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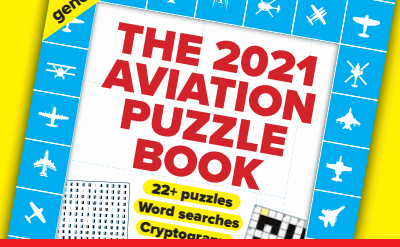

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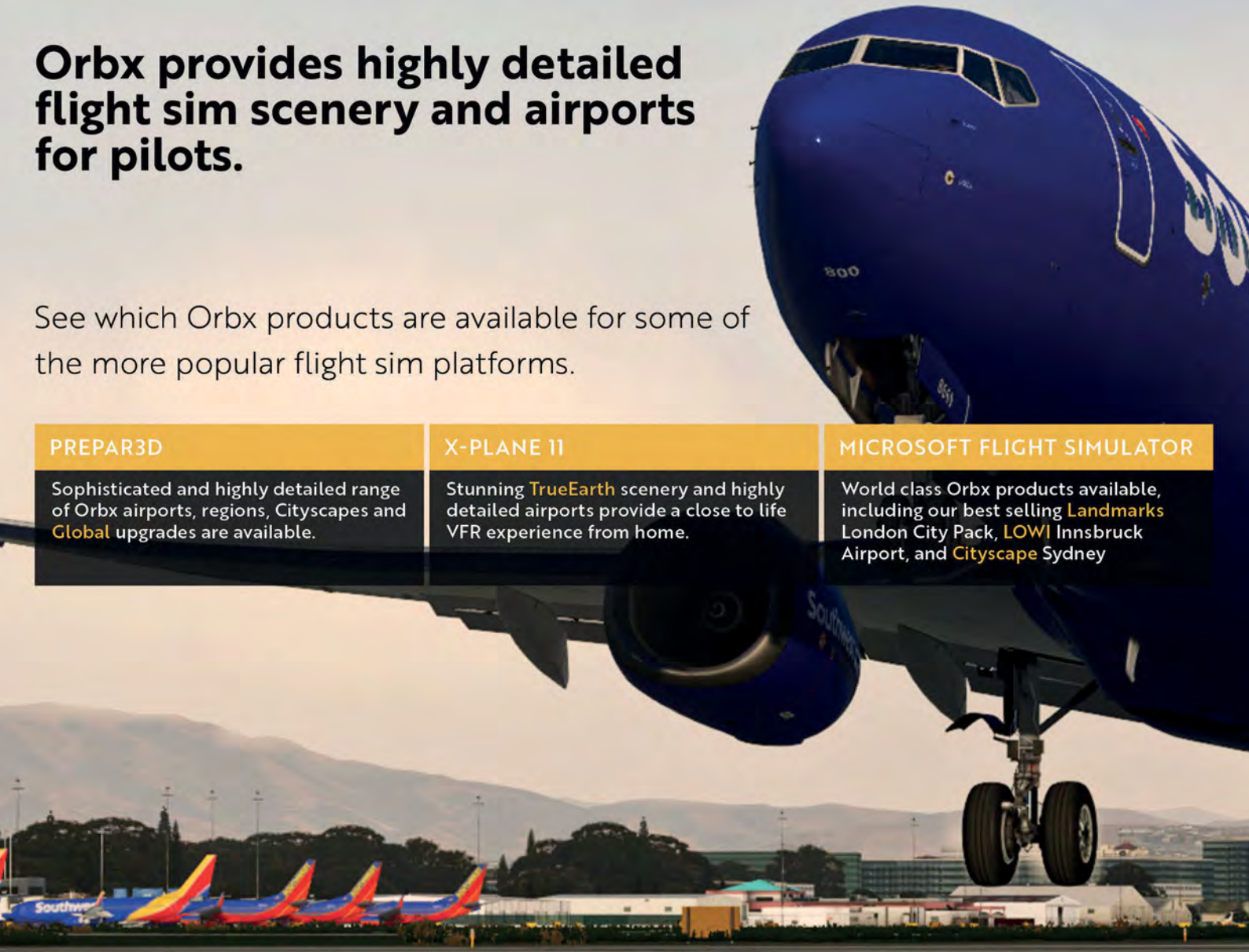

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REGULARS

We are happy to report that, at time of going to press, production and dispatch of our magazine is not affected by the ongoing coronavirus pandemic. Should this change, we will continue to update you as best we can. Some postal services may be delayed.

You can keep in touch with our latest updates and see what we are doing to keep distribution as normal as possible by visiting **www.keypublishing.com/FAQs**.

Cover (main image) **Alrosa was the last Russian scheduled operator of passenger Tu-134s, retiring the type in 2019** Denis Fedorko Inset (lower left) **Italy's RSV trials weapons and equipment on the Typhoon and other air force aircraft** Riccardo Niccoli Inset (lower right) **The C-23A Sherpa visited UK air bases regularly in the '80s, shuttling aircraft parts around Europe** Peter R Foster

Starfighter's Second Life

Starfighters Aerospace TF-104G, N991SF, on its take-off run © Starfighters Aerospace, Matt Haskell Photography @mhaskellphoto

A former Italian Air Force TF-104G, MM54258, construction number 583H-5209, model 583-10-20 – which was retired from service in 2004 – has taken to the air again.

The aircraft, now registered N991SF, flew after work by Starfighters Aerospace, which operates from the Kennedy Space Center in Florida. The Starfighter took off on January 27 from the Shuttle Landing Facility with Starfighters Aerospace CEO and founder Rick Svetkoff as well as chief pilot Piercarlo Ciacchi (formerly of the Frecce Tricolori and an ex-Italian Air Force F-104 pilot) aboard, supported by crew chief Sean Freitag.

Svetkoff said after the flight: "She flew like a dream. It was amazing, the airplane flew like a rocket ship."

Starfighters Aerospace is the only commercial operator of the F-104 in the world and performs a variety of services to customers, including microgravity experiments, pre-launch space payload testing/qualification, suborbital spaceflight simulation, air-launch of microsatellites and avionics testing/qualification. The company has been most notable, previously, for its airshow involvement, flying as the Starfighter demo team.

The company also provides training for licensed pilots. Through an FAA Letter of Deviation Authority, licensed pilots can pay to fly the aircraft and receive type-specific training. Starfighters Aerospace operates a fleet of seven F-104s. Matt Haskell

UK Extends 'Red List' to Counter COVID

As part of measures to prevent the spread of new variants of the COVID-19 virus, from January 29, the UK added the United Arab Emirates, Burundi and Rwanda to the 'Red List', its register of high-risk countries from which direct travel is banned. This now includes 14 African countries, all of South America (and Panama), and Portugal, because of its ties with Brazil. A government statement at the time said: "The United Kingdom has to prevent the spread of the new variant originally identified in South Africa into the UK".

British and Irish citizens and those with a UK right of residence who have been in the UAE in the previous ten days can travel to the UK if they can find an alternative routing, although Qatar Airways, which carries many people to the region, suspended bookings made in the UAE for seven days, citing "UK government concerns".

A 'managed isolation' scheme was also announced on January 27, whereby passengers arriving in England would be required to stay in specific hotels for ten days after arrival, although the government had not given details of a start date or costings by press day.

Saying that the UK's plans to quarantine passengers from listed countries did not go far enough according to Scotland's First Minister, Nicola Sturgeon: "This approach leaves open the possibility that people will travel into the UK from those countries via third countries." On February 2 she announced a managed isolation scheme for all arrivals to Scotland from outside the UK. Jim Winchester

Team Mosquito to Build Loyal Wingman

A consortium led by Spirit AeroSystems has been selected to build a full-scale test vehicle for the UK's 'loyal wingman' combat UAV programme. An initial £30m will be given to Team Mosquito, which also includes Northrop Grumman UK, and which will build the aircraft in a former Bombardier facility in Belfast, Northern Ireland.

The vehicle is a development of the Lightweight Affordable Novel Combat Aircraft (LANCA) concept and is expected to begin test flights by the end of 2023. It is designed to fly at high speed alongside fighter jets, armed with missiles, surveillance and electronic warfare technology. It will be the UK's first uncrewed air vehicle able to target and shoot down enemy aircraft and survive against surface-to-air missiles.The aircraft could ultimately be deployed alongside Typhoon and F-35 Lightning jets by the end of the decade. Jim Winchester

A computer-generated image of a Mosquito loyal wingman UAV and F-35 Spirit AeroSystems

Norwegian Axes Long-Haul Operations

One of Norwegian's Boeing 787-9 Dreamliners Norwegian

Oslo-based Norwegian Air has confirmed plans to terminate its long-haul flights, stating they are "not viable" and attributing the decision to the effects of the ongoing coronavirus pandemic.

Long-haul bases across the UK, France, Spain, Italy and the US will close, with more than 1,100 employees braced for redundancy at its London/Gatwick gateway alone. The British Airline Pilots' Association (BALPA) described the January 14 announcement as "more devastating news" for the air transport industry.

Norwegian Air is shifting "focus onto a European network" as it plans to use a 50-strong 737 fleet during this year and increase this to 70 narrowbody jets by 2022. The firm also stated it will continually assess profitable opportunities as the pandemic eases.

CEO Jacob Schram said: "[This] robust business plan today will provide a new start for the company. By focusing our operation on a short-haul network, we aim to attract existing and new investors, serve our customers and support the wider infrastructure and travel industry in Norway and across the Nordics and Europe."

During Norwegian's long-haul stint, it flew a total of 37 Dreamliners across multiple subsidiaries, comprising both the two-class, 259-seat -8 and larger 338-seat -9 – the majority of the widebodies left the fleet between 2019 and 2020.

Additionally, before the 737 MAX grounding in March 2019, it operated the MAX 8 on connections between Scotland and Ireland to cities on the US Eastern Seaboard. Recent traffic figures showed it carried just 129,664 customers in December with an average of nine aircraft.

On January 21, it was reported that the Norwegian government has "decided to support and contribute to the airline's funding of new capital, pending certain conditions". It is set to provide a hybrid loan as long as the carrier can raise 4.5bn Norwegian krone (£387m) from strategic and institutional investors, according to *The Financial Times*.

Greece Signs Deals for 18 Rafales and 10 M-346s

The Greek and French governments have recently signed a contract for the supply of 18 Dassault Rafale fighters to the Hellenic Air Force.

The deal, signed in Athens on January 25, comprises 12 second-hand aircraft, taken from French Air and Space Force stocks, and six new examples. The €2.5bn contract includes weapons. A second contract was signed for logistical support, covering the next four-and-a-half years.

Deliveries will begin at a rate of one a month starting this July, beginning with six of the second-hand jets, followed by the new aircraft from spring 2022 and the last of the used aircraft in early 2023. On February 1, the French ministry of defence signed for 12 new Rafales to replace those being sold to Greece.

Separately, Greece and Israel have signed a deal to create a flight school for Greek pilots. In the $1.68bn deal announced on January 6, the Hellenic Air Force will acquire ten Leonardo M-346 trainer aircraft, and Israel's Elbit Systems will build and maintain the school, which will be based at the Israeli Air Force Flight Academy at Hatzerim, where Israel currently operates 24 M-346 'Lavi' aircraft. Jim Winchester

MAX Cleared for Return to European Skies

The 737 MAX will soon be back in European skies. These TUI Belgium MAX 8s have been stored at Brussels since March 2019 AirTeamImages.com/Jan Serveriins

The European Union Aviation Safety Agency (EASA) has now given its approval for the Boeing 737 MAX to return to service in Europe. The announcement on January 21 follows the meeting of four conditions imposed after the groundings of two years ago: that the two accidents to Lion Air and Ethiopian Airlines aircraft are deemed sufficiently understood; that design changes proposed by Boeing are EASA approved and their embodiment is mandated; that an independent extended design review is completed by EASA; and that 737 MAX flight crews are sufficiently trained.

EASA executive director, Patrick Ky said: "These four conditions have now all been met, allowing us to go ahead with the return to service. This assessment was carried out in full independence of Boeing or the Federal Aviation Administration." He added: "We have every confidence that the aircraft is safe, which is the precondition for giving our approval. But we will continue to monitor 737 MAX operations closely as the aircraft resumes service." US operators have begun re-introducing the MAX. Following American Airlines 737-8s on December 29, United was returning the 737-9s to schedules on February 11. Alaska Airlines plans to fly the 737-9 from March 1 and Southwest Airlines from March 11. Jim Winchester

Rossiya Adds Superjets

Rossiya SSJ100 Superjet, RA-89043, was spotted on approach to Moscow/Sheremetyevo on January 12 AirTeamImages.com/Artyom Anikeev

St Petersburg-based Rossiya, an Aeroflot Group subsidiary, has received its first inherited Sukhoi SSJ100. Six-year-old RA-89043 (c/n 95074) was transferred from its parent company on New Year's Day. In 2020, it was revealed by the Aeroflot Group that Rossiya's future role would revolve around domestic operations using indigenous-built types. At the time of writing, Rossiya had inherited nine PowerJet SaM146-equipped SSJ100s. Thomas Lee

Boeing and Airbus Deliveries Down

The biggest aircraft manufacturers in the world, Airbus and Boeing, have disclosed their delivery figures for 2020.

Boeing handed over 157 aircraft, with the 787 Dreamliner being the most numerous at 53 airframes. This was followed by the 737 with 43 examples, while the 767, 777 and 747 recorded 30, 26 and five deliveries respectively.

In comparison, Boeing delivered a total of 380 aircraft in 2019. The corporation's most successful period was the fourth quarter, after regulators recertified the 737 MAX in the US, Brazil and Mexico. As a result, the airframer delivered a combined 59 jets, including 31 737s alone.

Greg Smith, Boeing executive vice-president of enterprise operations and chief financial officer, said: "Through the pandemic, we took meaningful steps to adapt to our new market, transform our business and deliver for our commercial, defence, space and services customers in 2020. As we continue navigating through the pandemic, we're working closely with our global customers and monitoring the slow international traffic recovery to align supply with market demand across our widebody programmes. In 2021, we'll continue taking the right actions to enhance our safety culture, preserve liquidity and transform our business for the future."

Meanwhile, Airbus performed better during the year as it handed over 566 commercial jets to 87 customers, despite the COVID-19 crisis, which saw it adapting its production and delivery plans. The A320 Family dominated, with 446 examples making their way to customers. The A350 was the next most popular with 59 delivered, while 38 A220s and just four A380s were supplied. Total handovers were 34% lower than in 2019 and the busiest month was December, during which 89 aircraft were delivered.

Airbus CEO Guillaume Faury said: "Working hand-in-hand with our customers allowed us to navigate a difficult year. The Airbus teams, customers and suppliers truly pulled together in the face of adversity to deliver this result. Based on our 2020 deliveries we are cautiously optimistic as we look into 2021, although challenges and uncertainties remain high in the short-term."

Last year, Airbus recorded 383 new orders. The A220 won 64 of them, while 296 fresh contracts were placed for the A320 Family including 37 A321XLRs.

In the widebody segment, the Toulouse-based giant won 23 orders, which consisted of two A330s and 21 A350s. After 115 cancellations by the end of 2020, Airbus' backlog stood at 7,184.

Thomas Lee and Thomas Haynes

Global X Gets First Jet

Seen at Miami on January 20, former Frontier Airlines A320, N223FR is set to become N276GX for new operator Global X
AirTeamImages.com/Steven Marquez

US start-up Global X took delivery of its maiden aircraft on January 19 in the form of a 15-year-old Airbus A320ceo, N276GX (c/n 2695), ex-N223FR. The 180-seat airframe, which is set to be joined by another example shortly, will be based at Miami/International. It is scheduled to be deployed on charter flights in the US, Caribbean and Latin America once Global X is granted certification by the Federal Aviation Administration, due in Q1 2021. Additionally, the charter firm is entering the cargo market and is expected to receive its first A321P2F (passenger-to-freighter) in Q3 of this year. Thomas Lee

Amazon Procures Used 767s

Amazon Air currently has a fleet of freighters including 767s, of which it is adding more
Flickr Commons/formulanone

In a first for the e-commerce giant, Amazon has purchased its own aircraft as it reacts to a growing customer base. The acquisitions, exclusively of Boeing 767-300 aircraft, include seven examples from Delta Air Lines and four from Canadian carrier, WestJet.

Sarah Rhoads, vice-president of Amazon Global Air, commented: "Our goal is to continue delivering for customers across the US in the way that they expect from Amazon, and purchasing our own aircraft is a natural next step toward that goal. "Having a mix of both leased and owned aircraft in our growing fleet allows us to better manage our operations, which in turn helps us to keep pace in meeting our customer promises."

The four widebodies procured from WestJet are currently undergoing passenger-to-freighter conversion at Lake City Gateway Airport in Florida; they are expected to join Amazon Air's fleet this year. These are to be followed by the seven ex-Delta twinjets due for arrival from next year after being converted.

The firm says the fleet additions will ensure added capacity in Amazon Air's network for years to come, although it will continue to rely on third-party carriers such as Atlas Air, Air Transport International and Southern Air to operate them. The fleet of Amazon comprises 68 airframes, but is likely to grow dramatically as demand for its services increase. Thomas Haynes

China Airlines Retires Passenger 747s

Taipei-based China Airlines was set to operate a farewell flight for the Boeing 747 on February 6. The carrier is retiring its remaining passenger-configured jumbos. The 15-year-old -400, B-18215 (c/n 33737), was expected to fly 350 fare-paying guests on a special five-hour, 40-minute trip.

The farewell rotation, flight CI2747, was due to depart Taipei/Taoyuan at 11.30am before heading to Japan for a sightseeing flyby over Mount Fuji, returning to Taiwan at 5.10pm local time. A goodie bag of a key ring, model aircraft and a commemorative certificate was a gift for passengers. China Airlines introduced the 747 in 1975 and continues to operate a fleet of 18 747-400Fs. Thomas Lee

Myanmar Airways Introduces E190

Myanmar Airways International's E190s join four Airbus A319ceos and a single A320ceo
Embraer

Myanmar Airways International (MAI) started its maiden revenue flights with the Embraer 190 at the end of last year, although future services remain uncertain following the military coup in the country.

For the launch on December 21, the airline used its sole General Electric CF34-equipped example, XY-ALO (c/n 19000529) – leased from CDB Aviation – on four return services from Yangon. Two days later, it was joined in the South East Asian nation by a second Brazilian-built airframe, XY-ALP (c/n 19000556). A further two E190s are set to join the fleet soon. The E190 was also deployed on nine destinations across the Yangon-based firm's domestic network. The jets were intended to take over the routes previously operated by the eight-strong fleet of ATR 72-600s used by MAI's sister company, Air KBZ, but at the time of going to press, all airports were believed to have been closed under the state of emergency.

At the launch Saravanan Ramasamy, chief executive at MAI, described the operation of the E190 as "another important milestone in MAI's fleet expansion strategy and domestic jet network growth", with plans to scale up to eight flights a day in line with demand.

MAI's pilots undertook initial flight training in Zhuhai, China in September 2020, while Embraer conducted a course for maintenance personnel. The airline has opted for the Brazilian airframer's pool programme. Thomas Lee

Belavia's First E2

Belarusian flag carrier Belavia has accepted its maiden Embraer 195-E2. The Pratt & Whitney PW1900G-equipped example, EW-555PO (c/n 19020042), arrived in the country on December 22. The Minsk-based carrier has revealed the type will serve popular routes such as Barcelona, London/Gatwick, Munich, Nur-Sultan (Kazakhstan) and Sochi (Russia). The jet was ferried from Embraer's São José dos Campos factory in Brazil, making technical stops at Recife, and Málaga, Spain. The aircraft is configured in a two-class, 125-seat layout and is set to be joined by two further E195-E2s, all on lease from AerCap.

Anatoly Gusarov, CEO of Belavia, said: "The E2 offers Belavia lower operating costs, as well as the lowest impact on the environment. At Belavia we like to keep our fleet young and fresh; with the addition of the E195-E2 we can take more passengers, further, in greater comfort and more efficiently – the E2 is the perfect fit."

The first Embraer 195-E2, EW-555PO, for Belavia was delivered in December Embraer

Cesar Pereira, vice-president of Europe, Middle East and Africa, Embraer Commercial Aviation, added: "As airlines ramp up operations, the E195-E2 is perfectly positioned to right size routes previously operated by narrowbodies, keeping frequencies and adjusting capacity to new levels."

According to Belavia, the E195-E2 – which was inked in a deal with the lessor in February 2020 – brings significant environmental and economic benefits such as a 25.4% reduced fuel consumption per seat and a cut in nitrous oxide and carbon dioxide emissions of 35% and 50%.

Upon delivery, the airline became the eighth operator to fly Embraer's E2 product. Belavia has a 28-strong fleet comprising 12 older E1 models: five E175s and seven larger E195s. Thomas Lee

Volotea Retires 717

Low-cost airline Volotea has retired its final remaining Boeing 717 after nearly a decade of scheduled operations. The retirement in early January ends its scheduled use in Europe.

