 737 slightly younger than Nolinor's C-GNLK is C-GMAI, a 737 born in 1978 and operated by Air Inuit, also based in Canada. RUTACA, from Venezuela, has one (YV380T) that first flew in 1981.

Tehran-based Mahan Air has an A300 from 1987, as well as the oldest 747 still being used for passenger services (EP-MNR, born in 1987), while Zagros Airlines, also based in Iran, has a McDonnell Douglas MD-80 made in 1985. Little Eastern Airlines (formerly Dynamic Airways), based in Miami, has a 40-year-old 767, registration N605KW.

In all likelihood, you haven't flown with any of these minnows, but step a little closer to the modern day and the big boys soon start cropping up.
Of the major players (and as mentioned by Harteveldt), Delta has some of the oldest jets. Its fleet of 978 aircraft has an average age of 15 years, and includes a 34.7-year-old 757, and a clutch of 33.8-year-old 767s.

The average age of the BA fleet is 13.5 years, and its oldest aircraft is a 777, registration G-VIIA, which it received in 1996. It retired the last of its 747s in 2020, when global travel was halted by the Covid pandemic.

There is another option for fans of elderly aircraft, however. The Airfleets.net database is not exhaustive, with the smallest charter and sightseeing outfits not included. Such as DDA Classic Airlines, based in the Netherlands, which offers pleasure flights for aviation enthusiasts on a DC-3, a model that has been out of service since 1950.

CREDIT: Oliver Smith

By Evans Kimani

EuroAirport:

Basel–Mulhouse–Freiburg

Namukasa Joan
Joannamukasa2015@gmail.com

The airport in the world where you can land in three countries at the same time

The EuroAirport Basel Mulhouse Freiburg is one of a kind. Built on the territory of a single country, it has customs borders for two neighbouring nations and serves cities in three different European countries. Plans for the construction of a joint Swiss–French airport started in the 1930s but were halted by the Second World War.

Swiss planners identified Basel as one of the four cities for which a main urban airport would be developed and recognized that the existing airfield at Sternenfeld in Birsfelden was too small and, due to the development of the adjacent river port facilities, unsuitable for expansion. The suburb of Allschwil was proposed for a new airport, and this would require being constructed across the Franco-Swiss border, leading to talks with French authorities centered on developing a single airport that would serve both countries, enhancing its international

airport status.

In 1946 talks resumed and it was agreed that an airport would be built 4 km (2.5 mi) north of Blotzheim, France. France would provide the land and the Swiss canton of Basel-Stadt would cover the construction costs.

Basel-Stadt's Grand Council agreed to pay the costs for a provisional airport even before an international treaty was signed (which was not until 1949). Construction began on 8 March 1946 and a provisional airport with a 1,200 m (3,900 ft) runway was officially opened on 8 May.

Between autumn 1951 and spring 1953, the east–west runway was extended to 1,600 m (5,200 ft) and the "Zollfreistrasse" (customs-free road) was constructed, allowing access from Basel to the departure terminal without passing through French border controls.

The first enlargement project was approved by referendum in Basel in 1960 and, over the following decades, the terminals and runways were continually extended. The north–south runway was extended further to 3,900 m (12,800 ft) in 1972. In 1984, an annual total of 1 million passengers was reached. In 1987, the trademark name EuroAirport Basel–Mulhouse–Freiburg was introduced.

In 1992 a total of 2 million passengers used the airport. By 1998, this number rose up to 3 million.
In December 1998, Swissair inaugurated service to Newark using Airbus A310s. The main reason it launched the route was that it had heard another carrier was planning to begin flights from Basel to Newark; Swissair wanted to start flying the route before the other airline did.

The structure is located entirely in the north-eastern French region of Alsace, which is home also to the airport's headquarters. Nevertheless, the airport is split into a French customs border and a Swiss customs border.

The latter area is operated by Swiss border police with the authority to apply Switzerland's laws regarding customs, medical services and police work.
French police officers have the same powers on their side of the customs border - but can also perform random checks in the Swiss section.

They are also in charge of the security of the whole building.
Since there has been no border barrier splitting the Swiss and French areas since Zurich joined the EU's Schengen zone, customers can spend either Euros or Swiss Francs within the building, depending where in the airport they end up shopping.