The Barcelona-based carrier had planned to phase the jet out by 2022 and replace it with additional Airbus A319 aircraft, but brought its retirement forward by a year.

Volotea operated 19 717s and took delivery of its first example on December 22, 2011. All the jets were set up to seat 125 in a single-class layout.

Boeing Capital Corporation was the company responsible for leasing 15 of the narrowbodies, while the four most recently delivered aircraft were leased by UK-based Falko Regional Aircraft.

The airline's final five examples flew scheduled services for the last time on January 11, returning to the firm's hub at Venice/Marco Polo airport, Italy. There are now just three main operators of the 717 globally: Delta Air Lines, QantasLink and Hawaiian Airlines, with fleets of 85, 20 and 19, respectively. Delta plans to retire its 717s by December 2025, Hawaiian is expected to keep the type until the same year and Qantas is likely to fly them until 2026 after Cobham Aviation Services won a ten-year contract to operate the jets on the carrier's behalf. Thomas Haynes

Lift Takes Off

South African low-cost airline Lift flew its first commercial services, from Johannesburg to Cape Town and back on December 10. The airline flies three A320s leased from local company Global Aviation, including ZS-GAL, seen on the first day of operation at Johannesburg/O.R. Tambo V1images.com/Jono Druion

Montenegro Airlines Ceases Flying

Montenegro Airlines has suspended all flights, citing the government's decision not to continue to support the flag carrier among reasons for the action.

A statement on the airline's website thanked all passengers for "years of trust, travel and friendship", and apologised for disruption to the organisation of travel in coming days and weeks. It continued: "Due to the new circumstances related to the decision of the government of Montenegro not to support the existence of a national airline in the future, and which has a very negative impact on the safety of continued air traffic, we estimated [it is a] level of risk that Montenegro Airlines cannot accept."

The Podgorica-based firm, which was founded in 1994, flew to 20 cities in 12 countries, using a trio of Embraer 190s and a single Fokker 70.

Just ten days after Montenegro ceased operations on December 26, 2020 the country's government registered a new airline called ToMontenegro, which will likely salvage parts of its predecessor. The move comes as those behind the venture act to preserve the carrier's slot allocations at major European airports.

Milojko Spajić, minister for finance, said that it could take six to nine months to get the new carrier up and running. Thomas Haynes

Air Sial Starts Ops

Pakistan's newest carrier, Air Sial, started operations on December 25 with a Karachi to Islamabad flight. Future destinations planned for its three leased A320s include Lahore, Peshawar, and Sialkot, where the airline is headquartered. Its first aircraft, AP-BOA, is seen on finals to Karachi on November 29 V1images.com/Shajie Hussein

IN BRIEF

Bosses at EASYJET have said the firm will not accept any new aircraft this year. The company says it is readjusting its delivery profile to better fit demand amid continued COVID-19 disruption. Following talks with Airbus, the firm has agreed to move 22 delivery slots from the 2022-2024 financial year to the 2027-2028 period. In addition, there will be movement of 15 handover dates within the 2022-2024 cycle to more closely match forecast seasonal requirements. These changes will result in the Luton-based firm taking no aircraft this year, eight in 2022, seven in 2023 and 18 in 2024.

British holiday firm JET2.COM has suspended all operations until March 25 with flights to Iceland halted until April 26. The Leeds Bradford-based carrier made the decision during "ongoing uncertainty" as the country entered a third lockdown in January after a significant rise in COVID-19 infections. All UK travel corridors were closed by the government and citizens prohibited from leaving their homes except for restricted travel reasons. The airline has a 90-strong fleet consisting mostly of Boeing 737-800s and operates from ten UK bases.

Cargo giant DHL has purchased eight examples of the Boeing 777F, which are scheduled for handover by 2022. According to John Pearson, CEO at DHL Express, the investment took place after the company recorded a 40% growth in its e-commerce volume during Q4 of 2020 alone, with this "unprecedented demand" expected to continue well into the future. DHL last placed an order for the 777F in 2018 and has so far received ten from a 14-strong deal.

Saab 340 for RVL

East Midlands-based RVL Aviation has taken delivery of a Saab 340B(F) freighter, G-RRVE, (s/n 340B-223). It is the first of a multi-aircraft commitment between Jetstream Aviation Capital and RVL and will be used for ad hoc cargo charter and RVL's operations on behalf of its major international logistics customers. The aircraft is leased from Jetstream, the largest global owner of Saab 340 and 2000 turboprops.

Dave Connor, RVL's managing director, said: "Everyone at RVL is enormously excited by the prospect of operating the Saabs and taking advantage of the substantially larger cargo volume and payload that they offer. We are confident that they will be key to securing new business."

The company currently operates four Beech 200 King Airs, six Reims-Cessna F.406s, three Cessna 404 Titans and a single Cessna 402. Jim Winchester

Flybig Gets Airborne

New Indian airline, flybig, began operations on December 21 between Delhi and Shillong in the northeast of the country. According to data by ch-aviation, the fledging firm initially wet-leased a De Havilland Canada Dash 8-400 from SpiceJet to operate the rotations. On January 3, flybig's first aircraft, an ex-Virgin Australia ATR 72-500, VT-FBA (c/n 955), entered service. Two further examples of the Franco-Italian-built turboprop will join the start-up soon.

Flybig is one of the carriers created to boost regional connectivity as part of the India's UDAN initiative. This is a government scheme that aims to develop underserved markets and flybig will focus on destinations not previously served by air. Thomas Lee

CIVIL ORDERS

Purchaser	Aircraft	Number	Order Placed	Notes
Alaska Airlines	737-9	23	December 22	
China Aviation Leasing	ARJ21-700	30	January 8	Plus 30 options
DHL	777F	8	December	Announced January 12

Tecnam Taxi to Link Small Indian Cities

Air Taxi India is the country's newest scheduled air carrier service and is operating under the same government-led UDAN scheme as flybig. The carrier is introducing the new concept of operating lighter aircraft and aims to fulfil the initiative's objectives of linking small cities that would otherwise be left without air connectivity. The airline began scheduled service on January 14 with the Chandigarh-Hisar route. At present, the airline operates a single twin-engined Tecnam P2006T, capable of carrying three passengers. However, it plans to grow in the future with additional aircraft and routes, connecting the more remote parts of the country. Shrey Chopra

Tecnam P2006T, VT-ATC, of Air Taxi India, the country's latest carrier to enter the scheduled flight market and which aims to serve unconnected areas Shrey Chopra

Turkey's MELTEM III ATR 72 MPA in Service

The first Turkish Navy P-72 MELTEM III MPA, TCB-751, which was officially inducted into service on December 11, 2020 SSB

The first P-72 (ATR 72) maritime patrol aircraft (MPA) to be completed under the MELTEM III programme has entered service with the Turkish Navy. The development was confirmed by the Presidency of Defence Industries (SSB), which is supervising the project.

The MELTEM III programme covers the provision of six ATR 72-600 airframes converted to MPA configuration. The first aircraft, serial number TCB-751, test serial CSX69926 (construction number 1070), was formally accepted into service on December 11. The subsequent two will follow later in 2021.

The original contract for this long-running project, signed on December 21, 2005, was for ten MPA versions of the ATR 72-500. Although work had begun on converting the first of these aircraft, it was abandoned when development of the newer ATR 72-600 led to the contract being renegotiated. The total was reduced to six airframes based on the new variant, plus two ATR 72-600s configured purely as standard utility transports. Both of the utility versions were delivered in 2013.

Upgraded Mirage 2000D Emerges

The first refurbished Mirage 2000D, serial number 639, landed at the French Air and Space Force Air Base 118 at Mont-de-Marsan in southwest France on January 7.

Fifty-five Mirage 2000D aircraft are being upgraded by Dassault under a mid-life refurbishment programme. The improved Mirages are expected to start returning to operations in 2022 after a year of testing. The work improves the Mirage 2000D's air-to-ground and air-to-air capabilities to what is called the M2000D standard. The aircrew will also have an improved user interface for navigation and weapons.

Austrian Saab 105s Retire

After 50 years service and more than 156,000 flight hours, on December 31 the Austrian Air Force officially retired the Saab J105OË trainer. On January 13, the last flight of the Swedish-built jet trainer in the Österreichische Luftstreitkräfte, took place when BJ-40 was flown to the Flying Bulls' facility at Salzburg Airport. This aircraft, known as the 'Golden Tiger', was specially painted to mark the golden jubilee of the type in Austria, the first example of 40 having entered service in 1970. BJ-40 is to remain on display in the Flying Bulls' Hangar 7 at least until mid-year. The Austrian defence minister, Klaudia Tanner said: "The solidarity and partnership between the Air Force and [sponsors] Red Bull, [at] joint events or at the Airpower events, has a long tradition. It was a great pleasure for us to accept the invitation from Red Bull and to make our anniversary Saab accessible to a broader population once again."
Jim Winchester

The 'Golden Tiger' Saab J105OË outside the Flying Bulls' Hangar 7 after its final flight on January 13 Austrian Armed Forces/Daniel Trippolt

David Dorrell 1929-2021

The world of aviation has lost one of its most influential yet unassuming contributors with the passing of David Dorrell. He was one of the longest serving aviation magazine editors, having been at the helm of *Air Pictorial* from 1961 to 1988. During that time he transformed the monthly magazine and in the process the viability of the Air League.

The origins of *Air Pictorial go* back to 1939 when it was first published by the Air League of the British Empire as the *Air Defence Cadet Corps Gazette*, morphing into *Air Pictorial* in 1951. By the late 1950s, the Air League was in some difficulty financially but its general manager, Air Cdre Christopher Paul, recognised *Air Pictorial* as "an unexploited asset". He recruited editor David Dorrell and according to Paul: "As *Air Pictorial* sales improved, so did its revenue and after five years the entire running costs of the Air League were covered."

Born in Croydon, Dorrell began an engineering apprenticeship with Vickers-Armstrongs at Weybridge, interrupted by National Service in the RAF. While in the Netherlands he met Joep Ruijgrok, the first female Link Trainer instructor in the world who worked for KLM. They married in 1956 and had six daughters. David died of COVID-19 on January 11, 2021, six years after Joep. Vic Flintham

Belgian A109 Display Scheme Unveiled

The new scheme for the Belgian Defence – Air Component A109 display helicopter Laurent Heyligen – LH Aviation Photography

On January 28, the Belgian Defence – Air Component A109 Display Team unveiled its special colour scheme for the upcoming airshow season during a small coronavirus-safe ceremony at Beauvechain air base. The helicopter selected for the team is Agusta A109BAi H46, which received the 'Razzle Blades' scheme designed by Jeroen Van Veenendaal, who also created the two previous display schemes.

In 2021, the A109 will be displayed by Commandant pilot Jo Jacobs and Commandant pilot Stijn Soenens from 17 Squadron based at Beauvechain, who also flew for the 2019 and the (virtual) 2020 display seasons. For the time being, no venues have been selected for where they will appear, as which airshows will go ahead is still uncertain due to the ongoing COVID-19 pandemic. Laurent Heyligen – LH Aviation Photography

Second FAF A330-200 Handed Over

Newly-acquired French Air and Space Force Airbus A330-243, F-UJCT, at Paris-Charles de Gaulle after completing its delivery flight on December 15 French Air and Space Force/M Vallé

The French Air and Space Force's second Airbus A330-200 was delivered to Paris-Charles de Gaulle Airport on December 15. The aircraft is a secondhand A330-243 and has been assigned the registration F-UJCT. Its previous operator, Avianca Brazil, retired the aircraft in April 2019, after only two years of service.

It is the second of three aircraft ordered as part of the French government's aeronautical support plan, announced on June 9, 2020. The first of these, F-UJCS, was also a five-year-old former Avianca aircraft, delivered on November 26.

The third, a new production airframe, is due to arrive in 2022. All three will be converted to multirole tanker transport standard. They will replace the two Transport Squadron 3.60 Airbus A340s (F-RAJA and F-RAJB), that were due to make their final flights on December 19 and 23, respectively.

Large Test Events Become Black Flag

The USAF's 53rd Wing's large force test events have been renamed as Black Flag to reflect how test and tactics development have become exercise-like.The name Black Flag establishes it as a counterpart to the existing Red Flag and Green Flag exercises.

The renamed Black Flag event employs weapons and tactics in training that parallel how the US Air Force would fight in a genuine combat situation. It is to be a realistic, massed-force, fully-integrated, high-threat-density exercise environment.

The 53rd is the only wing responsible for operational test and tactics development for the air force's fighter, bomber and remotely-piloted aircraft fleets.

"As a venue for innovation through integration, Black Flag is ultimately a deep-end testing arena to create and discover capabilities utilising existing and emerging materiel," explained Lt Col Mike Benitez, 53rd Wing director of staff and Black Flag lead project officer.

Benitez added: "Warfighters know that innovation happens at the intersection of weapons and tactics – [which is] where integration occurs."

French Rafales' UAE Anniversary

The French Air and Space Force celebrated ten years of operating Dassault Rafales from Al Dhafra Air Base in the UAE, painting one example in a special colour scheme.

During that time, the Rafales have been undertaking missions over Afghanistan, Libya, Iraq and Syria. French operations began at the base in 2008, initially with Dassault Mirage 2000-5F aircraft, which left the base in 2011. Then, from 2010, Rafales with the French Air Force's 3/30 Fighter Squadron 'Lorraine' began flying from the UAE base. On June 24, 2016, 3/30 Squadron was replaced by seven Rafales of 1/7 Fighter Squadron 'Provence,' one of which received the commemorative art.

Celebrating ten years of French Air and Space Force Dassault Rafale operations from Al Dhafra Air Base in the United Arab Emirates, this 1/7 Squadron example received the special colour scheme to mark the milestone EMA/Loic Marzin/Armée de l'Air et de l'Espace

A close-up of the anniversary artwork

48th FW F-15s Live Fire Exercise

Boeing F-15C Eagles and Boeing F-15E Strike Eagles assigned to the USAF's 48th Fighter Wing at RAF Lakenheath participated in a live missile fire exercise over December 8-10.

The aircraft fired modified Raytheon AIM-9M Sidewinder infrared-guided missiles with inert warheads at flare packs being towed 300ft behind a drone. This was the first time in four years that 48th Fighter Wing pilots have been able to participate in this type of training.

Live fire exercises usually involve the fighter squadrons deploying to Tyndall AFB, Florida, to participate in Combat Hammer, which is a Weapons System Evaluation Program.

The Lakenheath exercise was conducted with the defence technology company QinetiQ.

"Firing a missile gives the pilot the sense of how quickly the interaction takes place and presents a realistic sense of capability," said 493rd Fighter Squadron chief of weapons and tactics, Capt Nathan Hartoin. "It is very important to get this practice in a peacetime environment to ensure full capability during a wartime setting."

Last Amazonas Delivered to Brazil

Brazilian Air Force personnel stand in front of the third and final SC-105 Amazonas search and rescue aircraft during the handover ceremony at the Airbus facility in Seville, Spain on December 9, 2020 Brazilian Air Force

The Brazilian Air Force (FAB) received its third and final Airbus SC-105 Amazonas search and rescue (SAR) aircraft on December 9, during a handover ceremony at the company's facility in Seville, Spain.

The aircraft, serial 6552, left Spain on December 11 and has now arrived at Campo Grande AB in Mato Grosso do Sul state. It will be operated by the 2nd Squadron of the 10th Aviation Group (2°/10° GAv) 'Pelicano (Pelican)', alongside serials 6550 and 6551, delivered in August 2017 and October 2019, respectively. Locally designated the SC-105 Amazonas, this dedicated SAR platform is a variant of Airbus' C-295MPA Persuader twin-turboprop maritime patrol aircraft.

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Harvard to Take Flight Once More

The fully completed Harvard after being rolled out at Tillsonburg Eric Dumigan

The Canadian Harvard Aircraft Association (CHAA) is preparing to return Canadian Car and Foundry-built Harvard Mk.4 20304 to the skies, with a first flight planned for spring 2021. Final restoration and paperwork will be completed over the winter. The aircraft is the most original Harvard in the Tillsonburg, Ontario-based organisation's fleet, and plans are afoot to showcase it at the annual EAA AirVenture in Oshkosh, Wisconsin (July 26 - August 1).

Harvard 20304 was built in 1952 and was the 95th Mk.4 to emerge from the assembly line at Fort William, Ontario. It served in the RCAF for 11 years, firstly from Macdonald, Manitoba and later at Centralia, Ontario. After withdrawal from military service, it was acquired by Gilbert Dressel in 1964 and then was stored in a barn near Wainfleet for four decades.

It was purchased by CHAA member Greg Tyrell in 2006. Greg, a former CHAA president and the organiser of many fundraising events, wanted to restore the aircraft as a tribute to his father Stanley who had served in the RCAF. Sadly, Greg passed away before this could become a reality and in 2009 the Tyrell family donated the Harvard to the CHAA, which vowed to complete the work.

All markings were documented before the aircraft was stripped down. Volunteers spent more than ten years returning the Harvard to its former glory and to the livery it wore when retired at Centralia. On October 25, 2020, attended by members of the Dressel and Tyrell family, 20304 was rolled out and dedicated to Gilbert, Stanley and Greg, accompanied by an RCAF march-past. In an unusual, memorable moment, the aircraft was blessed by Rev Bill White while those in attendance placed their hands upon it. www.harvards.com Eric Dumigan

Rebuild Restart for New Zealand Vildebeest

An archive view of Vildebeest NZ102 over Canterbury Plains, near RNZAF Wigram Air Force Museum of New Zealand

The rebuild of Vickers Vildebeest, NZ102, has recommenced in earnest at the Air Force Museum of New Zealand in Christchurch. The machine's significant remains have been resident at the attraction for many years, along with components from several other former Royal New Zealand Air Force (RNZAF) Vildebeests. Over the past two decades, some progress had been made, but the completion of other projects and a lack of reference material meant that it was always a lower priority.

Some advances have been achieved with reverse engineering, where the structure is painstakingly disassembled and examined to learn how to reconstruct it. The Christchurch team has consequently rebuilt an almost complete fuselage frame. The initial aim is to create a full skeletal airframe using as much original structure as possible. As the project moves forward the museum will gain a clearer picture of what can be achieved beyond that.

As well as progressing the technical aspects, staff have also been conducting research into the service history of NZ102. As a result, connections between the aircraft and several notable RNZAF personnel have surfaced. One was Leonard Trent, who went on to be one of three New Zealand airmen to be awarded the Victoria Cross during World War Two. During his flying training at RNZAF Wigram, Trent flew in NZ102 as pilot or passenger 13 times. These sorties included a visit to Rongotai in Wellington and participation in a flypast of Vildebeests during the RNZAF's first major air show on June 4, 1938.

The RNZAF operated 39 of the single-engined biplanes between 1935 and 1944. They were used in a variety of roles including coastal defence, reconnaissance, aircrew training and target drogue towing. The project at Christchurch is based around what the museum believes to be the world's most complete Vildebeest remains. www.airforcemuseum.co.nz

With thanks to Darren Hammond, AFMNZ

Zero Project Close to Completion

Good progress is being made to returning Mitsubishi A6M3 Zero 3148 to airworthy condition Courtesy Gordon Page

Bob Hammer and his team at Legend Flyers, located at Paine Field in Everett, Washington, are soon to return a rare Mitsubishi A6M3 Zero to the skies after a particularly arduous restoration. "There's just so many parts," said Hammer, as he demonstrated the hand-built cowl flaps that are now installed and ready to cool the Pratt & Whitney R-1830-92 engine. "It's taking a long time to do this restoration the right way, always keeping safety in mind first," he added.

Some 30 years after Zero 3148 was recovered by John Sterling on the Pacific island of Taroa, the aircraft is in the final stages of systems installation, and landing gear trials have recently been completed.

The Zero is about to begin engine runs, which will lead to test flights later this year.

The machine has been painted in authentic colours following careful research. The tail code of 'S-112' and the stencilling on the fuselage indicating sponsorship by the children of Manchurian middle schools, have been accurately replicated. "We're doing it to exacting standards, and that takes time," explained Bob. "We could have built two flying [Messerschmitt] Me 262s in the time it has taken to build the Zero," he added. The aircraft is now available to purchase. Interested parties should contact Gordon Page of Air Assets International at gpage@airassets.com With thanks to Gordon Page

Hellcat Restoration Flies

On January 3, renowned warbird pilot Steve Hinton undertook the first flight of Fagen Fighters' Grumman F6F-5 Hellcat following an extensive restoration led by his son, Steve Hinton Jr of Chino, California-based Fighter Rebuilders. The work took around two and a half years to complete. The former US Navy airframe (BuNo 78645) now represents the machine once flown by VF-83 ace Don McPherson – BuNo 72534 *Death N' Destruction* – during its time operating from USS *Essex* in 1945. Jamie Ewan www.fagenfighterswwiimuseum.org

Spanish Hercules for Display

The Spanish Air Force's oldest Lockheed C-130H Hercules flew for the last time on December 29, 2020, travelling from Zaragoza to Cuatro Vientos, near Madrid, where it is destined to join the Museo del Aire.