The rare nature of this airport allows passengers heading to Switzerland to bypass French customs clearance.
The EuroAirport is connected to the landlocked nation's customs area by a 1.6-mile-long customs-free road to Basel.
The city of Basel is one of the three served by EuroAirport, alongside France's Malhouse and Germany's Freiburg im Breisgau.

The Alsace commune of Saint-Louis where the airport has been built is included in the Trinational Eurodistrict of Basel, an association of cities and municipalities from Germany, Switzerland and France aimed at promoting cross-border projects and cultural exchange.

This international airport is operated jointly by France and Switzerland. However, given it is also Feiburg's airport, its board includes eight members each from France and Switzerland and two advisers from Germany.

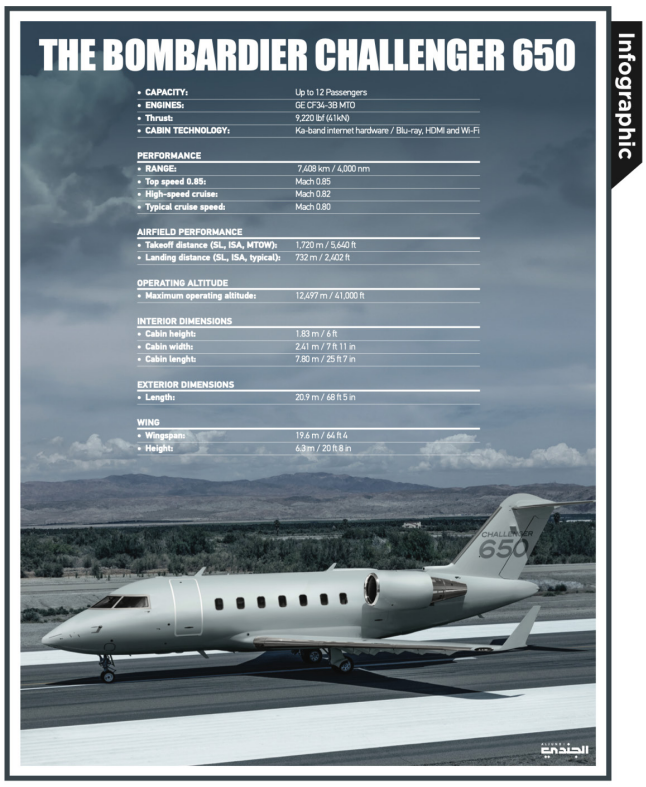
The unique nature of this airport was put to the test during the corona virus pandemic, as Switzerland and France adopted different testing and quarantine rules to allow arrivals to enter.

The issue was solved by temporarily separating Swiss-bound travellers from those heading to France.
Claire Freudenberger, external communications manager at EuroAirport, said "We are a laboratory of cross-border cooperation."

CREDIT: Alice Scars

BOMBARDIER CHALLENGER 650

A Formidable Force in Defence Aviation



Infographic

Unparalleled Dependability and Might

The Challenger 650 aircraft has industry-leading dispatch reliability, class-leading power for mission equipment, over 11 hours of endurance, class-leading maintenance intervals and ample cabin space for workstations and mission equipment.

This explains why there are more specialized Challenger 600 series aircraft in operation than all direct competitors combined.
In the dynamic realm of defence aviation, the Bombardier Challenger 650 stands as a testament to cutting-edge technology and uncompromising performance.

Originally designed for corporate and VIP missions, this exceptional aircraft has seamlessly transitioned into the realm of defence, proving its mettle as a versatile and reliable asset.

At the heart of the Challenger 650's appeal for defence applications lies its robust engineering and adaptability. The aircraft's spacious cabin, initially crafted for luxury, provides a strategic advantage in military operations.

With the ability to be configured for various mission profiles, including surveillance, reconnaissance, and troop transport, the Challenger 650 emerges as a multifaceted platform capable of meeting diverse operational needs.

Equipped with powerful engines and advanced avionics, the Challenger 650 boasts an impressive capability to cover vast distances without compromising on performance, making it an ideal choice for strategic reconnaissance and surveillance operations.

The Challenger 650's avionics suite is a marvel of modern technology, ensuring that defence forces have access to real-time data and communication capabilities.

Moreover, enhanced situational awareness, secure communication channels, and precise navigation systems contribute to the aircraft's effectiveness in complex and challenging environments. In a world where information is power, the Challenger 650 provides defence agencies with a decisive edge.
Cutting costs without cutting corners
The Challenger 650 aircraft has the lowest direct operating cost in its class through affordable maintenance programs and longer maintenance intervals than the competition.

Smooth ride
The Challenger 650 aircraft's wing design integrates Bombardier's signature smooth ride technology, helping passengers arrive at their destination refreshed and well-rested.

Best-equipped cockpit
The Bombardier Vision flight deck on the Challenger 650 aircraft is equipped to meet current and upcoming navigational requirements and offers the industry's most extensive baseline feature set including synthetic vision and MultiScan weather radar systems. With over 5 million flight hours, the Challenger 650 aircraft delivers class-leading reliability with more system redundancies than any of its competitors.

Furthermore, the aircraft's adaptability extends to its payload capacity. With the ability to integrate a variety of sensors, mission-specific equipment, and defensive systems, the Challenger 650 can be tailored to meet the specific requirements of defence missions. Whether its intelligence gathering, maritime patrol, or airborne early warning, this aircraft proves its worth as a flexible and customizable platform.

Operational flexibility
The ability of the Challenger 650 to operate from a variety of airfields, including those with shorter runways, enhances its versatility.
This adaptability ensures that defence forces can deploy the aircraft in diverse environments, responding swiftly to emerging threats or supporting allied forces in remote locations.

The Bombardier Challenger 650's integration into defence aviation signifies a paradigm shift in the way modern forces approach air operations. Its combination of range, adaptability, and advanced technology positions it as a force multiplier, capable of meeting the evolving challenges of contemporary defence scenarios.

As modern militaries look to bolster their aerial capabilities, the Challenger 650 emerges as a compelling choice, embodying the fusion of luxury and lethality in the skies.

Credit: Ikram Bendalla

TOP 10 BIGGEST MILITARY HELICOPTERS IN THE WORLD

Helicopters have been around for a very long time, yet there are still many people who have never flown in one. Helicopters can also come in various sizes, and if you're like most people, the bigger they are, the more exciting they are.
Most military helicopters are used to carrying personnel or equipment to and from various locations, which is why they are made so large.

1. Sikorsky CH-53K King Stallion (USA)

The Sikorsky CH-53K King Stallion is the biggest and heaviest helicopter used by the military, and it was originally developed to meet the needs of the U.S. Marine Corps. It has a payload capacity of just under 16 tons and can carry 37 troops comfortably.

2. Bell Boeing V-22 Osprey (USA)

This large helicopter is used by the U.S. Army, Air Force, Navy, and Marine Corps, and it combines the speed of a fixed-wing turboprop plane with the vertical lift capabilities of a standard helicopter.

One of the most interesting characteristics of the Osprey is that it can refuel in the air, and it can even land on ships, rough terrain, and so on.

3. EuroCopter EC 725 (France)

Also known as the Super Cougar, the EC 725 was specifically designed to enhance French search-and-rescue missions. It made its maiden flight in 2000 and was first delivered to the French Air Force in 2005. The EC 725 has an internal payload of roughly 12,500 lbs. and an external payload of more than 9,900 lbs.

4. AgustaWestland AW-101 (Italy / United Kingdom)

The AW-101 comes in several versions, including anti-submarine warfare and utility versions. It has also been exported to countries such as Canada, Portugal, and Saudi Arabia, and some of those countries call it the Merlin.
This helicopter can carry 26 soldiers and has a payload capacity of up to 11,000 lbs. It was designed and developed as a modern naval utility helicopter.

5. NHI NH90 (Netherlands / France / Italy / Germany)

TOriginally, there were two versions of the NH90.
The different versions are known as the NH90 NFH (NATO Frigate helicopter) and the NH90 TTH (tactical transport helicopter).
They were used for both anti-ship and anti-submarine warfare roles, and for assault transport, electronic warfare, rescue, and VIP transport duties.