The aircraft was accepted by the Spanish Air Force on November 3, 1974 and has since amassed around 18,000 flight hours on military and humanitarian duties. With the Hercules fleet scheduled for withdrawal, the Museo's machine – T.10-03/31-03 – will be stored at Cuatro Vientos until a new bridge has been constructed, enabling the aircraft to be towed to the museum site. Roberto Yáñez

F-117 Assigned to Castle Air Museum

Lockheed F-117 Nighthawk, s/n 84-0813, has been allocated to the Castle Air Museum in Atwater, California. The aircraft that the attraction is set to receive entered service in 1983 and is a combat veteran of Operation Desert Storm in 1991. According to USAF officials the aircraft should be delivered to the Castle Air Museum sometime in June and will undergo some restoration work before it goes on display.

SAAB Safir Joins Yorkshire Collection

Former Austrian Air Force SAAB 91D Safir, OE-KTP, has joined the Real Aeroplane Company's fleet at Breighton, near Selby in Yorkshire, following its arrival from Italy in mid-November 2020.

The last of 24 examples built by Sweden's Svenska Aeroplan AB for Austria, the aircraft served with the air arm's flight training school at Zeltweg, around 100 miles southwest of Vienna. The SAAB flew as '3F-SX' from February 24, 1965, until it was withdrawn on September 13, 1993.

Later sold on to the civilian market, the distinctive monoplane was registered as OE-KTP and took part in air displays for several years with the four-ship Team 2000 across Austria before moving to Italy in 2016. Arriving at Breighton by container, the machine has now been reassembled and is expected to fly in the near future.

The Saab Safir, OE-KTP, which has been added to Real Aeroplane Company collection
With thanks to Dave Butler-RAC Engineering

Real Aeroplane Company Engineering www.realaero.com

Busy Haulers

USAFE's Cold War Sherpas

From the mid-1980s, C-23A Sherpas could regularly be seen shuttling between USAFE air bases. Dr Kevin Wright spoke to former members of the 10th Military Airlift Squadron to hear how this unit functioned and its importance should tensions with the Eastern Bloc have spilled over into conflict during the Cold War

Main photo: **On approach the C-23A generally maintained maximum speed until just two miles from touchdown to reduce air traffic delays at major airfields** Peter R Foster

Keeping valuable frontline fighters flying is always a high priority. In the early 1980s the US Air Force was aware its European wartime supply plans needed rethinking. Its own studies revealed that the equivalent of 300 fighters, 600 to 800 wartime sorties per day, could be lost without an adequate supply of essential spare parts. The solution was the European Distribution System (EDS). The vital components would be stored at dispersed bases to ensure survivability and reduce dependence on direct airlift from the continental US. Linked by a computer system, the parts would be delivered to required locations by a new, robust intra-theatre airlift capability.

The formal air force 'Request for Proposal' specified an off-the-shelf turboprop aircraft, big enough to carry General Electric J79 and Pratt & Whitney F100 engines used by F-4 Phantoms, F-15 Eagles and F-16 Fighting Falcons over distances up to 700 miles. It needed to be rough field-capable and able to operate in Europe's variable weather conditions. CASA with its C.212 Aviocar and Short Brothers with the SD-330 Sherpa entered the competition.

Short Brothers (Shorts) won the US$54m contract for 18 aircraft designated C-23A in US service. Powered by Pratt & Whitney Canada PT6A-45R engines, the first example was rolled out in Belfast, Northern Ireland on August 8, 1984. It was delivered on November 2, 1984 and the last on November 8, 1985. In an arrangement then unique to Europe, Short Brothers not only built the C-23A but trained the initial USAF aircrews and did the major maintenance and support work.

The C-23A was fitted largely with commercial avionics, supplemented by additional military items. Equipment included UHF, HF, VHF-AM/FM radios, plus VOR/ILS, INS, TACAN and ADFs. Extra military items were a flight data recorder, cockpit voice recorder, identification friend or foe (IFF), ground proximity warning and radar altimeter. The Sherpa also carried a Collins RNS-300 colour weather radar.

The aircraft's cargo bay was 6ft 6in x 6ft 6in x 29ft 10in long, accessible via a hydraulic rear main loading ramp. It could be fitted with a floor rail system to accommodate up to four LD-3 standard freight containers, fighter engines or even small-wheeled vehicles with a capacity for up to 7,000lb of cargo. Passenger seats could be installed in the front or along the side of the C-23A's cargo compartment. It also had a smaller 5ft 6in x 4ft 6in left side forward loading door.

GETTING STARTED

Aviation News spoke with Col Bob Spivey (ret'd), the first CO of the reactivated 10th Military Airlift Squadron (MAS) from May 1984 to July 1986 at Zweibrücken AB in West

Germany which operated the C-23As. He explained the thinking at the time: "USAFE [US Air Forces in Europe] had a major problem getting essential grounding parts [without which aircraft couldn't fly] to all its fighter bases. The supply chain could not possibly hope to keep up the supply of these parts they needed in wartime. The idea developed that a bunch of small airplanes, running between bases, hauling parts in a hub and spoke arrangement could be the answer. In 1984 I was offered command of the 10th MAS and allowed the chance to assist in the selection of the initial 36 pilots and set up the squadron as I wanted." It was an offer he couldn't refuse. "To introduce a new aircraft type into service within MAC [Military Airlift Command] was a unique opportunity and probably the best decision I ever made. The air force originally planned to have four major warehouses in Europe, two in England, one in West Germany and another in Spain. They were to be electronically interconnected to identify where all the parts were located and ultimately that system was to be connected to the airplanes as well. Instead, we ended up with one warehouse in England and the 18 airplanes in West Germany. The original plan was never completed," Spivey revealed.

Rhein-Main AB in West Germany on a winter's day as the crew prepare for a flight USAF/SSgt Fernando Serna

Inset: **10th Military Airlift Squadron patch** Mark Race

NEW OPERATION

"In July 1984 we arrived at Zweibrücken as a tenant unit of the resident 26th TRW [Tactical Reconnaissance Wing] with its RF-4Cs. We had to get everyone bedded down in Europe, qualify and train them further. It was about six months before we began flying regular operations, which was quite an achievement. We were a full spectrum, very busy squadron flying up to an authorised 24,000 hours a year." The unit did so well that in 1985 the 10th MAS gained MAC's Outstanding Airlift Squadron Award, with the maintenance squadron winning the comparable award the following year.

He continued: "Within 10th MAS we came up with a hub and spoke operation. We would hit every base in England and the rest of Europe every day, twice a day and deliver parts as they were needed. We basically copied the FedEx model. That took care of 95% of the grounding parts at all our fighter bases. We met the original goal but in a different way to that first envisaged.

"Our initial cadre of 36 very experienced pilots was roughly comprised of half from C-130s and the other half from C-141s. Soon others joined straight after completing their Undergraduate Pilot Training (UPT). We flew with a crew of three – two pilots and a flight mechanic. The latter was a mixture of flight engineer and air loadmaster, but without their formal qualification. We trained them to suit our needs, calculating load weights and how to get equipment on and off the aircraft." ▶

A C-23A undertaking low flying training in autumnal weather with Hohenzollern Castle in southwest Germany in the background USAF/MSgt Patrick Nugent

A large American flag formed the backdrop to the ceremony at Short Brothers' Belfast plant for the handover of the first C-23A Sherpa on August 18, 1984 USAF/SSgt Fernando Serna

Col Bill Barbour was one of the last pilots to join the 10th MAS in late 1989 Via Bill Barbour

BELFAST-BOUND

Col Spivey explained: "Short Brothers were thrilled to build the aircraft for us and delivered them all on time. There was no set training course for the C-23A, so we had to develop our own. We all went to Shorts in three classes of 18 people [each a mix of pilots and flight mechanics] for three weeks. First was myself, our Operations Officer, Mark Race and my Chief of Standards/Evaluation, Carl Rubner and ten other pilots plus five flight mechanics. We were trained and checked out by the Shorts guys and so we returned home as instructors. We started organising ongoing training back at Zweibrücken while our second group went to Belfast. We went to Norway for some cold weather training."

Retired Col Mark Race (then a Major) was the squadron's first Operations Officer, joining the 10th MAS with 4,440 hours on C-47s and C-141s. He was also among that first group to visit Short Brothers for conversion training. "There I had seven flights totalling seven-and-a-half hours. Four of the flights were in a Shorts 330, only three in the C-23A. On my first local flight out of Zweibrücken, I had only four hours in the C-23A, as did most of the other initial 12 pilots [from the first course at Shorts]. We even kept a book in the squadron where pilots would write down anything they might have found new in the cockpit!"

"We regularly flew low level, down to 500ft, to practise our wartime mission..."

Col Spivey takes up the story: "Short Brothers also supplied all the parts and ground support equipment. Unusually at the time, we had a contract logistics arrangement so they did the major maintenance work and completed aircraft modifications if they were required. The C-23 turned out to be a pilot's dream. It was an extremely operationally capable aircraft, even though it might not have won a beauty contest – a lot like an airborne jeep. The engines were good, it was not a hard airplane to fly and had an unbelievable navigation system, including an INS. It was quite forgiving but when heavy you had to handle it carefully, especially in icing conditions.

"We moved a lot of cargo from base to base and even did some movement work for charities too. All the aircraft were named after some of the key stops on our route structure – it got a lot of good publicity at the various bases. We rarely flew without a near full cargo load. We spent a lot of time moving engines around and with one on board that was pretty much a full load. We ran missions through the Berlin Corridor too and so had to be checked out to do that. The C-23A was a wonderful trainer for other transport types, the only thing that it could not do was reach high altitudes."

An essential requirement for the C-23A's selection was the capability to carry fighter engines. Here, an F-16 powerplant is loaded at Zaragoza AB USAF/SSgt Fernando Serna

FLIGHT TIMES

Mark Race outlined a typical example from one of his flight logs:

Saturday, October 19, 1985:
Zweibrücken to Ramstein 15mins
Ramstein to Hahn 25mins
Hahn to Spangdahlem 20mins
Spangdahlem to Zweibrücken 35mins
Zweibrücken to Mildenhall 2hrs 5mins
Sunday, October 20:
Day off at Mildenhall
Monday, October 21:
Mildenhall to Kemble 50mins
Kemble to Fairford 30mins
Fairford to Upper Heyford 30mins
Upper Heyford to Alconbury 30mins
Alconbury to Bentwaters 30mins
Bentwaters to Mildenhall 30mins
Mildenhall to Zweibrücken 2hrs 15mins

Race stated: "We had similar daily runs in Spain and Italy and at times delivered parts outside our standard daily routes. This sort of flying provided exceptional training for our new co-pilots. We never flew above 10,000ft, in all kinds of weather, frequently [in] icing conditions. A co-pilot could get five or six instrument approaches in a day.

"We had 98 pilots, two operational test and evaluation pilots and 48 flight mechanics. The two OT&E pilots were assigned by Air Force Logistics Command to us for two years to evaluate and write up if the C-23A met its required operational capability and standards. After two years they were subsumed into the squadron as line pilots. Of the 98 pilots, 50 were second lieutenants assigned directly from UPT. Many went on to have distinguished air force and airline careers. Within the air force, their time on

Low-level navigation and flying down to 500ft were essential skills for the C-23A pilots' wartime role. This photo shows the effectiveness of the European One camouflage, worn by the Sherpas, against the German countryside USAF/MSgt Bill Thompson

the C-23 enabled them to rapidly upgrade to MAC C-130s, C-141s and C-5s in follow-on assignments. It was a fun time. I am sure there are over 100 former C-23 pilots flying with the major airlines today."

Col Spivey described the often difficult flying conditions: "Most of us had to re-learn some of our basic flying skills. In a C-141 when you meet icing conditions you just flicked the deicing switch, climbed above it and carried on. In the C-23A, it could get pretty interesting at 8,000ft in bad weather and the frequently poor visibility. Winter flying was always exciting. The C-23A had air boots for deicing. You had to let the ice build-up and then activate the boot so it broke the ice off; it would come off in sheets. But you can't just leave the boot on otherwise the ice just builds over the top of it again making it useless. We used ice guards on the side of the airplane to protect it from ice thrown against it by the propellers.

"We regularly flew low level, down to 500ft, to practise our wartime mission, continuing to deliver vital spares. We had to assume that there would not be a fully functioning air traffic control system, so we needed to be good at flying low-level VFR. To be fully qualified in the C-23A actually took a lot of training, which was not always well understood. We also had to be proficient at loading and unloading the airplane in our NBC equipment for possible wartime fallout, biological and chemical scenarios. In early 1985 we even deployed the whole squadron to Torrejón and operated from there for about a month and did not miss an operational beat.

RAF Kemble was the main warehouse. "It was wonderful for us, not very busy. We could get in and out very easily, away from Mildenhall, Lakenheath and other airfields that had so much traffic." The regular flights to Spain required a fuel stop, and Limoges in France was used.

Col Spivey revealed: "The C-23A flew at around 96% reliability. We could get crucial parts to bases within 24 hours. We did a lot of flying, became very well known, regularly turning up at almost every US air base in Europe. We used the callsign 'Pokey' for operations because we were so slow, and 'Skivvy' for training flights. The crews and aircraft performed very well and our relationship with Short Brothers was absolutely outstanding. We were a very friendly squadron. It was a great experience. I had responsibility for the flying, our maintenance squadron and the contract work with Short Brothers. This was much more than most squadron commanders had the chance to do and I was very grateful for that opportunity.

"When Shorts began thinking about the B model, several of us helped with ideas for improvements. With the C-23A they really took a commercial design and put a bit more equipment and painted it a different colour to look like a warfighter. The 'B' model had a lot more dedicated military equipment in it – way more beefed up and more capable."

GOOD EXPERIENCE

The then Lt Tim Paradiso was one the first pilots to join the 10th MAS direct from UPT. He currently flies Boeing 777s for Delta Air Lines and has more than 20,000 flying hours. He explained: "I can say without a shadow of doubt that the most important flying experience of my career were the two years I spent on the C-23A. In 1984, it was not common practice to send newly ▶

The C-23A's ability to move fighter engines and spares around Europe in wartime could have enabled an extra 600 to 800 sorties per day USAF/MSgt Patrick Nugent

Three of the 18 C-23A Sherpas which served with the 10th MAS on the Zweibrücken flight line USAF/MSgt Patrick Nugent

Above: **In 1986, the C-23A's avionics were much more advanced than in much larger cargo aircraft such as the C-130, C-5 and C-141** USAF/MSgt Bill Thompson

Below: **Inter-theatre C-5A Galaxy and intra-theatre C-23A Sherpa on the ground at Zweibrücken AB. The Sherpa's double-size side cargo door is open in this shot** USAF/CMSgt Don Sutherland

graduated pilots to an assignment overseas, but I arrived in Zweibrücken before the first airplanes from the factory did.

"As Col Race mentioned there were about 40 experienced officers and about 60 of us who joined with less than 200 hours flying time. They shared their experiences and freely gave us their insights that helped us all become better pilots, better officers and better people. Even over 30 years later I am lucky enough to still be able to ask them for advice and have them as friends.

"I flew more than 500 hours a year, a considerable amount at that time. We did so in variable weather conditions including 25kts crosswind landings and instrument approaches down to minimums. We... became proficient in such conditions much more quickly than was possible elsewhere as we did it several times a day. It made us better pilots and it was unusual since most other pilots flew just one mission a day. I became an aircraft commander in less than a year and was given more responsibilities at the age of 24 than most of my fellow classmates from flight school."

LATE JOINER

Retired Col Bill Barbour had flown a C-130 during the Panama invasion in December 1989. A few days later he joined the 10th MAS in West Germany. He explained: "Even as I joined the unit they were already getting prepared to shut down." He quickly completed his in-house conversion training. "The C-23A's avionics package was impressive. Not quite the glass cockpit of today's standard, but in comparison to the C-130, it was a very modern airplane. It had a colour weather radar and the navigation systems were pretty sophisticated. It was a good little aircraft, but a bit underpowered compared to the later 'B' model. If we were travelling long distances, fully loaded with cargo, we would have a reduced fuel load to keep within weight limits and so made an extra stop on the way to fill up.

"It was not a fast aircraft, rather slow in fact. It was sometimes very difficult for the air traffic controllers to sequence us in with the faster aircraft landing and taking off. On final approach we only configured for landing just a couple of miles out, so we could keep up full speed and didn't cause too many delays in the traffic pattern for the fast movers."

Bill Barbour's stay with the 10th MAS was a short one due to the end of the Cold War. Following the Gulf War in 1991 there was a very rapid drawdown of the USAF presence in Europe, the EDS was no longer needed and the squadron deactivated on March 31, 1991. Three of the C-23A's were subsequently relocated to Edwards AFB, assigned to 412th Test Wing working with the USAF Test Pilots School. Eight went to the US Army and the last seven transferred to the US Forest Service. AN

Sherpa, 84-0462, taxiing for departure from RAF Alconbury Peter R Foster

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WORLD AIRLINE FLEETS 2021

A compact overview of the world's airline fleets and major helicopter operators as of 2nd December 2020. We cover aircraft right down to DHC-2, Piper PA-31, Cessna 402/404 and all the way up to the mighty Airbus A380, and every thing between. Each country is listed by alphabetical order of the ICAO prefix of the country, and then by alphabetical order of the airline name. This is then followed by the airline name, the two and three letter codes and callsign. Details of aircraft on long-term order are given after the main fleet listing, which comprises, in registration order, the following information :- 1] An O to allow you to mark your sighting; 2] Registration; 3] Aircraft type & sub-type; 4] Construction number / Manufacturer's serial number & Line / set number if applicable; 5] Immediate previous identity. To identify aircraft on forward order we have bolded out the O and registration, thus. Also for an aircraft in non covid-19 storage we show these as O. [1] Soft-back in card covers with comb binding price £11.95; [2] Soft-back in card covers, square bound, & wrap around cover. PRICE: £11.95

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Our annual review of Airlines operating to and within Europe, will be published in November 2020. This will be the 28th edition of Airlines to Europe, and follows the same layout that has been adopted in previous issues. There are new airlines included in this edition, whilst others have fallen by the wayside, and yet more to follow in the coming months. As with previous editions we have taken the main airlines data base and stripped out any airlines or aircraft not likely to be seen in Europe. Airlines to Europe features:- European based air tanker fleets; manufacturers fleets; executive airliners; airliner demises; aircraft registration; aircraft type; constructors number line number if applicable; immediate previous identity; colour cover; over 132 pages; fully updated to mid October 2020.

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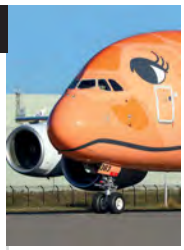
AIRLINES 2021

Now in its 39th edition AIRLINES is now the established book for airline fleet listings in an easy to carry format. This publication lists airline fleets where aircraft from light twins to wide-bodies are operated. Each aircraft is listed with registration, type, constructor's number, previous identity and Line number (if applicable), fleet number and or name when applicable.



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Rebirth of the Dancing Crane

The Story of JAL *Part 2*

Following privatisation in the 1980s, Japan Airlines continued to grow, until it faced the threat of bankruptcy in 2010. Having emerged successfully from that crisis, it is now struggling with the effects of the coronavirus pandemic, as Jozef Mols details

There had been discussions in Japan about possible airline deregulation since the late 1970s and, on November 18, 1987, JAL was completely privatised. Although the airline had been the designated national flag carrier since 1972, it would now have to compete with All Nippon Airways and Japan Air System on both domestic and international routes. Increased competition resulted in changes to the airline's corporate structure. It was reorganised into three divisions: international passenger services, domestic passenger services and cargo and mail services.

Facing stiffening competition, JAL embarked on a series of codeshare agreements with major airlines around the globe. In 1986, the airline had entered into one with Qantas on two routes: Tokyo-Perth and Tokyo-Brisbane. In 1988, another was signed with Thai on the Nagoya-Bangkok route, followed in 1989 by a codeshare agreement with Vietnam Airlines. This involved using Boeing 747-400 on the Osaka to Ho Chi Ming service. The agreement ceased one year later only

One of 27 Boeing 787-8s in the JAL fleet, JA838J, is seen landing at Moscow/Domodedovo AirTeamImages.com/Artyom Anikeev

for it to be resurrected in April 1996.

JAL received its first 767 in 1985 in the shape of a -200. Four more were to follow with the type remaining in service until 2011. In 1986 the initial example of 31 767-300s arrived (two of which were 767-300Fs) and six of the passenger versions remain in the fleet albeit currently stored.