6. MIL Mi-26 (Russia)

The Mil-Mi-26 helicopter is the largest production helicopter in the world. In the West, it is called the Halo, and it is currently being used by a total of 20 countries, including India and Russia.
With the capability to carry certain loads externally, the Mil-Mi-26 helicopter can even carry two combat vehicles that each weigh over 22,000 lbs. Its cargo area has a length of nearly 40 feet and is almost 11 feet wide, making it quite a big aircraft.

7. Boeing CH-47F Chinook (USA)

The CH-47F Chinook can transport war supplies, troops, and various types of battlefield equipment. It has also been used for parachute drops, medical evacuations, the recovery of aircraft, and many different search-and-rescue missions. As you can see, it is not only a very large aircraft, but a very useful one as well.

8. MIL Mi-38 (Russia)

The Mi-38 helicopter has both civil and military customers, and it can accommodate up to 32 troops. As far as payload capacity goes, the internal payload on the Mi-38 is more than 11,000 lbs.The Mi-38 has new engines and avionics, as well as a new rotor system and airframe. The Russian military began the use of these helicopters in 2018, and the manufacturer now has plans for many other upgraded versions as well.

9. Changhe Z-18 (China)

The largest military helicopter ever adopted by China, the Changhe Z-18, will eventually replace the older Z-8 helicopters. With more powerful engines and a redesigned fuselage, the Z-18 has a lot of interior space and has tremendous performance at high temperatures and altitudes.

The Z-18 can accommodate nearly 30 passengers, and it once broke a record by flying around Mt. Everest at an altitude of nearly 30,000 feet.
It was developed by Changhe Aircraft Industry Group (CAIG) and is known in China as the White Heron. It is a fairly new type of military transport helicopter.

10. MIL Mi-8 (Russia))

Currently in use in more than 60 countries, the MIL Mi-8 helicopter can accommodate 24 troops and an external payload of more than 6,600 lbs., as well as an internal payload of roughly 8,800 lbs.
Since the early 1960s, over 7,000 examples of the Mi-8 helicopter have been developed. The export version is known as the Mi-17, and there are still many other variants being produced today.

UAE'S HUNTER 2-S DRONE: REVIEW

John Isiko
jisiko@gmail.com

The Hunter 2-S is also referred to as a suicide drone or loitering munition. The weapon system was developed to loiter for an extended period over an area to carry out strikes.

The hunter 2-S swarming drone system leverages cutting edge artificial intelligence that empowers the UAVs to fly in Information and share information with one another that allows them to perform coordinated missions and effectively engage targets.

HALCON, which is a subsidiary of the Emirati EDGE Group, one of the top 25 defence contractors in the world, Has recently launched the Hunter 2-S swarming drone, which are expected to greatly affect battlefields in the future, by providing the armies with advanced tactical advantages across a series of combat scenarios and various tasks.

The Hunter 2-S UAV is an advanced, highly capable solution that relies on a swarm strategy to achieve greater efficiency compared to operating in an uncoordinated mass.

Features, specs, and uses

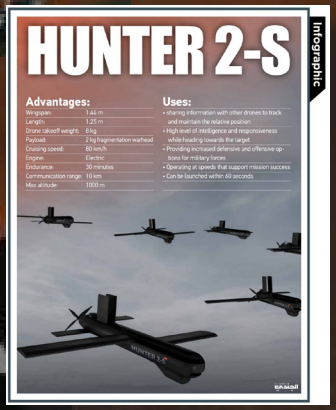
The Hunter 2-S uses 3D printed parts, specifically aerospace-qualified thermoplastic material, created using HALCON's advanced in-house manufacturing capabilities.
The Hunter 2-S is a battery-powered, electric drone designed for attack, intelligence, surveillance, and reconnaissance (ISR) missions that carries a 2kg fragmentation warhead payload.

The Hunter 2-S drones, which are launched from the ground to ensure combat decisiveness, feature wings that fold out upon launch from a launcher tube, which can be installed on an armored vehicle or artillery, to then fly in a formation of up to 21 drones.

This swarm of drones can fly autonomously to perform coordinated missions that help confuse and overwhelm the enemy.