The first of ten McDonnell Douglas MD-11s for JAL was delivered in 1993. By the start of the new millennium, the airline was keen to acquire ER models of the Boeing 767 and 777 to take over MD-11 operations. JAL reached an agreement with Boeing to sell its MD-11 fleet and replace them with two 767-300ERs and eight 777-200ERs. This helped the airline to improve its cash flow as the new 777-200ER has greater range and seat capacity with nearly the same operational costs. The model can fly non-stop from Tokyo to the East Coast of the USA. The final MD-11 in the fleet left JAL in 2003.

JAL received its first of eight Boeing 737-400s in June 1995, with the type entering service in September of the same year. These -400s are operated in conjunction with Japan Transocean Air (JTA), a company founded in 1967 as Southwest Air Lines, with today's ownership being 51.1% controlled by JAL and the rest held mainly by Okinawan interests. JTA occasionally lends aircraft to JAL in the event of equipment failure, as well as providing maintenance services for these 737-400s. JTA's own subsidiary Ryukyu Air Commuter became a de facto part of JAL when the latter took the controlling share.

Harlequin Air was founded in 1997 as an affiliate of Japan Air System (JAS) and operated single examples of the MD-81 and DC-10-30. After JAS was absorbed by JAL, Harlequin was integrated into the parent company.

MERGER

In 2001, Japan Airlines and Japan Air System agreed to merge on October 2, 2002, with the plan to consolidate operations by 2004. JAS was formed following the merger of TOA Airways and Japan Domestic Airlines on May 15, 1971. Japan Air System was the smallest of the three major Japanese carriers.

The deal between JAS and JAL was the first major airline industry realignment in Japan in three decades, and partly a consequence of the slump in worldwide air traffic following the September 11, 2001 terrorist attacks in the USA. Fares in Japan were considered to be among the world's highest, therefore sales were threatened by economic downturns. At the time, JAL only had a 25% market share for domestic air traffic, compared to ANA's 50%. Thus the merger was also a means of providing stronger competition to ANA in the domestic market.

As a consequence, JAS aircraft comprising 22 A300-600s, six of the A300-B2 and four A300-B4s and its various McDonnell Douglas MD-81s, MD-87s and MD-90-30s were taken over by JAL. In 2002, two of the A300s were scrapped at Sendai Airport and two others were transferred to Fly Air in Turkey. DC-10 operator JALways, founded as Japan Air Charter in 1990, became a fully owned subsidiary of JAL at the same time. Following the merger of JAS and JAL, the two companies operated under the JAL brand: Japan Airlines International and Japan Airlines Domestic. On October 1, 2006, the two brands were merged into a single organisation which was Japan Airlines International.

SPECIAL SCHEMES

In 2003, JAL inaugurated a route between Fukuoka and Shanghai, using a Boeing 767. It was also during the first years of the new millennium that the airline started using 'logo-jets' with special colour schemes in order to attract further attention. In 2004, JAL opened a new service between Tokyo and Hangzhou in China at the same time as ANA, followed in 2007 by flights between Tokyo and Shanghai. In 2005, JAL ordered a total of 40 Boeing 737-800s, the first of which was delivered a year later. By the end of 2006 it became possible to check-in ▶

Founded as Japan Air Charter in 1990, JALways was to become a fully owned subsidiary of JAL in 2001. This DC-10-40, JA8544, was operated on routes to Guam and other popular resorts. 'Reso'cha' is a contraction of Resort Charter Jozef Mols Collection

In 2002, JAL changed its logo to this 'Arc of the Sun' design, as seen on JA011D, one of the 32 Airbus A300s inherited after the merger with Japan Air System Jozef Mols Collection

The Boeing 767 entered JAL service in 1985. The one pictured at Seoul/Incheon in 2006, JA8635, was a -300 that was sold on to Kalitta Air in 2016 Key Collection

on all JAL flights via the internet.

On April 1, 2007, JAL joined the oneworld Alliance. A few months later, Japan Asia Airways and JAL International decided to merge as JAL received authorisation to operate its own flights between Japan and Taiwan. The integration of Japan Asia Airways (JAA) was expected to result in further cost cuts and eliminate duplication. At the time of the merger, Japan Asia operated eight passenger flights daily on four routes connecting Tokyo, Osaka and Nagoya with Taipei and Tokyo with Kaohsiung. JAA flew its last service on March 3.

In 2007, JAL ordered ten Embraer 170s for J-Air, which began operating in 1981 as a division of the Japan Flight Academy. In 1996 it was separated as a wholly owned regional subsidiary of JAL. More aircraft were ordered by JAL for this subsidiary in August 2014 when it announced a deal had been struck for three E170s and 12 E190s and 12 options for the E-Jet family (from these options, five E170s and seven E190s were later delivered).

DIFFICULT TIMES

Although JAL was still the largest Asian airline in terms of revenue – and, in 2007, was carrying 13.1m passengers annually – the airline suffered significant financial losses that year. Some of its problems were related to dwindling reservations due to the worldwide economic crisis following the 2003 Gulf War (which had caused fuel prices to rise), swine flu and the banking crisis, but other problems had more fundamental causes.

One of these was personnel: the JAL group employed about 50,000 staff members, which was considered by many industry observers as about 30% too

JAL's ten MD-11s were each named after a bird, JA8588, seen landing at Hong Kong in December 1996, being *White-Tailed Eagle* AirTeamImages.com/Ralf Meyermann

many. As long ago as 1975, the airline had started to decrease the number of new employees, but this caused a 'reverse-pyramid' effect, with too many veterans and too few young personnel. Another problem was related to the fleet: JAL simply had too many aircraft and too many routes. As Tokyo/Narita imposed limitations on the share of slots, JAL – with its focus on international business – chose to compensate for the limitation by operating big aircraft like the Boeing 747, even on domestic routes. However, these became uncompetitive assets as the industry standard moved towards smaller and more efficient aircraft.

In an effort to slash costs, JAL decided to scrap 20 of its international flights by March 2012 and to cut staff numbers by about 10% through early retirement. This was necessary after the airline received a 100bn yen (£735m) government credit in September 2009. External consultants even suggested a possible merger with ANA in order to save JAL, but this solution was not acceptable to the shareholders of JAL – or by ANA, given its comparatively better performance as an independent carrier.

In September 2009, Japan's Ministry of Land, Infrastructure, Transport and Tourism formed a task force aimed at aiding a corporate turnaround at JAL, which examined various cost-cutting and strategic partnership proposals. At the time, Delta Air Lines and American Airlines were in rival talks to invest in the ailing carrier in order to expand their business in Asia. By forming a capital tie-up with either, JAL could also secure a viable business partner to help it weed out unprofitable routes and lower its operating costs.

Delta was not considered an option by the Japanese government as the airline had been through bankruptcy proceedings themselves after taking over Northwest ▶

When JAL took over Japan Air System in late 2006, they adopted its fleet of MD-81s, MD-87s and MD-90s, including MD-90-30, JA8064, in this colourful scheme Jozef Mols Collection

JAPAN AIR LINES/JAPAN AIRLINES FLEET

Type	Introduced	Retired	Notes
Douglas DC-3	1951	1951	Leased from Philippine Airlines for three days of promotional tours prior to start-up of Japan Air Lines
Martin 2-0-2	1951	1952	
Douglas DC-4	1952	1964	
Douglas DC-6B	1954	1969	
Douglas DC-7C	1958	1965	
Douglas DC-8-30 Series	1960	1975	
Convair 880	1961	1971	
Douglas DC-8-50 Series	1962	1982	
Boeing 727-100	1965	1988	
Douglas DC-8-60 Series	1968	1988	
Douglas DC-8-60F Series	1968	1988	
Beechcraft H-18	1969	1974	Used for pilot training
NAMC YS-11	1969	1970	
Boeing 747-100	1970	2002	JAL is launch customer
Boeing 747-200B	1971	2007	
Boeing 747SR-100	1973	2005	
Boeing 747-200SF	1974	2007	Operated by JAL Cargo
McDonnell Douglas DC-10-40	1976	2005	Operated also by Japan Air Charter/JALways 1991-1997
Boeing 747-100SF	1977	1992	Operated by JAL Cargo
Boeing 747-300	1983	2009	
Boeing 767-200	1985	2011	
Boeing 767-300	1986	stored	Six are currently stored
Boeing 747SR-100SUD	1986	2006	
Boeing 747-400	1990	2011	
Boeing 747-200F	1991	2008	Operated by JAL Cargo
Boeing 747-400D	1991	2011	
Saab 340	1992	2020	Operated by Japan Air Commuter
McDonnell Douglas MD-11	1993	2004	
Boeing 737-400	1995	2003	Operated by JAL Express 1998-2014
Boeing 737-800	2006	Current	And by JAL Express 2007-2014
McDonnell Douglas MD-81	2006	2010	After merger with JAS and by JAL Express 2008-2010, and Harlequin Air 1997-2005
McDonnell Douglas MD-87	2006	2008	After merger with JAS
McDonnell Douglas MD-90-30	2006	2013	After merger with JAS
Airbus A300	2006	2011	After merger with JAS
Boeing 767-300F	2007	2010	Operated by JAL Cargo then latterly JAL
Embraer 170	2008	Current	Operated by J-Air
Airbus A320	2012	Current	Operated by Jetstar Japan
Boeing 787-8 Dreamliner	2012	Current	
Boeing 787-9 Dreamliner	2015	Current	
Embraer 190	2016	Current	Operated by J-Air
ATR 42-600	2017	Current	Operated by Japan Air Commuter
ATR 72-600	2018	Current	Operated by Japan Air Commuter
Airbus A350-900	2019	Current	
Airbus A350-1000	2021	Current	

JAL Express (JEX) was established in 1997 as a domestic subsidiary of the main carrier. In September 2014, it was fully merged into JAL and its 39 737-800s, including JA311J, joined the fleet Jozef Mols Collection

Airlines. American was preferred as it was part of the same oneworld alliance as JAL. At that time, JAL had a debt of $16.5bn (£12.9bn). Delta and its SkyTeam alliance members offered a $1bn (£781m) injection in order to lure JAL away from the oneworld alliance. American and its partners, on the other hand, were willing to invest up to $1.4bn (£1.1bn).

In addition to this, Air France-KLM offered help. The European airlines were willing to invest a few hundred million dollars and take a minority stake in the carrier in exchange for codeshare agreements.

After weeks of speculation, JAL applied for protection under the Corporate Rehabilitation Act (equivalent of Chapter 11 bankruptcy filing in the USA) on January 19, 2010. JAL would receive a 300bn yen (£2.2bn) cash injection and have debts worth 730bn yen (£5.4bn) waived, in exchange for which it would cut its capital to zero, close unprofitable routes and reduce its workforce by 15,700 employees (33% of the total). Shares of JAL were delisted from the Tokyo Stock Exchange on February 20, 2010. At the time, this was the largest-ever Japanese bankruptcy involving a non-financial company and the fourth largest in Japan's history. Kazuo Inamori took over as CEO of JAL, while Japan Air Commuter president Masaru Onishi was promoted to president of JAL.

OUT OF THE RED

Although JAL exited bankruptcy as part of the oneworld alliance, the airline was still considering a strategic investment from Delta and joining the SkyTeam alliance. However, American – together with other oneworld members such as British Airways and Qantas – persuaded JAL to remain. It was decided that switching alliances from oneworld to SkyTeam would be too risky and could hinder JAL's ability to turn around quickly. Two days later, JAL announced it would strengthen its partnership with American, including a joint application for antitrust immunity on transpacific routes.

J-Air began operating in 1981 as a division of the Japan Flight Academy. Then, in 1996, it was separated as a wholly owned regional subsidiary of JAL. Today, the airline operates a fleet of Embraer 170s and 190s connecting Japan's smaller cities JAL

JAL Cargo was closed in October 2010 after 31 years as a separate entity and the freight business consigned to passenger aircraft lower deck holds.

Finally, JAL emerged from bankruptcy protection in March 2011. British Airways and JAL agreed a revenue-sharing deal for flights between Europe and Japan in March of that year. The same year, JAL formed Jetstar Japan, a low-cost carrier, in a joint venture with Qantas subsidiary, Jetstar Airways. In April 2012, JAL started its flights to Boston, using Boeing 787-8 Dreamliners. The airline had ordered 29 Boeing 787-8s and 20 Boeing 787-9s. In July 2013, JAL and Finnair concluded a codeshare agreement on flights between Tokyo and Helsinki. In the meantime, the A300s had been retired in May 2011 and the MD-90 was withdrawn from the fleet in March 2013.

In 2013, Airbus was able to announce a historic deal with JAL for 31 Airbus A350s with a total value of $9.5bn. The order related to 18 A350-900s and 13 larger A350-1000s. The first of these, an A350-900, arrived in June 2019.

The following year, JAL announced it had reached a basic agreement with Mitsubishi Aircraft Corporation to purchase 32 Mitsubishi Regional Jets (MRJ), to be employed on domestic routes as of 2021. However, the MRJ programme, by now rebranded SpaceJet, was suspended in October 2020.

In 2014, JAL and JAL Express Co (founded in 1997 as a domestic subsidiary serving regional destinations) merged and soon after, Hokkaido Air Systems joined the JAL Group when JAL took a 57.3% interest in the airline. The other shares are owned by the government of Hokkaido and the city of Sapporo. In 2019, JAL would order two ATR 42-600s for this subsidiary company to replace its fleet of three Saab-340s. The first was delivered in December 2019. Earlier, in 2017, Japan Air Commuter – another subsidiary, formed in July 1983 and part of JAS at the time of the merger – had ordered nine ATR 42-600s, the first of which was delivered in October 2018. The ATRs joined a fleet of nine Bombardier Q400s and nine Saab 340s.

GOING SUPERSONIC

In 2017, JAL signed a codeshare agreement with Hawaiian Airlines, followed by another with Garuda Indonesia a year later. JAL – once a potential customer for Concorde – had not lost its appetite for high-speed

Almost every version of the Boeing 747 has been operated by JAL at one time or another over the years. In 2009, JA8084 was photographed leaving Tokyo/Haneda – it was one of the 44 747-400s that served the airline AirTeamImages.com/Mario Aurich

Boeing 777-300, JA8941, one of 20 to be operated by JAL, wears the crane emblem which was reinstated after JAL's restructuring in 2011 Boeing

transportation. In December 2017, JAL and Boom Supersonic announced a strategic partnership to bring commercial supersonic travel to passengers. The new Boom jet is planned to fly at a speed of Mach 2.2 and halve flying time. JAL invested $10m in Boom and is working with the manufacturer to refine the aircraft design. JAL also took an option to purchase up to 20 Boom aircraft through a pre-order arrangement.

JAL set up its own low-cost long-haul airline in 2018 under the temporary name of T.B.L. Co. Ltd. The airline was set up to operate low-cost flights to Europe using two Boeing 787-8 Dreamliners, leased from JAL. In March 2019, JAL announced the airline would operate under the name ZIPAIR Tokyo and that the first flights would link Tokyo with Bangkok and Seoul, with flights to Europe following "soon after." However, on April 9, 2020, JAL had to postpone all ZIPAIR passenger flights due to the coronavirus pandemic. Since then, these aircraft have made only occasional flights carrying medical supplies.

Notwithstanding the current crisis, JAL is looking to the future. During the last days of January 2020, it became known that the airline, together with Air France-KLM were considering taking a participation in ailing Malaysia Airlines. According to Reuters, JAL would eye a participation of at least 25% of the shares. As of July 25, the two carriers planned to operate joint flights between Tokyo and Kuala Lumpur but the start up of this project had to be delayed due to the pandemic. In February 2020, JAL and Aeroflot signed a codeshare agreement for flights between Moscow and Japan. Domestic flights within the Russian and Japanese borders are also part of the agreement.

Subsidiary Japan Air Commuter ordered nine ATR 72-600s in 2017. Its initial aircraft was the 1,500th airliner built by the European company ATR

The pandemic has had more far-reaching consequences for JAL. On July 7, 2020, the airline retired its first Boeing 777-200ER. Although the airline plans to use the type for several more years, the retirement was intended to "prepare the fleet for the post-corona recovery of the airline sector." At the same time, JAL made it clear it hoped to resume 80% of its domestic flights in August, later revising that to 100% by October. In the event, by December it was still only operating 82% of domestic schedules. Even when the home market recovers, the airline will be exposed to weakened international travel as it had a 51-49 split on international versus domestic passenger revenue in the nine months ending in December 2019. As a result, JAL slashed its annual net profit forecast by 43% and bonuses to employees were halved due to the deterioration in business. In 2019, JAL had paid two months' worth of wages as a bonus. It is hard to predict the future outlook for any airline currently as long as the COVID-19 crisis continues though vaccines offer hope for better times ahead. AN

Having bought almost exclusively American-made aircraft for most of its existence, mainline JAL broke with this tradition by ordering 31 Airbus A350s from the European manufacturer in 2013 in a deal worth $9.5bn. The first A350-900 was delivered in 2019 Airbus

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Wildcats on the Prowl

The Battlefield Reconnaissance Helicopter (BRH) Wildcat variant, referred to as the Wildcat AH1 by the UK MOD, replaced the land versions of the Westland Lynx but only 34 were ordered compared to more than 100 of its predecessor Leonardo

The battlefield variant of the Leonardo Wildcat, the replacement for the veteran Westland Lynx, is now providing sterling service to the British Army and Royal Marines. **Tim Ripley** reports on recent operations and future upgrades

At the height of the first phase of the COVID-19 crisis in April 2020 Leonardo Wildcat AH1 helicopters became a common sight over Britain's cities.

The Army Air Corps' helicopters had been enlisted to deliver teams of Royal Engineers to help scout out sites for the temporary Nightingale hospitals that were being set up across the country to receive and treat patients with the infection.

It is seven years since the land variant of the Wildcat first entered Army Air Corps (AAC) and Fleet Air Arm (FAA) service. As well as domestic duties such as providing support during the pandemic, it has been deployed on operations to the Baltic states and the Caribbean as well as on exercises across Europe. During this time, it has proved to be a robust and worthy successor to the veteran army variant of the Westland Lynx.

EXIT THE LYNX

Two decades ago, the AAC and FAA began looking for a replacement for their Lynx helicopter variants. The iconic Lynx had been the result of an Anglo-French co-operation deal, which led to development of the Gazelle, Puma and Lynx helicopters. The UK's Westland Aircraft took the lead on the Lynx project and the first prototype undertook its maiden flight at Yeovil, Somerset in March 1971.

After more than 30 years of service the Lynx was getting long in the tooth and needed a refresh. The Royal Navy wanted a replacement for its maritime variants and the British Army and the Royal Marines needed a new battlefield reconnaissance and utility version. In what became a rather convoluted procurement process, the UK Ministry of Defence eventually settled in 2004 on a single airframe fulfilling the needs of both. This decision led to the development of what was initially called the Future Lynx or Lynx Wildcat. Two main variants went into service, with the land one dubbed the Wildcat AH1 and the maritime variant designated the Wildcat HMA2. Its manufacturer, former AgustaWestland and now Leonardo Helicopters, market the helicopter as the AW159 Wildcat.

The variants share a common airframe, engine, drive train and defensive aid suite but have different sensors and weapons. Both have the large WESCAM MX-15Di electro-optical/infrared turret mounted in the nose turret, but the maritime variants also have the Leonardo (ex-SELEX Galileo) Seaspray 7000E active electronically scanned array (AESA) radar. The maritime version has in its armoury the Thales Martlet short-range anti-ship missile, the MBDA Sea Venom anti-ship missile, BAE Systems Stingray anti-submarine torpedo and Mark 11 depth charge. The land variant's armament is less comprehensive; its only offensive capability is a 0.50in heavy machine gun that can be positioned in a cabin door mounting.

CUTS TAKE THEIR TOLL

The procurement of the Wildcat coincided with the start of the 2008 economic crisis and when the Conservative-Liberal

The Wildcat AH1 and HMA2 variants are largely common, although the former (nearest camera) lacks the Seaspray radar and has prominent wire-cutter blades above the windscreen and below the nose Leonardo

Democrat coalition government took power two years later a further round of defence cuts was ordered. In 2006 the intention had been to order 70 helicopters, including 40 army and 30 navy variants. This went through several iterations and by 2012, the number of helicopters publicly on order was cut to 34 of the Battlefield Reconnaissance Helicopter (BRH) for the AAC and 28 of the Surface Combatant Maritime Rotorcraft (SCMR) variant for the Royal Navy in a deal worth £1.7bn.

It subsequently emerged that eight additional light attack or LAH variants with forward firing weapons were ordered for use by the Special Forces but these were cancelled in the defence cuts in 2012. These were intended to replace Lynx AH9A helicopters which were operated by the AAC's 657 Sqn, part of the Joint Special Forces Aviation Wing (JSFAW) based at RAF Odiham in Hampshire. A reduction in funding meant that the LAH variant was cancelled and 657 Sqn was disbanded with the Lynx AH9 retired in 2018.