The maximum take-off weight of the Hunter 2-S drone is 2 kg, it has a maximum cruising speed of 80 km/h, a maximum altitude of 1,000 meters, an endurance of 30 minutes, and a communications range of up to 10km.

With a wingspan of 1.44m and a length of 1.25m, the swarming drones can all be deployed within 60 seconds, delivering their payload by striking the target and are capable of hitting multiple targets simultaneously.
One of the advantages of the Hunter 2-S aircraft is that it is cost-effective compared to the use of missiles in battles.



Looking to the future

HALCON has future development plans to increase the number of Hunter 2-S-class drones to more than 21 aircraft per swarm, the company also plans to test the first complete system of the Hunter 2-S by the next year 2023, with full production starting in 2025.

Advanced artificial intelligence technologies

Using advanced artificial intelligence (AI) technologies, these tactical drones share information with each other to maintain their relative positions, and that same AI can identify targets by their shape and density, gauge whether to attack directly or within proximity, and assign the relevant number of drones to the target.

Positioning the Hunter 2-S: a battlefield scenario

An armored truck fitted with the Hunter 2-S Tube Launcher stations itself 10km away from an enemy base. Once launched, the 21 drones unfold their wings, gaining altitude and reaching their cruising speed as they approach a joint-operations enemy base which has a rotary-wing aircraft, fuel tankers, armored vehicles, and multiple camps.

Two drones can be assigned to strike the rotary-wing aircraft, one drone per fuel tanker, two drones per armored vehicle, and the remaining drones to strike the camps. The strike can be executed simultaneously, autonomously, and with speed as one drone strikes the cockpit of the rotary-wing aircraft and another hits the tail.

The fuel tankers that are hit cause a bigger explosion which can cause raging fires. A drone can hit an armored vehicle, rendering the vehicle inoperable if not destroyed. Camps are then decimated as the fragmentation warhead spreads its payload.

The high levels of autonomy coupled with the simultaneous strike capabilities of the Hunter 2-S make it extremely difficult for adversaries to counter the attack, as their forces and base get crippled in a matter of seconds.

As the base is hit to devastating effect, intelligence can also be gathered using the Hunter 2-S's camera. Images and videos of the successful mission can be analyzed for greater success in future missions, and a better understanding of the enemy.

On the defensive side of warfare and peacekeeping, a vulnerable army convoy can have immediate and effective air cover in case of an ambush. Adversaries that employ guerilla tactics in any environment often target convoys transporting supplies, leaders, and diplomats. In a matter of seconds, threats that have surrounded a convoy and controlled the road can come under swift aerial attack.

The UAV is capable of attacking static and moving objects, including ground-based aircraft and armored vehicles.

In addition to attacks, the drone can carry out surveillance, intelligence, and reconnaissance missions. It has a maximum take-off weight of 8 kilograms (17.6 pounds), a wingspan of 1.44 meters (4.7 feet), and is 1.25 meters long (4.1 feet).

THE LOCKHEED SR-71 BLACKBIRD

A TRIBUTE TO THE KING OF SPEED

By Vincent M. Mupenzi
v.mupenzi@theaviator.co.ug

The Lockheed SR-71 "Blackbird" is a retired long-range, high altitude, Mach 3+ strategic reconnaissance aircraft developed and manufactured by the American aerospace company Lockheed Corporation. The SR-71 has several nicknames, including "Blackbird" and "Habu".

The SR-71 was developed as a black project from the Lockheed A-12 reconnaissance aircraft during the 1960s by Lockheed's Skunk Works division. American aerospace engineer Clarence "Kelly" Johnson was responsible for many of the aircraft's innovative concepts
The SR-71's existence was revealed to the public in July 1964; it entered service in the United States Air Force (USAF) in January 1966.

Development

Lockheed's previous reconnaissance aircraft was the relatively slow U-2, designed for the Central Intelligence Agency (CIA). In late 1957, the CIA approached the defense contractor Lockheed to build an undetectable spy plane.
The project, named Archangel, was led by Kelly Johnson, head of Lockheed's Skunk Works unit in Burbank, California. The work on project Archangel began in the second quarter of 1958, with aim of flying higher and faster than the U-2.

Of 11 successive designs drafted in a span of 10 months, "A-10" was the front-runner. Despite this, however, its shape made it vulnerable to radar detection. After a meeting with the CIA in March 1959, the design was modified to have a 90% reduction in radar cross-section.

The CIA approved a US$96 million (~$731 million in 2022) contract for Skunk Works to build a dozen spy planes, named "A-12", on 11 February 1960. The 1960 downing of Francis Gary Powers's U-2 underscored that aircraft's vulnerability and the need for faster reconnaissance aircraft such as the A-12.

Designation as SR-71

The SR-71 designation is a continuation of the pre-1962 bomber series; the last aircraft built using the series was the XB-70 Valkyrie. However, a bomber variant of the Blackbird was briefly given the B-71 designator, which

was retained when the type was changed to SR-71

USAF Chief Of Staff General Curtis Lemay preferred the SR (Strategic Reconnaissance) designation and wanted the RS-71 to be named SR-71. Before the July speech, LeMay lobbied to modify Johnson's speech to read "SR-71" instead of "RS-71".

The media transcript given to the press at the time still had the earlier RS-71 designation in places, creating the story that the president had misread the aircraft's designation. To conceal the A-12's existence, Johnson referred only to the A-11, while revealing the existence of a high speed, high altitude reconnaissance aircraft.

Design

The SR-71 was designed for flight at over Mach 3 with a flight crew of two in tandem cockpits, with the pilot in the forward cockpit and the reconnaissance systems officer operating the surveillance systems and equipment from the rear cockpit, and directing navigation on the mission flight path.

The SR-71 was designed to minimize its radar cross-section, an early attempt at stealth design. Finished aircraft were painted a dark blue, almost black, to increase the emission of internal heat and to act as camouflage against the night sky. The dark color led to the aircraft's nickname "Blackbird".

Shape and Threat avoidance

The SR-71 had several features designed to reduce its radar signature. The SR-71 had a radar cross-section (RCS) around 110 sq ft (10 m2). The SR-71 featured chines, a pair of sharp edges leading aft from either side of the nose along the fuselage.

These were not a feature on the early A-3 design; Frank Rodgers, a doctor at the Scientific Engineering Institute, a CIA front organization, discovered that a cross-section of a sphere had a greatly reduced radar reflection, and adapted a cylindrical-shaped fuselage by stretching out the sides of the fuselage. After the advisory panel provisionally selected Convair's FISH design over the A-3 on the basis of RCS, Lockheed adopted chines for its A-4 through A-6 designs

Operational History

The first flight of an SR-71 took place on 22 December 1964, at USAF Plant 42 in Palmdale, California, piloted by Bob Gilliland. The SR-71 reached a top speed of Mach 3.4 during flight testing, with pilot Major Brian Shul reporting a speed in excess of Mach 3.5 on an operational sortie while evading a missile over Libya. The first SR-71 to enter service was delivered to the 4200th (later, 9th) Strategic Reconnaissance Wing at Beale Air Force Base, California, in January 1966.

Final Retirement

The USAF had not budgeted for the aircraft, and UAV developers worried that their programs would suffer if money was shifted to support the SR-71s. Also, with the allocation requiring yearly reaffirmation by Congress, long-term planning for the SR-71 was difficult.

In 1996, the USAF claimed that specific funding had not been authorized, and moved to ground the program. Congress reauthorized the funds, but, in October 1997, President Bill Clinton attempted to use the line-item veto to cancel the $39 million (~$66.4 million in 2022) allocated for the SR-71.

In June 1998, the U.S. Supreme Court ruled that the line-item veto was unconstitutional. All this left the SR-71's status uncertain until September 1998, when the USAF called for the funds to be redistributed; the USAF permanently retired it in 1998.

NASA operated the two last airworthy Blackbirds until 1999. All other Blackbirds have been moved to museums except for the two SR-71s and a few D-21 drones retained by the NASA Dryden Flight Research Center (later renamed the Armstrong Flight Research Center).

Record Breaker

The SR-71 was the world's fastest and highest-flying air-breathing operational manned aircraft throughout its career and it still holds that record. On 28 July 1976, SR-71 serial number 61-7962, piloted by then Captain Robert Helt, broke the world record: an "absolute altitude record" of 85,069 feet (25,929 m).

Source: Multiple