The first land Wildcat flew in October 2010 at the AgustaWestland (now Leonardo) plant at Yeovil in Somerset, some three years ahead of the navy variant.

The first conversion to type training on the land variant began in 2014, ahead of the standing up of the first operational unit, 847 Naval Air Sqn (NAS), the following year.

JOINING FORCES

In a bid to save money on training and logistic costs the MOD ordered that both the land and maritime variants would be based at Royal Naval Air Station (RNAS) Yeovilton in Somerset. This allows the maintenance of the Wildcat fleet to be carried out by contractors on a single site and the joint training for aircrew also takes place there. The centralised location also provides stability for AAC and FAA personnel operating the helicopter.

All the land variants are now operated as a single fleet or pool that is shared by 1 Regt AAC and 847 NAS. It had originally been intended to form five AAC Wildcat squadrons, but in 2017 in a further round of army re-organisation this was cut to just three squadrons in a single regiment. This happened half way through the process to convert the 1 and 9 Regt AAC to operate the Wildcat. The manpower assigned to operate the Wildcat helicopter was reduced. Two sub-units, 669 and 672 Sqns, which had flown the old Lynx AH7 and AH9 until 2017, would now not be re-formed to convert to the new helicopter.

The AAC was now to have only two operational Wildcat sub units, 661 and 659 Sqns, with 652 Sqn as the training/conversion sub unit for the land variant. There was not expected to be a reduction in the number of Wildcats operated by the AAC and FAA on a day-to-day basis. In December 2019, the Ministry of Defence revealed in a Freedom of Information request that on a daily basis 24 Wildcat AH1s would be operational with the remaining ten undergoing routine depth maintenance.

Up until April 2020, 1 Regt had been part of an organisation known as the Aviation Reconnaissance Force or ARF, along with Westland Gazelle AH1 and Britten-Norman Defenders and Islanders of 5 Regt AAC at Aldergrove Flying Station in Northern Ireland. The ARF was supposed to be the British Army's airborne 'eyes in the sky' over the UK and on foreign operations. The formation ▶

Although the Wildcat AH1 lacks the undernose radar, the AAC has considered fitting it to their variants for overland use Jim Winchester

A Wildcat AH1 at low level. The land variant serves with three squadrons of 1 Regt AAC and the FAA's 847 NAS, but does not sport any identifying unit markings Dino Carrara

of the 1st Combat Aviation Brigade in April 2020 replaced the ARF and meant the Wildcats were placed in this organisation, alongside the AAC's AgustaWestland Apache AH1 attack helicopters.

The AAC's 1 Regt is closely integrated with 847 NAS, sharing maintenance, simulator and conversion training. Personnel are often pooled between the two units to help with career planning and build up operational experience. The main difference is that personnel from 847 NAS have to be qualified to fly their helicopters from the decks of Royal Navy warships to support amphibious landings by the Royal Marines. To fulfil these missions, 847 NAS is under the day-to-day control of the Commando Helicopter Force (CHF), which is also based at Yeovilton. This ensures close integration with the Merlin HC4s of 845 and 846 NAS.

WILD WEATHER

The new Wildcats got their first chance to deploy on real-world operations in September 2017 when three 847 NAS helicopters embarked on the assault ship HMS *Ocean* to lead the UK's response to Hurricane Irma in the Caribbean. Along with RAF Boeing Chinook and Royal Navy Leonardo Merlin helicopters, the Wildcats spent several weeks in the Caribbean helping devastated communities in the British Overseas Territories recover from the impact of the hurricane.

In February 2018, 847 NAS was in action again when two of its helicopters embarked on the French amphibious assault ship, FS *Dixmude*, for a five month-long cruise to the Pacific and Middle East.

It was not long before 1 Regt AAC had its chance to participate on foreign operations when four of its Wildcat helicopters deployed to Estonia in April 2018. The helicopters spent four months supporting the 1st Battalion, The Royal Welsh's battlegroup at Tapa as part of Operation Cabrit, as the United Kingdom's contribution to NATO's enhanced Forward Presence (eFP) in Eastern Europe is codenamed

The helicopters were operated by crews from 661 Sqn during their deployment supporting Estonian troops and The Royal Welsh in training, as well as participating in NATO's Exercise Sabre Strike, which spanned all three Baltic states and involved the armed forces of about 20 nations. The deployment of 661 Sqn to Estonia was a first for the AAC and it was also the first time that UK military helicopters had been based in the country since UK troops deployed there as part of NATO's eFP effort in May 2017.

The AAC Wildcats provided a welcome ISTAR capability for the UK contingent in Estonia, which until then had only had Lockheed Martin Desert Hawk III hand-launched mini-unmanned aerial vehicles as its organic ISTAR assets. With the forward basing of Wildcats the AAC considerably upgraded the ISTAR capability available to British, Estonian, and NATO commanders on a 24/7 basis.

The commitment by the UK government to enhance its military support to Norway and other allies in Scandinavia took 847 NAS to the Arctic Circle in January 2019 to work alongside Apache attack helicopters of 656 Sqn from 4 Regt AAC. Exercise Clockwork saw 847 NAS deploy to Bardufoss air station in northern Norway for six weeks to practise operating in snow conditions, which culminated in live firing exercises in co-ordination with the AAC Apaches.

Spring 2019 saw a major gathering of British battlefield helicopters in Estonia, with 1 Regt and 847 NAS both deploying Wildcats to the country to support the first Apache mission to the region. In April 2019, 659 Sqn flew to Estonia for a four-month tour as part of an ongoing commitment to the Baltic nation, operating from Amari Air Base alongside RAF Eurofighter Typhoon jets. They were joined by four Apaches of 663 Sqn and participated in a series of NATO exercises across the Baltic states during the spring and summer of 2019. This culminated in a major NATO amphibious landing exercise on the Estonian coast involving Royal Marines operating from the assault ship HMS *Albion*. Two Wildcats of 847 NAS were embarked on the ship and flew combined missions with their land-based AAC colleagues.

Two squadrons, 847 and 656, returned to Norway in February 2020 to take part in a major NATO training event, Exercise Cold

Two Wildcat AH1s at RAF Lossiemouth being operated by 847 NAS, which is assigned to the Commando Helicopter Force. The Wildcat fleet is based at RNAS Yeovilton, with all 62 in UK service based at the Somerset airfield Niall Paterson

Response. Joint training involved Wildcats and Apaches working in combined teams to track and identify targets in Arctic conditions. When the COVID-19 pandemic struck Norway in March 2020, the exercise was stopped early and the British aviators returned to their home bases. At the same time, a UK attack aviation battlegroup was preparing to operate for the first time as part of a US Army combat aviation brigade during Exercise Defender Europe in the spring and summer of 2020. Closer to home, the British Army's 3 Regt AAC held a preparatory training exercise for its participation in Exercise Defender Europe 20 in the Stanford Training Area in Norfolk, with Apache AH1s of 662 Sqn AAC operating from forward arming and refuelling points established by RAF Chinooks.

The advent of the pandemic scuppered some plans; Wildcats of 1 Regt were to join their colleagues from 3 Regt and the RAF for Defender Europe 20 in Germany and Poland but, just like Exercise Cold Response, it fell victim to the COVID-19 crisis. It was scaled back considerably in March 2020, with the UK participation withdrawn.

'As part of the COVID-19 tasking, Wildcats criss-crossed the UK, moving experts and vital supplies to hospitals and other locations'

Back in Britain, however, the pandemic called for additional duties and 1 Regt was heavily involved in ramping up military assistance to help civilian health authorities and emergency services. A dedicated COVID-19 Support Force was set up by the Ministry of Defence on March 18 and was given its own helicopter component.

Units from the UK Joint Helicopter Command were placed at high readiness at four sites around the country to respond to Military Assistance to Civil Authorities (MACA) tasks. These include evacuation of COVID-19 patients or the movement of medical supplies. Among them were Wildcats from 1 Regt operating from their home base at Yeovilton to provide coverage of the Midlands and south of England. Meanwhile, a forward operating location was established at RAF Leeming in North Yorkshire with one Chinook and a Wildcat to support MACA tasks in the north of England, operating in southern Scotland if needed. The deployed helicopter forces were assisted by the Joint Helicopter Support Squadron, normally based at RAF ▶

Above: **Deck crew attach a static line to a Wildcat landing on HMS *Ocean* during Exercise Trident Juncture 2015** LPhot Des Wade/MOD Crown Copyright 2015

Below: **Soldiers of 6 Regt AAC prepare to hook a trailer to a Wildcat during underslung load training** SSgt Si Longworth AAC/MOD Crown Copyright 2018

Benson, as well as the RAF Tactical Supply Wing, based at the MOD Stafford site.

As part of the COVID-19 tasking, Wildcats criss-crossed the UK, moving experts and vital supplies to hospitals and other locations, but 1 Regt's most high-profile mission was on April 30 when a Wildcat and Apache took part in a 100th birthday fly past over the Bedfordshire home of the charity fund raiser Capt Tom Moore.

Meanwhile, Wildcat crews continued their routine training missions to maintain their flight proficiency and qualifications – a major task for the ship-borne operations of 847 NAS. On May 14 its Wildcat crews for the first time landed on the deck of the aircraft carrier HMS *Queen Elizabeth* while she was cruising in the English Channel. To ensure the Wildcat crews remained qualified for operating at sea required 24 safe landings by day and night, the latter with the aid of night-vision goggles.

A Royal Marine fast-ropes from a Wildcat AH1 on to HMS *Albion* during an exercise off Cyprus in October 2020. Wildcats used by 847 NAS are pooled with the AAC's examples at Yeovilton LPhot Barry Swainsbury/MOD Crown Copyright 2020

OPTIONS

Since arriving at RNAS Yeovilton seven years ago the Wildcat land variants have settled into routine service. It operates alongside AAC Apache as the eyes and ears of the attack helicopter to find targets in environments ranging from the forests of Estonia to the Arctic north of Norway as well as taking part in training. An upgrading of the maritime Wildcat variant is in progress with testing underway to equip the helicopter with a suite of guided weapons to strike at enemy ships. The land variants could potentially take these missiles with minimal modification but so far the British Army has not opted to fit its Wildcats with offensive weapons, relying instead on the Apache for this role.

The success of the Leonardo Seaspray 7000E radar on the maritime Wildcat has led many army aviators to consider whether it should also be fitted to land variants. The synthetic aperture mode of this radar could also be suitable for Wildcats to find targets such as tanks and rocket launchers in rain or fog, which degrades the effectiveness of the MX-15Di electro-optical sensor. However, no decision has been made on this upgrade.

The Wildcat is now a firm fixture of the British armed forces. For years to come it will be in the forefront of UK helicopter operations on land and maritime environments. AN

Currently the only weapon carried by the Wildcat AH1 is the door-mounted M3M 0.50in calibre machine gun Niall Paterson


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Photographic record made by the Brazilian Air Force on one of the missions to combat COVID-19 in Brazil.

Dan-Air's Trijet Boeings

Dan-Air was one of the few British operators of the Boeing 727, using them to modernise its fleet and its image in the early 1970s. **Bob O'Brien** remembers the airline's trijet years

Dan-Air was a British operator formed in March 1953 and registered as an airline on May 21 with a working capital of £5,000. The business was a subsidiary of Davies and Newman Ltd, a London firm of shipping brokers that was established in 1922. The Dan-Air board of directors consisted of Fred Newman MC CBE, John Wingett Davies and E O Wallis, while the post of chief pilot was given to Capt F R Garside. The name Dan-Air was a contraction of Davies and Newman, and the fledgling company took over a Douglas DC-3/C-47B Dakota, G-AMSU, owned by Meredith Air Transport. Davies and Newman had previously acted as brokers for Meredith, but when the company ran into financial difficulties, as did many independent airlines at the time, the aircraft's operating certificate was taken over by Dan-Air.

Operations commenced from Dan-Air's base at Southend Airport in Essex in late June 1953, with a charter flight to Shannon, Ireland via Manchester Ringway with Capt Garside in command. A second Dakota, G-AMSS, joined the company in February 1954 from William Dempster Ltd who, like Meredith Air Transport, had run into financial difficulties towards the end of 1953 and ceased operations. The aircraft was acquired on favourable terms by Dan-Air and was soon put to work on the company's passenger services as well as its blossoming freight business.

In January 1955, the airline was to make its first base relocation when it moved from Southend to the thriving Blackbushe airfield in Hampshire, where it joined a host of other carriers, including Eagle Airways, Silver City Airways and Airwork Ltd, now sadly all a distant memory from the airfield's illustrious past. Dan-Air flew its first passenger service in May 1956 with a Blackbushe to Jersey service using a Dakota. In 1959, the Ministry of Civil Aviation announced the forthcoming closure of Blackbushe – the date set was to be May 31, 1960. Like other carriers, Dan-Air had to find a new home and the then relatively underused Gatwick Airport in Surrey was chosen for the company's new headquarters because London Heathrow had no available space to accommodate a small charter airline. The final Dan-Air flight from the Hampshire airfield (which re-opened in October 1961) was made by one of its three Bristol 170 Mk.31 freighters, G-APLH. The airline had become known in the industry for its acquisition of relatively inexpensive aircraft, such as the Airspeed AS.57 Ambassadors purchased from BEA (British European ►

Main photo: **Seen on approach to Palma de Mallorca in 1982, G-BCDA served with Dan-Air from 1974 until the end of the airline's operations, before going to a South American operator** Bob O'Brien Collection

Top: **Pictured at London Gatwick Airport in July 1978, Dan-Air's first 727, G-BAFZ, was an ex-JAL example fitted with more seats and additional emergency exits** AirTeamImages.com/Carl Ford

Below: **One of Dan-Air's early 727s, G-BAEF, wearing the airline's final scheme for the type** Bob O'Brien Collection

G-BAEF at Manchester alongside two Comets. This Boeing 727 wears a revised livery with more red on the nose and a greater curve on the cheat line at the front Bob O'Brien Collection

Airways), and the fleet of de Havilland DH.106 Comet 4C aircraft acquired from BOAC (British Overseas Airways Corporation). The Comet fleet undertook the majority of the airline's charter work starting in the late 1960s, flying from Gatwick and several regional airports. However, the fuel-thirsty aircraft were coming to the end of their operational life, so the airline made plans to introduce a new type to its fleet in the shape of the Boeing 727-100.

BOEING'S NEW TRIJET

Design studies for the Boeing 727 had begun in 1956, with the manufacturer aiming for commonality with other designs, such as the Boeing 707, and to reduce delays and initial start-up costs. The company was under pressure from its European counterparts – de Havilland in the UK and Sud-Aviation in France which had their jet products, the de Havilland DH.106 Comet and the Sud SE-210 Caravelle, already in production. When the aircraft finally emerged from the drawing board, its fuselage profile was identical to the Boeing 707 from the floor upwards and its flight deck layout was very similar, with accommodation for three flight crew including a flight engineer.

Preliminary orders for the first aircraft came on January 30, 1960, when United Airlines and Eastern Air Lines both ordered 40 each, which brought the project from design to production status. The engines chosen for the new tri-jet were three Pratt & Whitney JT8D-7 turbofans, giving the aircraft a cruising speed of 569mph, with accommodation for up to 131 passengers. The prototype Boeing 727, N7001U, took to the air for the first time at the company's Renton facility in Washington State on February 9, 1963. This stayed with the company as a demonstrator until it was delivered to United Airlines on October 6, 1964, where it spent its entire career before being retired by the airline in 1991. It was then donated to the Museum of Flight in Seattle where it now resides, adorned in its first United colour scheme.

Orders for the new aircraft started to come in slowly prior to the initial flight. West Germany's Lufthansa was the first European carrier to purchase the 727 when it placed an initial order for 12 series -100 aircraft to be named 'Europa Jet' for services within Europe and the Mediterranean. In all, 582 Boeing 727-100 series were produced.

The aircraft was developed into the -200 series, which many of the leading airlines of the world introduced into their fleets well before Airbus arrived on the scene with its new family of passenger jets. The -200 was created with minimal changes, predominantly a 20ft extension to the fuselage made up from two equal plugs fore and aft of the wing. The aircraft was again powered by three Pratt & Whitney JT8D-7 turbofans, giving 14,000lb st each, with accommodation in the cabin for 189 passengers. The number of -200s built came to an impressive 1,260.

ENTER THE 727

The first of Dan-Air's 727 fleet was acquired from Japan Air Lines (JAL). The aircraft, a -46, was delivered new to the Japanese carrier in January 1966 as JA8310 and was purchased by Dan-Air in November 1972 and registered G-BAFZ. The aircraft, along with G-BAEF and G-BAJW, were flown from Japan to Wichita, Kansas in March 1973 with no HF (High Frequency) radio equipment installed because they had been used primarily on domestic sectors within Japan.

The aircraft individually made their Pacific crossings with stops at Wake Island and Honolulu, where they were refuelled and had to wait for a JAL Tokyo-Los Angeles flight to pass over to provide a navigational fix. Only then could they continue on to the West Coast and the Boeing facility in

The final colour scheme variation for Dan-Air saw the straight red and black cheat lines being replaced by swept red and blue lines, as illustrated on G-BCDA, shown here in January 1979 Bob O'Brien Collection

In the summers of 1981 and 1982, Dan-Air leased 727-155C, G-BIUR, from Ariana Afghan Airlines. In between this, it flew with Kabo Air and wears the Nigerian carrier's basic colour scheme Bob O'Brien Collection

Kansas where the pre-delivery work was carried out.

Before the aircraft could enter service with Dan-Air there was much administration and engineering work that had to be undertaken, including certification of the aircraft to operate on the British civil aircraft register. Among the many tasks that Boeing had to complete on the aircraft was the reconfiguring of the cabin, fitting 153 seats rather than the 131 that the aircraft flew with in Japan. Two emergency exits were installed aft of the wing – one port and one starboard – to cope with the extra number of seats. They were also required by the CAA to have a stall protection system known as a stick pusher fitted. This was made mandatory after several deep stall accidents involving T-tail aircraft, notably the BAC One-Eleven and the de Havilland Trident, so that when the aircraft was about to stall, the device would shake the control column to notify the pilot. These were fitted on many 727s, but the CAA required modifications so that they would move the control column to correct the flight path, increasing speed and averting a catastrophic accident.

A further design change for the Dan-Air aircraft was the installation of extra fuel tanks to allow the aircraft to fly from Berlin to Tenerife non-stop with a full complement of passengers and baggage. One of the aircraft with the larger fuel capacity was to be permanently based in Berlin for inclusive tour work. In 1972, Dan-Air took over a contract from Orientair, which had run into financial difficulties. The company had been set up at Southend by a Capt Lockwood, formerly with Channel Airways, to run a series of inclusive tour flights with a BAC One-Eleven Srs 400 (G-AXMI) on behalf of a group of West German tour operators to Spain and the Canary Islands. The reason for a foreign airline operating inclusive charters out of Berlin was that no German airlines were allowed to operate from the city under the terms of the Four Powers Agreement at the end of World War Two. This was enforced by the Soviets, who were partners with the DDR (East Germany) to the treaty. For the 2,200 mile trip from Berlin to the Canary Islands up to 20 seats were removed from the aircraft, increasing the seat pitch and making the five-hour flight a more comfortable experience. In addition to the charter flights to the Mediterranean, the aircraft were also used to transport Turkish migrant workers who were employed in Germany back to Istanbul and other Turkish cities for their holidays.

'More aircraft joined the fleet over the coming years, with despatch reliability being one of the best in the industry'

FIRST FOR BRITAIN

The first 727 to arrive at Gatwick was G-BAEF in March 1973, still adorned in its Japan Air Lines livery. The aircraft was sent to the company's engineering base at Lasham in Hampshire for repainting into its new colours. With the acquisition of the new fleet, the company also obtained a 727-100 flight simulator, although it came from a previous operator of the type. It was considered vitally important for future pilot training on the fleet. Later, a series -200 six-axis simulator was added at Gatwick and any excess capacity the airline had in its training programme was highly sought after by other airlines with 727s in their fleets. The airline already had contracts with various tour companies to keep the Boeing 727s busy. Lunn-Poly, Global, Clarksons and Sunmed were already good customers of Dan-Air and would provide the airline with much valued business from all over the UK. ▶

Illustrating the longer fuselage of the 727-200 is G-BPNS, which joined the Dan-Air fleet in January 1989 Bob O'Brien Collection

Above: **Ex-Singapore Airlines 727-200 Advanced, G-BHVT, served Dan-Air from 1980 to 1982. It was leased out to Costa Rican operator LACSA in this timeframe for a period and wears a mix of the two airlines' colours and markings** Bob O'Brien Collection

Below: **The 727-200 began operating for Dan-Air in 1980, when the airline purchased two ex-Sterling Airways examples, including G-BHNF, seen here at Geneva** Bob O'Brien Collection

The first 727 revenue service for a British airline occurred on April 13, 1973, when Dan-Air flew between Manchester Ringway and Alicante. Manchester was to become a commercially important base for the airline and the 727 fleet over the coming years. In 1974, Dan-Air became the first airline to appoint a female pilot to the rank of captain on the Boeing 727 when Delphine Gray-Fisk, formerly with Skyways, was given her command. The fleet was enlarged further in the 1976/77 season with another three aircraft, and through its in-house leasing division, the airline was able to send the aircraft out to other carriers when the European summer season ended and it had excess capacity for the winter.

Dan-Air took delivery of its first 727-200 in March 1980 when OY-SBD, a Series 2J4 Advanced, arrived at Gatwick on delivery from Sterling Airways of Denmark. The aircraft was later placed on the British register as G-BHNE, followed two weeks later by another ex-Sterling -200, OY-SBC, later registered as G-BHNF. Tragedy struck the airline on April 25, 1980, when 727-46, G-BDAN, operating flight DA1008 from Manchester to Tenerife-Los Rodeos Airport, was lost with all on board while approaching the airfield in cloud, crashing in the El Diablo mountains in the principality of El Rosario.

To coincide with the opening of the Shetland Island's Sullom Voe Oil Terminal in May 1981, Dan-Air flew a charter flight carrying a party of dignitaries and press to cover the event. The 727 used was to be the largest jet to land at Sumburgh Airport. More aircraft joined the fleet over the coming years, with despatch reliability being one of the best in the industry.

The airline launched some new scheduled services in 1989 from Gatwick to Madrid, Lisbon and Zürich and at the same time unveiled a new business class brand called Class Elite. The 727 was among the aircraft types in the fleet used on the new routes and this marked the first time they had been flown on scheduled services. The same year Australia suffered from a pilot strike and G-BPNS went on a short term lease to Australian Airlines to cover for a capacity shortage in its domestic fleet, one of many aircraft drafted in from various airlines.

END OF THE ROAD

With the price of oil increasing on the world market, Dan-Air decided to dispose of the thirsty 727-100 fleet in 1990, with the last flight taking place on October 31. The airline found itself in a deteriorating financial position over the next two years, finally succumbing to the advances of British Airways, which bought the Dan-Air operation for a token £1. As for the 727-200 fleet, the last service was flown by G-BNNI DA758/9 on November 1, 1992, from Gatwick to Oslo Fornebu Airport and back under the command of Capt Lenton. At the time of the takeover by BA seven 727-200s were in the fleet and these aircraft found new owners. Two of them, G-BPND and G-BPNI were given C-Checks at Lasham and delivered to Sabre Airways for its charter operations. Over the years, Dan-Air had flown ten 727-100s and the same amount of 727-200s, the trijet serving the airline admirably right up to the end. AN

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Delta's long-lasting DC-8s

It was the first airline to operate the Douglas DC-8 and kept the type for almost 30 years, flying all the major passenger models, from early turbojets to stretched examples with high-bypass turbofans. Barry Lloyd recalls the aircraft that launched Delta Air Lines into the jet age

As the advantages of the jet engine became apparent to both operators and passengers in the late 1950s, airlines didn't want to be left behind in the race to replace their propeller-driven aircraft. Pan Am stole a march in October 1958 by putting the Boeing 707 into service on international routes. Delta Air Lines, which had a significant domestic network, was rapidly growing into a major carrier. With 21 Douglas DC-7s providing the backbone of its fleet, especially on its longer routes – and with one eye on the competition – Delta's management decided it was time for an update, and after some deliberation, the DC-8 was chosen to take it into the jet era.

The operation of a jet would offer several benefits, including a reduction in flying time by up to 40% on longer sectors. What's more, the passenger capacity of the DC-8 was twice that of Delta's DC-7s, plus there was more room for cargo. Delta now had bases at Atlanta, Chicago, Memphis and New Orleans, putting it into competition with Eastern Air Lines, which was also looking to replace its propeller fleet. Atlanta – a major hub for both Delta and Eastern – was already becoming one of the world's busiest airports and in 1971, it achieved the status of an international facility when services commenced to Mexico and Jamaica.

An interesting situation developed whereby both airlines were now looking at the same replacement type, then designated the DC-8-11. Eastern managed to secure delivery of the DC-8 before Delta. Before it had decided on a final design for the airliner, Douglas had consulted with the airlines, as a result of which the fuselage was widened by 15in. This allowed a combination of three seats on either side of the aisle, as opposed to the 3-2 configuration offered by Boeing. Having acceded to the operators' requests for a wider fuselage cross-section, however, Douglas initially refused to offer any changes to fuselage lengths.

The DC-8's fuselage allowed presentation of Delta's full name as seen on -51, N820E, April 1968, although it changed back to the abbreviated form after a few years AirTeamImages.com/ATI Collection

When Delta introduced the stretched 'Super Sixty'-series DC-8 in 1969, the fuselage title returned to its short form. DC-8-61, N1301L, was later converted to a -71 with CFM56 engines San Diego Air & Space Museum/Roger Belstein Collection

From 1964, as part of an interchange agreement with Pan Am, Delta DC-8s could be seen at London/Heathrow. This arrangement ended after 1974 when Delta sold its DC-8-33s. N8166A was photographed at Heathrow on September 15, 1970 Photo copyright Ad Vercruijsse – www.aviator.nl

However, word had reached Eddie Rickenbacker, the head of Eastern Air Lines, that the series -11, with its Pratt & Whitney JT-3D-6 engine, was somewhat underpowered and required water-methanol to assist with take-off power. The range provided by the engines was certainly sufficient for US transcontinental operations, thus appealing to both operators. Rickenbacker armed with this information, told Douglas to switch his order to the later and more expensive DC-8-21s, which would have an uprated version of the same engine, but in doing so, lost the original delivery slots. Not to be outdone, Delta then took the slots allocated to Eastern for the series -11s. The six aircraft delivered to Delta from 1959 onwards were handed over as series -11s but upgraded to series -12s in December 1960 and ultimately to series -51s. The -12 was the result of design changes made following test flights with the prototype, on which the -11 was originally modelled. Changes were made to the wingtips to make them more aerodynamic and leading edge slats were fitted. This increased the maximum take-off weight by 8,000lb. Following these changes, the aircraft were designated -12s.

The -50 series designation was related to the fitting of an uprated engine. The -12s had the JT3C-6 engines, which required water methanol injection for take-off. They were rated at 11,200lb of thrust (13,500lb st with water-methanol). As engine technology improved, P&W offered the JT3D-3B engine, which was more fuel-efficient, and produced a higher thrust 18,000 lb st). P&W had been forced into improving the engine because of the arrival on the scene of the Rolls-Royce Conway, which was more fuel-efficient and did not require water-methanol.

FIRST DC-8 OPERATOR

Additionally, Delta bought the first DC-8 produced, N8008D, from Trans International Airlines. At the time of purchase, the aircraft had already worn the colours of National Airlines, Trans International Airlines, Lufthansa and Canadian Pacific. It, too, had been converted to series - 51 configuration. ▶

Delivered in October 1968, N1300L was the first of Delta's second batch of DC-8-61s. It is seen parked alongside its first TriStar which was delivered Bob O'Brien Collection

Delta took delivery of the aircraft on October 1, 1967.

The next contest was to see which carrier could put its jets into service first. This time the race was between Delta and United. Delta's first DC-8, N801E, the 14th off the assembly line, was delivered on July 22, 1959, but both operators put their aircraft into service on the same day – September 18, 1959. However, Delta won the right to be called the first jet operator on a technicality, because of the time difference between New York and the West Coast. The route flown was New York – Atlanta and to complete the new flying experience, Delta had fitted a jetway at Atlanta – a major innovation at the time, equalled only at two other airports, San Francisco and La Guardia. The flight took just 1hr 40mins.

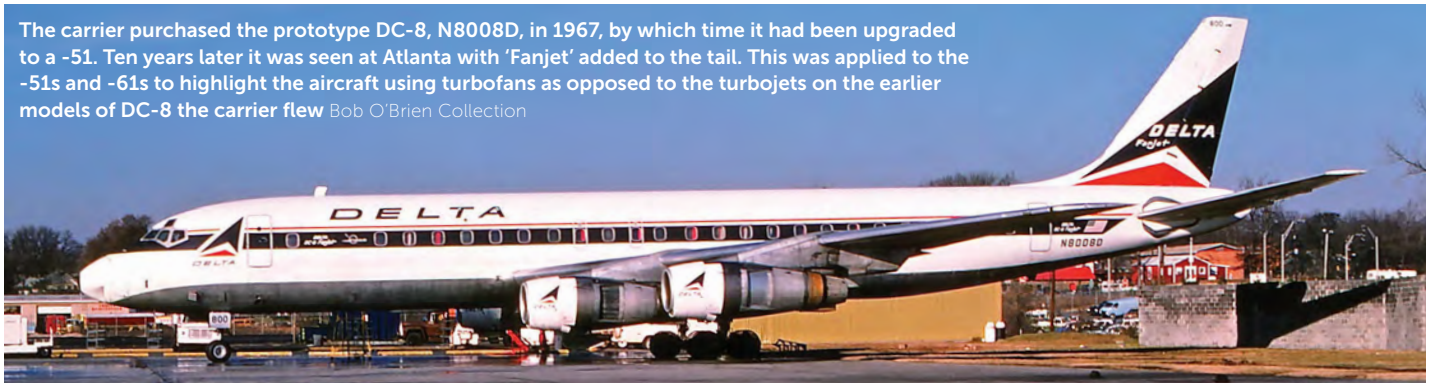
When a new type is introduced to the fleet, there are often changes to the colour scheme, and Delta took the opportunity to introduce the now familiar 'widget' logo, designed to represent the swept wings of a jet airliner. The longer fuselage of the DC-8 also provided extra space to accommodate the full title, 'Delta Air Lines', above the cheat line.

In an unusual departure from its normal schedules, a Delta DC-8 was chosen for a mission sponsored by Douglas Aircraft and the National Geographic Society. The flight took place on July 20, 1963, when N801E embarked on a 520-mile chase across the Canadian Northwest to follow a solar eclipse. The aircraft had been specially equipped with astronomical devices and carried 60 scientists, including Project Mercury astronaut Scott Carpenter.

The introduction of jets brought about significant traffic growth. Delta was pleased with its DC-8s and when the time came to buy more aircraft it continued with the type. This time it went to the used market and between 1968 and 1969 purchased seven DC-8-33s with the uprated JT4 engines, from Pan Am. The DC-8-33s had a longer range than their predecessors, so that when an interchange agreement with Pan Am was agreed, the Series 33s enabled Delta to undertake transatlantic flights on behalf of Pan Am, with the first service taking place on May 29, 1964. Passengers could fly from New Orleans via Atlanta to London or Paris. The new DC-8s were also used on some of the longer domestic routes, in addition to their regular links from New Orleans to San Juan, Montego Bay and Caracas.

Delta DC-8-61, N1302L, taxiing at New York's JFK airport in July 1978
AirTeamImages.com/Carl Ford

In April 1965, under pressure from existing operators, Douglas overcame its reluctance to lengthen the fuselage and launched an extended version of



The carrier purchased the prototype DC-8, N8008D, in 1967, by which time it had been upgraded to a -51. Ten years later it was seen at Atlanta with 'Fanjet' added to the tail. This was applied to the -51s and -61s to highlight the aircraft using turbofans as opposed to the turbojets on the earlier models of DC-8 the carrier flew Bob O'Brien Collection

Delta's fleet of DC-8-61s were converted to -71 configuration, including DC-8-61, N823E, which underwent conversion three years after being photographed at Tampa in 1980
AirTeamImages.com/Bob Robinson

Some of Delta's DC-8s were in service for a long time, but they were modernised along the way. N1304L was delivered as a -61 in April 1966, converted to a -71 in August 1983 and sold to UPS in August 1989 Don Linn

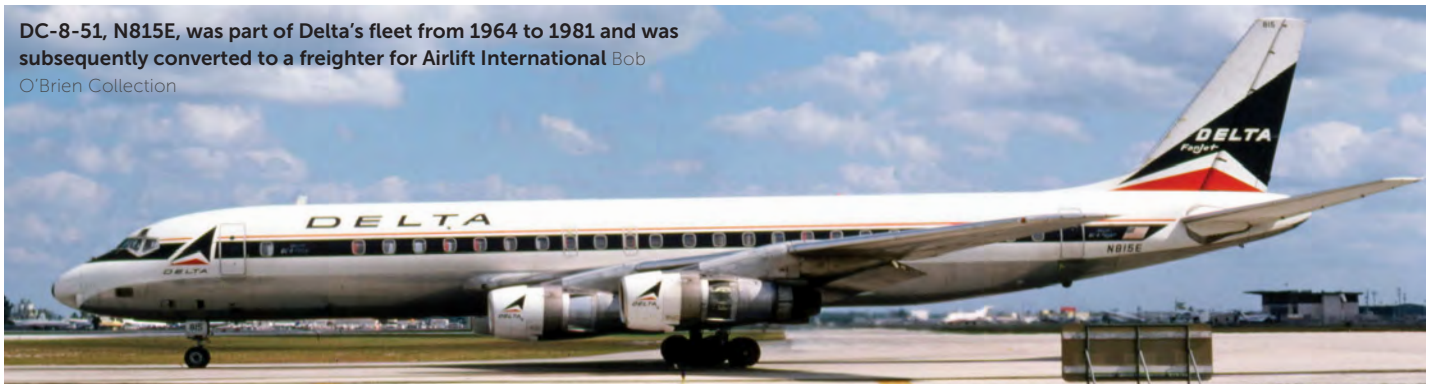
the DC-8, the series being known as the 'Super Sixties': the -61, -62 and -63, a development that Delta could not ignore. The -61 modification was designed for high capacity and medium range, which suited Delta's requirements perfectly.

The DC-8 programme had been suffering falling sales and was in danger of closing, but introducing a lengthened version brought new opportunities for sales. The DC-8-61 had been designed to increase cabin capacity, not least of which was a 37ft fuselage stretch, achieved by a forward plug of 20ft and an aft plug of 17ft. Strengthening of the structure was required as a result of this, but such was the original design that no other major airframe changes were needed. There was a compromise, however. In order to achieve this stretch, it was necessary to reduce the range capability. Given that the typical range of the -61 was 3,200 miles, this was adequate even for Delta's longer sectors and an initial order was placed for three aircraft.

'Delta was pleased with its DC-8s and when the time came to buy more aircraft it continued with the type'

This version of the DC-8 was capable of accommodating up to 252 passengers, but Delta chose to fit its stretched versions with just 212 seats, typically 18 in First and 194 in Coach (economy). They based this on the fact that operating costs of the new aircraft were only 10% higher than the shorter version, but seating was 60% greater. These were to be used on the southern sectors of Delta's network, for example from Los Angeles to Miami, and San Francisco to Orlando. The improved JT3D engines enabled a Delta flight to reach Los Angeles from Atlanta in less than three hours, making it the first service to do so.

On hearing that Douglas was about to offer a stretched version, the Port of New York Authority (PNYA) issued a letter to potential operators of the -61 suggesting that they take "the greatest care" when ordering the type because of the anticipated noise levels, which could lead to a ban. Operators would have to agree to the use of lower take-off weights to reduce the noise level. None of the prospective customers was dissuaded by this though, and the orders were confirmed. The first aircraft was delivered on April 9, 1967 and registered N822E, following the sequence of the earlier examples. The last of this batch of five was delivered on May 30, 1968. A further eight aircraft followed, but these followed a completely different registration sequence, being N1300L to N1307L. This final aircraft joined the fleet on November 6, 1969 bringing the -61 fleet to 13. One other ▶



DC-8-51, N815E, was part of Delta's fleet from 1964 to 1981 and was subsequently converted to a freighter for Airlift International Bob O'Brien Collection

N823E is seen at Dallas-Fort Worth in 1988 after conversion to CFM56 power. Apart from the engines, there are few visible differences beyond the removal of the 'Fanjet' branding Richard Vandervord

change which had taken place was that the 'Delta Air Lines' legend above the cheat line had now been replaced simply by 'Delta'.

RE-ENGINING

Several operators had asked (what was by then) McDonnell Douglas Corporation (MDC) for noise reduction systems, but there was no response. Aftermarket 'hush kits' had been developed, but not taken up. In 1975, General Electric began to discuss the idea of a new type of engine, the significantly quieter and more fuel-efficient CFM56 turbofan, as an alternative. MDC was reluctant initially, but in the late 1970s, with Boeing already on board, it finally agreed, resulting in the series -70. This meant that Delta's love affair with the DC-8 would continue for even longer. It had considered re-engining the type as far back as 1978, having determined that no other available types could perform the same routes with the same payload. The most likely candidate, the Boeing 767, was still on the drawing board and the only other choice was the Lockheed TriStar 400 which in the end was not developed. Faced with this, Delta chose to re-engine some DC-8s with the significantly superior CFM56. The decision was made to convert the -61s to -71s. Further modifications were required to improve the wings and relocate the engines.

The modifications were complicated by the fact that unlike the improved wings and remounted engines which had been factory-built initially on the -62s and -63s, these had not existed on the -61s. Additionally, there was a slight reduction in payload because of the heavier engines, but not enough to seriously affect overall performance. The new CFM56 engines were quieter and more powerful than the JT3D. They offered a 23% greater fuel efficiency, reducing operating costs and extended the range by a massive 3,300nm to 6,500nm.

Much of the re-engining work on earlier DC-8s for other operators was being carried out at Cammacorp's facility in Tulsa, Oklahoma, but after the first aircraft had been completed there, Delta decided to undertake the work in-house and by early 1984, the task was completed on the remaining aircraft at Delta's Technical Operations Center in Atlanta. While the re-engining was being carried out, improvements were made to the avionics, instruments and air-conditioning equipment. A completely new cabin fit was also added.

On April 24, 1982, Delta introduced the world's first commercial CFM56-2-powered passenger service for the short hop between Atlanta and Savannah, Georgia on a DC-8-71. The carrier retained a configuration of 212 passenger seat with 18 in First Class and 194 in Coach. All 13 DC-8-61s were converted to -71s. This fleet was sold to UPS during September and October 1986 and all of them were leased back to Delta. The first example left for UPS and conversion to a freighter in June 1987, with the rest progressively following over approximately the next two years.

By the 1980s twin-engined medium- and long-haul aircraft were becoming available, so replacement was inevitable. The DC-8-71s continued to be used on Delta's major routes until May 1, 1989, when N1304L flew the last passenger service by the type between Baltimore and Atlanta.

The relationship with Douglas, and later MDC, had seen Delta operate 42 DC-8s over almost 30 years of service with the carrier. They were replaced in most cases by 757s as part of a trade-in deal with Boeing. AN

Two decades old and counting... DC-8-71, N1304L, photographed on May 17, 1985 landing on Runway 4R at Newark Airport, New Jersey, still had a few more years to go with Delta Don Linn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Tupolev Tu-134

Soviet-built Workhorse

Conceived as a follow-on development of the Tu-16 jet bomber, the Tu-134 is a regional jet airliner that has enjoyed a long and productive career. **Alexander Mladenov** and **Krasimir Grozev** report

Inspired by the French-made Sud Aviation Caravelle, the Tu-134 was developed because of an order by the Soviet Communist Party leader, Nikita Khrushchev. During a 1960 visit to France, Khrushchev was given a demonstration flight on the Caravelle and was particularly impressed by the smooth and comfortable ride thanks to the tail-mounted jet engines. This method of installing the engine meant much less noise in the cabin and virtually no vibration. Shortly after his return to the Soviet Union, Khrushchev met aircraft designer Andrey Tupolev and asked him to use the Caravelle design layout on his next passenger jet model.

At that time, Tupolev had already developed two passenger jet types. The first of these, designated Tu-104, flew for the first time in June 1955. It represented a repurposed Tu-16 bomber with a new fuselage housing a passenger cabin. The need for a regional passenger aircraft led to the Tu-124, launched in March 1960. It was, in fact, a scaled-down derivative of the Tu-104. Both of these aircraft were developed by Tupolev in a rushed manner and were not known for particularly good operating economics.

Khrushchev's order was formalised on August 1, 1960 by decrees issued by the Soviet Union's Council of Ministers, which tasked the Tupolev Design Bureau to develop a 40-seat passenger aircraft. It was to be powered by a pair of Solovyev D-20P turbojets installed in the tail and be able to transport up to five tonnes of payload. The new jet was required to cover routes up to 810nm, flying at cruise speeds of between 432 and 486kts.

RUSHED DEVELOPMENT

Andrey Tupolev was well known during his lifetime for his design philosophy, which emphasised quick project completion in order to launch aircraft into mass production followed by work to improve and refine the design over a prolonged period. The Tu-134 followed this design approach. In an effort to save as much time as possible, Tupolev decided that the new aircraft would be a derivative of the Tu-124, which at the time was undergoing initial flight testing. The Tu-124's fuselage with its simple construction was adopted without any serious changes, retaining a diameter of 9ft 6in and a circular cross-section. As Khrushchev requested, the engines were placed in the tail, which was T-shaped, with the fin given a much larger area than that of the Tu-124.

The anhedral wings, which swept back 35º, were slightly modified compared to those of its predecessor – the span being increased to get a little more wing area. The undercarriage design remained unchanged, with the main units retracting rearwards in special nacelles extending from the leading edge of the wings. The aircraft also received a brake parachute – a direct legacy of the Tu-124, Tu-104 and, of course, the Tu-16 bomber. The 'chute was intended for use in case of landing on short, wet or icy runways.

In April 1961, Tupolev presented the

The maiden flight of the first prototype Tu-134 was in July 1963. Pictured at Moscow's Sheremetyevo Airport in June the following year, it was later preserved outside a Moscow polytechnic college but was broken up in 2013 Via Alexander Mladenov

preliminary design of the new airliner, known at the time as the Tu-124A. The number of passengers was increased to 55, with the seats in four-abreast rows. In October the same year, however, the Soviet monopoly airline Aeroflot stated that it needed a larger aircraft, as in this form the proposed new regional jet was actually duplicating the baseline Tu-124. Aeroflot desired a seven-ton maximum payload and a range of up to 1,600nm with four tons of payload. The number of passengers was to increase to between 65 and 70 in a single-class cabin configuration, again with four-abreast seating.

In the autumn of 1962, construction of the first prototype began, but due to the urgency to take to the air as soon as possible it was built in the 55-seat cabin configuration as originally conceived. As the new aircraft had a very similar design to that of the Tu-124, components for the aircraft were taken directly from the production plant in Kharkov where the Tu-124 was assembled. The first prototype of the new regional jet was built in the experimental workshop of the Tupolev Design Bureau in Moscow. Wearing the registration CCCP-45075, it had a length of 110ft 11in, a wingspan of 95ft 2in and a maximum take-off weight of 38 tons.

Aeroflot operated the Tu-134 into London/Gatwick for many years, CCCP-65851 being caught on approach in January 1987 AirTeamImages.com/Carl Ford

Its completion was reported in early 1963 and then the aircraft was dismantled and transported by land to the flight test centre in Zhukovsky near Moscow. Initially, the main designer of the project was Dmitry Markov, and under his leadership the main work on the Tu-134 was carried out. At the end of 1962, however, Markov was redirected to deal with Tupolev's military aircraft designs and Leonid Selyakov was appointed the new chief designer of the type, holding this position until the end of the Tu-134's serial production in the 1980s.

TESTING TIMES

At the end of February 1963 the designation Tu-124A was abandoned and the new aircraft received the Tu-134 destination. This was a decision taken by Andrei Tupolev himself as he wanted to show that an all-new aircraft was in development at the time, not just a Tu-124 version, although such a statement could not be regarded as entirely accurate.

The first prototype performed its maiden flight on July 29, 1963, with Alexander Kalina as the test crew commander. At the beginning of the following year the assembly of the second prototype began. Registered CCCP-45076 and like all other Tu-134s it was produced at the Kharkov Aircraft Plant, which is now in Ukraine. It featured a fuselage extended by 1ft 8in in addition to changes to its interior layout in an effort to accommodate 64 passengers. There were also changes made to the wing mechanisation after the initial unsatisfactory tests of the first prototype. The fuel capacity was increased from 25,346lb to 28,652lb, while the maximum take-off weight hit 42 tons. This was undertaken by the design team in order to meet Aeroflot's revised requirements dating from the autumn of 1961.

The second Tu-134 prototype undertook its maiden flight on September 9, 1964. The results from initial factory testing of the two prototypes led to somewhat mixed conclusions. On the one hand, the aircraft behaved perfectly in the air. On the other hand, however, due to the rushed manner of the new aircraft's design and testing and its basis in the Tu-124, an aircraft with mediocre flight performance, the Tu-134 suffered from a good many aerodynamic imperfections. These eventually resulted in disappointingly poor operating economics.

The two D-20P-125 turbojets, rated at 12,783lb st each, proved insufficient for an aircraft with a maximum take-off weight of 42 tons. Due to the T-tail layout, there ▶

All Tu-134s except the prototype were built in Kharkov, (then in the Ukrainian SSR, today in Ukraine). This view of the production line dates to circa 1973 when CCCP-65969, on the left of the picture, was delivered to Aeroflot Via Alexander Mladenov

Wearing Aeroflot's 1970s livery, Tu-134A, CCCP-65973, taxies at Zürich in December 1976. It later served with Tatarstan Airlines Via Alexander Mladenov

PRODUCTION FIGURES

A total of 854 Tu-134s of all versions were built. Of these, two were the prototypes and four were pre-production machines. The Tu-134 basic version was built to the tune of 49 examples, plus there were eight more Tu-134Ks.

Subsequently, 375 Tu-134A/A-3s were rolled out, followed by 162 more Tu-134AKs and 45 Tu-134B/B-3s. The serial production run of the Tu-134UBL derivative numbered 78, including one prototype aircraft, and 120 examples of the Tu-134Sh were built. The Tu-134SKh version production run numbered nine units.

The Tu-134's large-scale production was completed in 1984, but the military and special mission derivatives continued to be assembled at a slow rate until 1989 when the last Tu-134Skh was rolled out. With the exception of the first prototype, all the other 853 aircraft were assembled at the Kharkov Aircraft Plant. The highest production rate was reported in 1978 and 1980 when the plant completed 72 Tu-134s while in 1979 the figure was 71.

were also concerns that the tailplane would be rendered ineffective at large angles of attack.

Initially, it was decided that the Solovyov Design Bureau would develop a more powerful version of the D-20, but in the summer of 1965 the idea was abandoned and instead it began working on an all-new engine design. This was the D-30, rated at 14,987lb st. An increased-area tailplane was also to be trialled, but in the meantime, the second prototype was submitted for state testing and even managed to make its international debut at the Paris Air Show in June 1965.

Of the pre-production examples, only CCCP-65602, which took to the air for the first time in July 1966, received the new D-30 engine. Shortly afterwards, the fourth and last pre-production aircraft, CCCP-65603, took off on its maiden flight. After the addition of the larger tailplane, the first pre-production Tu-134 underwent a series of tests between October 1966 and February 1967 to assess the stalling and spinning behaviour. After nearly four years of testing and design alterations, the final certification trials were conducted between March and July 1967 by the Soviet Ministry of Civil Aviation. Even while these were underway, according to a long-established Soviet practice, the Tu-134's serial production had begun.

DESIGN CHANGES

The baseline variant was known simply as the Tu-134, without any other alphanumeric add-ons in its designation. The production-standard aircraft differed slightly from the last two pre-production examples. Larger doors were introduced, but the most important design change came about following requests from export customers which wanted a more modern weather radar. In the first Tu-134s, the radar was installed under the front of the fuselage and had an extremely narrow field of view, while a navigator's workstation was located in the glazed nose. The change called for deletion of the navigator from the crew, which now comprised three members, while the Groza-134 weather radar was relocated to the nose.

Changes in the nose section caused the fuselage length to increase by about 8in. However, this extension was only applied on a single baseline Tu-134, as an entirely new version of the aircraft was already in the making and set for launch. Production of the baseline Tu-134 continued until June 1970 and included a VIP version called the Tu-134K.

The initial conclusions from the operation of the Tu-134 showed that the baggage space was too small, and the flight range was often insufficient. To fix these shortcomings, design work began on the Tu-134A, a vastly improved derivative, in 1968. This had an increased maximum take-off weight of 47 tons, while the payload increased to 18,073lb and the flight range with maximum payload was extended to 918nm. The fuselage was also extended by 6ft 11in, which made it possible to increase the front baggage compartment and add more seats. The aircraft was now able to accommodate 76 passengers in a high-density cabin configuration. The variant was also powered by new engines, the D-30 Series II, which were more reliable, and provided with thrust reversers to eliminate the need for a brake parachute.

In 1969, two Tu-134A prototypes began flight testing but these still retained the short fuselage of the baseline version. The first 'true' Tu-134A made its first flight in July 1970. It retained the four-member crew, with the nose still extensively glazed and with a navigator's workstation. After 1971, there were some Tu-134As built in a modified configuration with the Groza-134 weather radar in the nose and a three-member crew. These were about 8in longer than their counterparts with glazed noses, a modification that remained unpopular in the Soviet Union and was built only for export customers.

Some of the Tu-134As for Aeroflot featured in-flight entertainment systems, including compact TV sets attached to the roof of the passenger compartment, but retained the same designation. After 178, the Tu-134A design was improved in a major way by deleting the centre-wing air brake, while the wing structure was strengthened.

The Tu-134AK was the dedicated VIP sub-version of Tu-134A, externally distinguished by the presence of a second passenger door on the port side, right in front of the engine; it also had folding side stairs. This

The typically Soviet-era cockpit of RA-65995, a Tu-134A-3 of Russian charter operator Kosmos Airlines. Note the crawl-way between the pilots leading to the navigator's position in the nose AirTeamImages.com/Artyom Anikeev

Syrian Air Tu-134B-3, YK-AYE, on approach to Moscow Vnukovo in March 2014 AirTeamImages.com/Artyom Anikeev

derivative was built for the Soviet Air Force, the country's government air transport unit and some foreign governments.

Some Tu-134AKs received improved Tatra and Tratra-M encrypted long-range communication systems, which required an additional communications operator, but the aircraft has no external differences with its predecessor. There were also two aircraft outfitted with the Karpati commucations system, distinguished by the long antenna fairing on the spine.

The Tu-134LK is a Tu-134AK conversion for cosmonaut training, which was undertaken on two aircraft. The modifications applied to these aircraft included an additional window to be used by the cosmonauts for practicing photographing the Earth's surface.

In 1981, the further-improved Tu-134A-3 sub-version was launched. Its main difference was the use of the more advanced D-30 Series III engine, rated at 15,274lb st, which retained its performance at higher altitudes and in hot weather conditions. The maximum take-off weight reached 49 tons and as well as serial production, a significant number of early Tu-134As were also upgraded to this new standard during their airframe overhauls.

A new variant, Tu-134B, had begun flight testing in 1979. This variant lacked a glazed nose, with the Groza-134 weather radar in a large radome and featured a three-member flight crew. There were also changes to the instrument panel, and thanks to the reduction of the volume of one of the baggage compartments, the airliner was now able to accommodate as many as 80 passengers in a single-class cabin configuration. Its serial production began in April 1980 and ran in parallel with the Tu-134A. In 1982, the Tu-134B-3 version appeared, powered by the D-30 Series III turbojets.

The main passenger versions also have VIP sub-versions known under the common name 'Salon', without any design differences but outfitted with a VIP interior.

IN OPERATION

After several months of experimental operation, Aeroflot performed its first revenue flight with the Tu-134 on September 9, 1967, between Moscow's Vnukovo Airport and Adler near Sochi. The new regional jet quickly began to enter the network of the Soviet Union's giant airline. Initially, the type was configured with 68 or 72 seats in a single-class cabin or with eight seats in first class and 56 in economy class. Passengers liked the new jet, mostly because of the low noise and vibration levels in the cabin. Pilots also liked the Tu-134 thanks to its easy handling and mistake-forgiving behaviour. After curing the initial teething troubles, the new twin-jet airliner gained a reputation as a reliable aircraft, capable of withstanding intense operations, often flying for 15-16 hours a day without experiencing any particular technical problems.

The Tu-134, however, had its fair share of drawbacks, at least in the beginning. Even with the extended-fuselage Tu-134A, the baggage compartments were often insufficient when flying with the full passenger load. The cabin itself was narrow and not particularly comfortable for longer flights. Until the advent of the further improved D-30 Series III, the aircraft experienced frequent problems with take-offs from hot and high airfields. Fuel efficiency remained poor until the very end of the type's commercial operation and according to some the Tu-134 operations were never profitable in Soviet times (given the symbolic price of air tickets).

In the Aeroflot system, however, the aircraft proved more than successful. In 1973, the An-10 regional turboprop was promptly retired after a serious accident and six years later the Tu-124 followed suit. This left the Tu-134 as the only ▶

When the USSR broke up, Tu-134s became the main equipment of many new airlines serving Russia and the former Soviet republics. Tu-134A-3, RA-65751, was transferred from Aeroflot to Perm Airlines in 1993 Key Collection

Yugoslavian charter operator Aviogenex began services in 1980 with a single Tu-134A, its fleet eventually including 12 of the type. YU-AJA is seen that year at Manchester AirTeamImages.com/Carl Ford

regional jet operated by Aeroflot. Between September 1967 and April 1991, the type carried 550m passengers on Aeroflot's extensive regional route network. Towards the end of the Soviet era, each Tu-134 was amassing about 1,100 flights a year with an 80% average load. Meanwhile, the aircraft was exported to virtually the entire Eastern Bloc except for Romania.

The Soviet Union's collapse in 1991 saw the Tu-134 going to virtually all the newly formed independent states, and the aircraft was often the first for many of the newly formed airlines. The end of heavily subsidised flights in the post-Soviet era also resulted in a collapse in passenger traffic, but the relatively small Tu-134 turned out to be the right aircraft for the 1990s in the former Eastern Bloc. The Tupolev Design Bureau has extended its service life several times – from the original 25,000hrs to 45,000 at incremental steps. In 1996, as many as 267 civilian-registered Tu-134s operated in Russia alone, but four years later the figure had dropped to 159.

In 2006, the number of the civil-registered Tu-134s in active operation around the world was 245. Many airlines began to withdraw it from use, replacing the veteran twin-jet with much more economical Western-made aircraft.

Several incidents since 2007, including the economic crisis in Russia and high oil prices, doomed the type's commercial operations. Aeroflot ceased services with it on January 1, 2008. On May 21, the following year, the Tu-134 performed its final revenue airline flight in Russia flown by Alrosa's Tu-134B-3, RA-65693, an aircraft produced in May 1980. Incidentally, the fate of this aircraft could well describe the life of many Tu-134s – manufactured as a Tu-134B and originally flown by the Latvian division of Aeroflot, it was upgraded to the B-3 standard during its first general overhaul. After the Soviet Union's collapse, the aircraft was initially operated by the Latvian airline Latavio. In the late 1990s, it eventually returned to Russia, where it changed several operators and in 1998 it was even converted into a VIP version with seating for 28 passengers. RA-65693 began flying in Alrosa colours in 2000, but initially was used for corporate transport and not until 2010 was it converted back into a passenger transport version with 73 seats in a single-class configuration.

'Passengers liked the new jet, mostly because of the low noise and vibration levels in the cabin'

By the end of 2020, more than 60 Tu-134s continued to serve with the Russian armed forces – mostly the Tu-134Sh and UB versions. There are also some AKs, including the Balkaniy aerial command post version. Another ten examples are still in use by various Russian government organisations. Separately, at least one Tu-134AK is still operated by the Ukrainian Air Force. There are also indications that Syrian Air was still flying two Tu-134B-3s, while Air Koryo of North Korea had one in active operation, but there is no reliable information whether they continued flying in 2020 or this year.

MILITARY VERSIONS

The Tu-134 was built in two main military variants. The first of these, dubbed Tu-134Sh, was developed for training navigators/weapons systems operators for the Soviet Air Force's tactical, special mission and long-range aviation branches. This derivative was developed in 1969-1970 using the Tu-134A's baseline design and built in two sub-variants. The Tu-134Sh-1 was a derivative optimised for training navigators/weapons systems operators destined for Tu-22 bombers (and later on the Tu-22M). Its main difference from the Tu-134A is the larger radome under the nose housing the Rubin radar, installed on many Soviet bomber types at the time. The wings have two hardpoints for practice munitions, each accommodating four PB-120 or BP-50-70 free-fall bombs. There were also workstations for 12 students in the cabin. The Tu-134Sh-1 was launched in production in 1971, followed a year later by the Tu-134Sh-2 that came equipped with another radar type, the Initsiativa-2, used on the tactical bomber types at the time.

In the 1990s, a few Tu-134Shs were converted for VIP transport but without a change in their designation.

The Tu-134UBL is the second main training version, developed by using the much-improved Tu-134B as a baseline. It was intended for training pilots for Tu-22M and Tu-160 bombers, as both of these lacked training versions and so it was considered more cost-effective to use a Tu-134 for aircrew training. This derivative differs significantly from the passenger versions as it sports an extended nose with a profile identical to that of the Tu-22M. This particular design change was introduced to

Tu-134UBKM, RF-93938, was specially modified as a trainer for Tu-22M3 navigators Andrey Zinchuk via author

allow pilots to train in performing landings with such a nose shape, which to some extent restricts the view forward and down.

The Tu-22M3 bomber, which entered service in the late 1980s, had a significantly improved weapons system that necessitated a new training aircraft for its navigators. A prototype Tu-134UBK was developed to meet this requirement, but the project was terminated soon after the Soviet Union broke up in 1991. In the event, to meet the requirement several Tu-134UBLs were converted in the late 1990s to the improved Tu-134UBKM standard to train Tu-22M3 navigators.

In the late 1970s and the early 1980s several dozen Tu-134AKs underwent conversion into aerial command posts, receiving the name Balkaniy. This sub-version featured 29 workstations in the passenger cabin, and the aircraft received much improved onboard communication equipment. The Tu-134AK Balkaniy can be visually distinguished by the large 'sting' in the tail housing a HF radio antenna.

The initial Tu-134UBL's first flight was in 1981. The same year, a specialised version of the Tu-134A-3, dubbed Tu-134SKh, was also rolled out. It was intended to monitor crops in the Soviet Union, assessing their growth rate, soil moisture, the presence of pests and others factors. Subsequently, this subversion was used to perform wider activity related to environmental monitoring, assessment of the consequences of disasters and accidents and other surveys. It featured four different wide-format cameras housed in the lower part of the fuselage and there was also a photo laboratory on board for rapid development of the films, as well as equipment for their analysis. It also sported two underwing gondolas housing Nit-C1SKh side-looking radars for surveillance of the Earth's surface. The navigation system was significantly improved in order to support the use of this sophisticated equipment. After 1991, most of these aircraft were sold to private

Above: **Still in service with the Russian Federation Aerospace Forces (formerly Russian Air Force) today, RF-65573 *Saint Petersburg* is a Tu-134AK VIP version** Andrey Zinchuk via author

Below: **Although its airline days are nearly over, the Tu-134 has found use as a corporate transport. RA-65798, photographed in Dubai in 2008, then belonged to Aviation Company Meridian, a VIP charter operator** Key Collection

customers, who converted the Tu-134SKhs into a VIP variant known as the Tu-134A-3M.

One Tu-134SKh was converted for freight, receiving a cargo door sized 1.61m x 1.09m, intended to serve as a prototype for a large-scale cargo conversion programme for the type. There was no interest in the in this conversion and the programme was eventually abandoned.

In the late 1960s, the Soviet Air Force had a plan to purchase a significant number of Tu-134 for medical and casualty evacuation. A single aircraft was converted in the Tu-134TS version with its passenger cabin modified to accommodate stretchers and seats for medial attendants. The Tu-134TS was tested, but then abandoned as it was deemed there was insufficient need.

In addition, the Soviet aviation and defence industries took 20 Tu-134s – mainly of the AK versions plus a few Sh and UBL variants and converted them to be testbeds for various research and development programmes, such as new radars and avionics.

The Tu-134, as well as the Tu-154 that appeared a little later, remain distinguished representatives of Soviet civilian aviation. The sleek Tu-134, although far from technically perfect, proved successful and safe enough while also leaving a deep impression in the collective memory of the people of the Eastern Bloc. Its name was even given to a popular brand of cigarettes produced in Bulgaria, but exported mostly to the Soviet Union and then Russia. The Tupolev Tu-134's place with the Russian military is assured until at least the end of the decade. AN

North Korea's state airline Air Koryo maintains a single immaculate Tu-134B-3, P-813, seen at Wonsan in September 2015 AirTeamImages.com/Felix Gottwald

Flight Bag

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FROM F-4 PHANTOM TO A-10 WARTHOG – MEMOIRS OF A COLD WAR FIGHTER PILOT

Book: 328-page hardback
Written by: Colonel Steve Ladd USAF (Retired)
Price: £25

There are many books out there about fighter pilots, but few if any are as compelling as this. Ladd captures the essence of being a USAF fighter pilot during the Cold War and as the title suggests flew both the McDonnell Douglas F-4 Phantom II and the Fairchild Republic A-10 Thunderbolt II (commonly called the *Warthog*). A captivating set of stories spanning almost three decades of service around the world keep you wanting to know more. His flying skills are complimented by his ability to tell his tale with a sense of humour not often seen in aviation memoirs

After USAF pilot training and selection for the F-4, Ladd is sent to Thailand where he flies 204 combat missions in the Vietnam War. This is followed by a tour in Spain where he meets his future (English) wife. Next is an instructor tour, then the Fighter Weapons Instructor Course and training Iranian students on the Phantom. The international streak continues at RAF Bentwaters in Suffolk where the wing is converting to the new A-10. Steve learns to appreciate the attack aircraft's manoeuvrability and its massive 30mm cannon.

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FLEET AIR ARM BOYS – VOLUME ONE: AIR DEFENCE FIGHTER AIRCRAFT SINCE 1945

Book: 256-page hardback
Written by: Steve Bond
Price: £25

This is the latest instalment in the popular Grub Street series, focusing on Royal Navy fighter operations since World War Two. There are 11 chapters of adrenaline-filled stories from all aspects of Fleet Air Arm fighter evolution from the last of the piston-engined fighters through to the latest Lockheed Martin F-35B Lightning II. One standout feature is the mix of stories from aircraft handlers, engineering officers, observers, and pilots. It was fascinating to read about the role of the FAA in air power projection. This well-researched and extensive volume has dozens of stories about landing fighters on carriers at night, combat operations and everyday life aboard ship.

Just some of the exciting stories involve underwater ejections from the de Havilland Sea Vixen, Korean War combat in the Hawker Sea Fury, and launching off a carrier in a fully loaded McDonnell Douglas F-4 Phantom II to intercept Russian bombers. An added bonus are the humorous stories of life in the Navy dotted throughout the book.

Each chapter has a number of photos and there is a separate section with 37 colour images. The structure of the book is based chronologically on the introduction of each fighter, and each chapter has several stories from various trades associated with that aircraft.

This book is must buy for anyone with an interest in FAA fighter operations, naval aviation memoirs, and any fans of the Grub Street Boys series.

Published by Grub Street: ISBN 9781911621980, available from www.grubstreet.co.uk

I WILL RUN WILD – THE PACIFIC WAR FROM PEARL HARBOR TO MIDWAY

Book: 320-page hardback
Written by: Thomas McKelvey Cleaver
Price: £25

Thomas Cleaver dives into a well-researched summary of the first six months of World War Two after the Japanese attack on Pearl Harbor in December 1941.

The stunning defeats suffered by the Allies in Malaya, the Philippines, Wake Island, and the attacks on Darwin along with the victories in the Coral Sea and at Midway are covered in all aspects from strategic, tactical and operational levels.

The campaign plans, naval battle summaries and personal accounts the author has collected are phenomenal and filled with amazing acts of bravery and sacrifice.

Valiant but costly actions of the Commonwealth and Dutch aircrew defending Malaya are captured in tragic detail, as is the demise of Torpedo Squadrons 6 and 8 at Midway. The heroic stand of the defenders of Wake Island is poignantly covered and the creation and use of the 'Flying Tigers' volunteer group is brilliantly described. Additionally, the Doolittle Raid is analysed more from a naval perspective in the chapter 'Our Target is Tokyo'. The author is to be commended on how he portrays Gen Douglas MacArthur's dismal performance in the Philippines.

Published to a high standard, the book has 21 chapters with numerous maps and two photo sections contain 67 images. The sheer volume of personal accounts in this book is impressive. If you have any interest in the early Pacific campaigns of World War Two, this is a must-read.

Published by Osprey Publishing: ISBN 9781472841339, available from www.ospreypublishing.com

P-47D THUNDERBOLT VS Ki-43-II OSCAR – NEW GUINEA 1943-1944

Book: 80-page softback
Written by: Michael John Claringbould
Price: £13.99

The aerial campaign over New Guinea during World War Two is a subject not often covered in the publishing world, but that gap is filled by an excellent volume in Osprey's long-established Duel series. The author, who comes from Papua New Guinea, has a great reputation in Pacific air war research. This particular volume compares the Republic P-47D Thunderbolt with the Nakajima Ki-43-II 'Hayabusa' (codenamed Oscar) and how they fought over the mountainous terrain and in extreme weather. The P-47 was known for its size, its heavy armament of eight .50-calibre machine guns and its legendary ruggedness. The Ki-43-II was famous for its manoeuvrability, its very light armament of two 12.7mm machine guns, and the unusual system of 'combat flaps' installed for greater turning performance.

The book follows the Osprey Duel format of a chronology, design and development section with technical specifications, a strategic overview, a comparison of the opposing aircrew, combat stories, a statistical analysis, the aftermath and some suggested further reading. There are some individual profiles of both sides pilots and numerous full-colour artwork of cockpits, armament layouts, and a battle scene. The author does a superb job of getting a good mixture of the technical aspects of both aeroplanes and personal accounts of both sides.

This is another well-researched volume in the series and is recommended for anyone with an interest in either aeroplane or the lesser-known Pacific air campaigns of World War Two.

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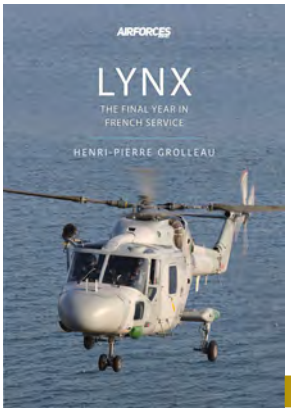

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Brief Encounter
Australia's Phantoms

Acquisition by the Royal Australian Air Force (RAAF) of the McDonnell Douglas F-4E Phantom II occurred as much by accident as design and as a temporary measure to cover delays to the F-111 programme. Stewart Wilson details the short career of the Phantom in RAAF service

The RAAF's fleet of 24 F-4Es was leased from the US Air Force and all were new aircraft built in 1970. The Phantoms were operated by 1 and 6 Sqns, components of 82 (Bomber) Wg based at Amberley, Queensland. The squadrons had previously operated Canberras, but by 1970 these aircraft had reached the end of their operational lives.

Delays to the F-111 programme resulted in a 'capability gap' and the Phantoms were acquired to fill it. They were delivered in September and October 1970 and returned to the USAF in two batches in October 1972 and June 1973.

The RAAF had ordered 24 F-111Cs in 1963; the first examples of this highly advanced strike aircraft were scheduled to arrive in Australia during 1967. The six-year delay while their problems were being sorted meant the Canberra's time was up well before the F-111s were delivered, necessitating the introduction of an interim type to keep the RAAF's strike squadrons operational. A third RAAF Canberra unit, 2 Sqn, operated the aircraft in Vietnam between 1967 and 1971 and kept them until retirement in 1982 for training, target towing and cartographic survey in their later years.

F-111 PROBLEMS

The delays to the F-111 resulted from several factors. The RAAF ordered the unique-to-Australia 'C' version of the aircraft, a hybrid combining the original F-111A's airframe, avionics and powerplants with USAF Strategic Air Command's FB-111A bomber and its extended-span wings, strengthened undercarriage and increased weights. This pushed the planned delivery date back to the second half of 1968, still within the Canberra's useful life.

By then, everything seemed reasonably well under control. The first F-111C flew in July 1968 and all 24 aircraft were formally handed over two months later in a ceremony at General Dynamics' Fort Worth, Texas, facility. But within three weeks of the handover it was decided to delay delivery pending modification after the USAF suffered its 11th crash of the type and the RAAF's aircraft were placed into storage.

Three RAAF Phantoms pose for the camera shortly after delivery
RAAF

Problems associated with the F-111's wing carry-through box – the vital structural 'heart' of its variable geometry wings – came to a head with cracks appearing in some places, along with the discovery of sub-standard welds by a sub-contractor. The Australian aircraft began to be modified to what was then considered an appropriate standard in January 1969, but the discovery in July that year of a fatigue crack in a statically tested wing box delayed things further.

By December 1969, things appeared to be again on track and Australia asked the USAF to reactivate the stored F-111Cs for early delivery. But more problems followed. In that same month, a 15th USAF F-111 crashed when it shed a wing in flight. The entire fleet was grounded for a period of seven months.

A massive modification programme was undertaken, and the already partially dismantled F-111Cs would lie idle for more than two years before reassembly and reactivation began. Deliveries to the RAAF finally took place between June and December 1973.

Smiling faces at the arrival of the first batch of RAAF Phantoms at Amberley on September 14, 1970 (left to right): Senator Tom Drake-Brockman (Minister for Air); Wg Cdr Roy Frost (82 Wing, RAAF); Col Hal Hume (USAF); and the Hon Malcolm Fraser (Minister for Defence) – who became the Australian Prime Minister in 1975 RAAF

BRIDGING THE GAP

With time rapidly running out for the Canberras and the F-111 programme facing uncertainty, the Australian government was forced to seek an interim type to fill the RAAF's strike needs.

A mission visited the USA in May 1970 with the intention of organising the lease of 24 suitable aircraft to fill the gap until the F-111s could be delivered. After examining alternatives (including leasing B-47 Stratojets from the USAF), the F-4E Phantom became the obvious choice – it was modern, available and had been battle-proven in Vietnam.

The deal was concluded on June 22, 1970 and covered 24 F-4Es to be leased at a cost of $US34m for the first two years and $US12m per annum after that. These costs were inclusive of spares and ground support equipment and the contract provided for the outright purchase of those and additional Phantoms should the F-111C programme be cancelled.

The Phantoms were diverted from USAF orders and delivery began just three months after the contract was announced under the Peace Reef programme. Built in mid-1970, the Phantoms were from Production Block 43.

As they were leased, not purchased, the Phantoms were given the out-of-sequence RAAF serial number prefix 'A69', this reflecting the USAF serial prefix and used for stores and accounting purposes only. 'A69' never appeared on the aircraft, which retained their USAF serials: 69-0304-'07, 7201-'17, 7219-'20 and -7234. An abbreviated USAF serial remained on the fin along with 'buzz' numbers reflecting the last one or two digits of the serial painted on for identification. The first aircraft – 69-0304 – was the 604th F-4E and the 3,847th Phantom overall.

TRAINING CREWS

Preparations for the Phantom's entry into RAAF service were quickly organised. In July 1970, the first of 39 members of a USAF maintenance training team arrived, to be based at Amberley. They taught RAAF maintenance personnel and conducted courses on communications, navigation, electronic countermeasures, engines, weapons, electrical systems, instruments as well as the airframe.

In addition, the USAF sent a 20-strong Maintenance Advisory Team, which arrived in Australia in August 1970. This was supported by the arrival in the same month of the first Phantom ground service equipment. In early September a McDonnell Douglas' field service representative also arrived.

Meanwhile, personnel from 1 and 6 Sqns had been in the USA since July, undergoing training at MacDill Air Force Base in Florida, the courses covering the Phantom's radar and weapons systems. The first course was completed in early September, allowing its participants to be back in Australia in time for the arrival of the first RAAF Phantoms on September 14.

Flying training was also carried out at MacDill, the first course conducted by the 4530th Tactical Training Sqn starting at the beginning of August and completing a month later.

The preparations were by necessity somewhat rushed, but nevertheless adequate under the circumstances as the Phantoms were not intended to become a permanent part of RAAF strength. This avoided having to establish the infrastructure which would normally accompany the introduction of a new combat aircraft into service.

The aircraft were flown from the factory at St Louis, Missouri, to George Air Force Base, California, and then to Amberley via Hickham AFB, Hawaii, and Andersen AFB, Guam; each flight accompanied by a pair of US Air Force Boeing KC-135 tankers. An RAAF P-3 Orion escorted the aircraft on the final leg, providing weather reconnaissance and search and rescue back-up.

The first five Phantoms arrived at Amberley on September 14, 1970 followed by a further six on September 19, seven on September 26, four on October 3 and the final two the following day.

Phantom s/n 7215 showing the standard USAF Southeast Asia camouflage scheme of the time, applied to all RAAF Phantoms. Australia's F-4Es were all new aircraft from Production Block 43, built in mid-1970 Robert Wiseman

IN RAAF SERVICE

The delivery operation was a joint USAF/RAAF effort, the Phantoms crewed by a mix of Australians and Americans; the first batch led by Wg Cdr Roy Frost – OC of 82 Wg temporarily – in 69-0306. ▶

The Phantom filled the capability gap while awaiting delivery of the F-111Cs and also allowed 82 Wing's ground and technical crews to gain experience on the systems and maintenance of a modern supersonic combat aircraft, which was a substantial technological leap over the Canberra.

As an interim type, the Phantom was not used by the RAAF in the wide variety of roles it was capable of performing, but was instead used almost exclusively as a strike aircraft by 1 and 6 Sqns. The idea was to maintain proficiency in that role until the F-111s arrived and training flights and exercises were undertaken on that premise.

The Phantoms worked with RAAF Mirage fighters and Royal Australian Navy A-4 Skyhawk strike aircraft during their period of Australian service, participating in major air defence and naval exercises. They made good use of the Evans Head bombing and gunnery range on the north coast of New South Wales.

Flying operations began only three days after the arrival of the first aircraft, the two squadrons initially operating as a single unit under the umbrella of 82 Wing until all the aircraft and crews had arrived from the USA.

Readiness then increased with various operational milestones achieved during the remainder of 1970 and into 1971. The first night sorties were flown in early October 1970; initial practice bombing sorties in late November; the first defensive tactics sorties (flown against Mirages) in January 1971; first ground attack sorties in February; and in June high explosive bombing began with some 176 Mk 82 500lb 'slick' bombs dropped over a four-day period.

The RAAF received 24 F-4E Phantoms in 1970, leased from the USAF to fill the 'capability gap' caused by delays to the F-111 programme. They served for less than two years Nigel Daw

Phantom s/n 7234 was the first of its type to have repair work of the magnitude described in the text, right, performed by service personnel anywhere in the world RAAF

Amberley's support units had plenty to do during the Phantom's short stay in the RAAF. No 482 (Maintenance) Sqn and No 3 Aircraft Depot (3AD) had to install various modifications to the AN/APQ-120 radar (completed in June 1971); check all aircraft for defects in the flap emergency system in September 1971 (four aircraft were found to have loose or broken lines); and, following the discovery of a large crack in one of 7234's stabilators during its rebuild after a major accident (see right), the other Phantoms had to undergo X-ray testing in early 1972.

One RAAF Phantom was lost, 7203, on the night of June 16, 1971 after an exercise near the Evans Head bombing range. The aircraft were initiating rejoin procedures when contact was lost. An extensive air search involving RAAF and civilian aircraft resulted in some wreckage from the missing Phantom being found in the sea the following morning. Sqn Ldr Stuart Fisher and Flt Lt Robert Waring were killed.

THE SAGA OF '234'

An accident involving 7234 on October 19, 1970 went into folklore. Flown by Flt Lt J L Ellis, the Phantom lost its left generator and bus tie during a training sortie out of Amberley. With these malfunctions, two essential services required during landing – brake anti-skid and nosewheel steering – were lost.

A 15kts crosswind on Amberley's runway exacerbated the problem. As directional control during the landing run was going to be very difficult if not impossible to achieve, it was decided to carry out an approach and 'engagement', stopping the aircraft using Amberley's arrester wires and the Phantom's tail hook.

Flt Lt Ellis performed a textbook approach but on engagement the cable on the starboard arrester gear drum broke and the remaining piece and shock absorber unit were dragged along the runway behind the aircraft. The cable slid through the Phantom's arrester hook until the swaged end fitting on the starboard end of the pendant came to rest against it.

Still travelling at high speed, the Phantom yawed violently to starboard, the arrester hook broke off and bits of cable and other arrester system parts flailed around the

A flight of RAAF Phantoms at East Sale just prior to take-off
RAAF

aircraft causing increasing damage including rupturing a drop tank.

The remaining cable wrapped around the port undercarriage strut and broke into pieces as the wheel ran over it. The aircraft continued to slide along the runway but then left it and the port wheel sank into soft earth, causing a violent yaw to the left, and the starboard and nose wheels collapsed. The Phantom came to rest 2,500ft from the end of the runway and 200ft off it.

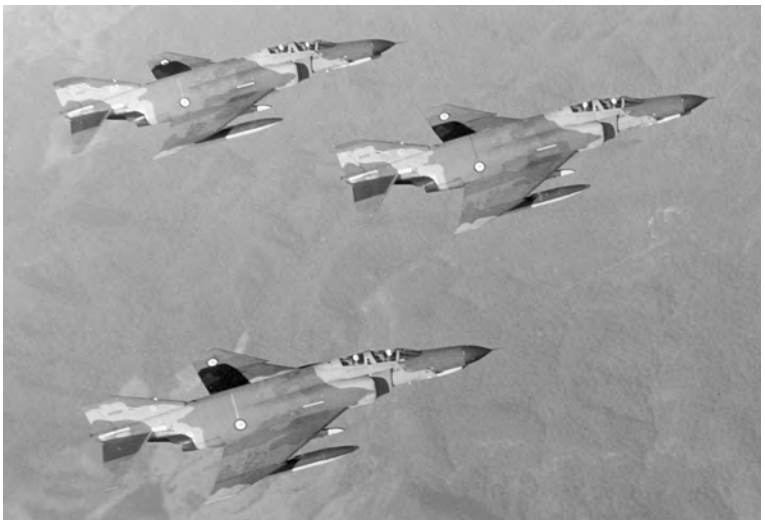
The aircraft suffered serious damage to most parts of the airframe and the Phantom was assessed as having suffered Category 4 damage – repairable, but only at depot or contractor level. A repair feasibility study was carried out and it was at first thought necessary that the Phantom would have to be returned to the USA. However, a detailed assessment led to the decision to undertake the repair at Amberley by 3 Aircraft Depot.

It was a massive effort, taking 18,750 man-hours to complete with most of the fixtures and handling equipment required needing to be manufactured in 3AD's workshops. Both wings, the tailplane and the nose section forward of the cockpit were replaced and the achievement was all the greater because none of the Australian tradesmen involved had any previous Phantom experience.

The job was finished in late September 1971 – more than 11 months after the accident took place – and 234 was reflown on the 30th of that month to rejoin 82 Wing's Phantom force.

This was the first time a repair of such magnitude had been carried out on a Phantom by service personnel anywhere in the world.

Wg Cdr Roy Phillips (ret'd) spent 20 years with the RAAF on fast jets, flying Sabres, Mirages, Phantoms and finally F-111s.



All of the RAAF Phantoms which were returned to the US were subsequently converted to F-4G Wild Weasels for the USAF. Later, 15 became QF-4G target drones RAAF

An impressive sight – 20 of 82 Wing's 24 Phantoms on the flight line at Amberley RAAF

During this time he logged more than 3,300 hours in total on these aircraft types. He recalled: "For those of us who had previously flown the Mirage, the Phantom offered a marked comparison. It looked like a tank, the cockpit was incredibly spacious and well laid out, in contrast to many European types. The way the controls and switches were laid out was typically American, uncluttered and well thought out.

"Flying the Phantom was akin to driving a twin-turbocharged Mack truck. Brute force alone pushed the unconventional and very 'draggy' airframe through the air. Engine thrust against airframe drag was always apparent on this aircraft – close the throttles at high speed and the aircraft just 'stopped', there was little need to deploy the speed brakes.

"A typical RAAF Phantom sortie might comprise a low-level navigation exercise followed by dive bombing onto the Evans Head range and then gunnery either against a target at Evans Head or against a 'splash' target towed by an RAN vessel. The latter was regarded as great sport by the Phantom crews.

"The Phantom was a fabulous aeroplane. Equally effective in a number of roles, it was perhaps unfortunate that the RAAF didn't exploit its capabilities as a fighter. But for a pilot who flew the Mirage and F-111 as well, the Phantom was the best workhorse of the lot – reliable and strong with very few limits and, when operated in the normal way, delightful ▶

Half a dozen 'thirsty' Phantoms line up for a drink at Amberley. The F-4E's internal fuel capacity was nearly 1,850 US gal and external tanks could add another 1,321 US gal to this amount RAAF

to fly. An extremely useful fighter-bomber – in its day without peer, in fact!"

Two years and one month after their arrival in Australia and with F-111 deliveries now confirmed for mid-1973, the first RAAF Phantoms were returned to the USAF. These came from 6 Sqn, which flew its last Phantom sortie, an eight-ship simulated strike and flypast at Amberley, on October 4, 1972.

Phantoms 0305 and 7211 at Richmond, New South Wales, at the time of the RAAF's 50th anniversary airshow in March 1971 having their engine intake covers applied. As a USAF F-4G, 7211 saw action in the 1991 Gulf War Nigel Daw

RETURN TO SENDER

On October 25, 1972 six Phantoms departed Amberley flown by American crews and accompanied by four USAF KC-135 tankers. Five more followed in early November. Aircrew from 6 Sqn who were not involved with F-111 training courses in the USA continued to fly Phantoms with 1 Sqn, which kept 12 aircraft until June 1973.

On June 6, 1973 (five days after the first F-111s had arrived at Amberley) six more Phantoms departed, followed by four on June 21 and the final pair the next day. The last official RAAF Phantom flight was made on June 20, 1973 by 1 Sqn's 7208.

All 23 surviving RAAF Phantoms were converted to F-4G Wild Weasel aircraft when returned to the USAF and 15 of them subsequently to QF-4G target drones. Seven of the former Australian aircraft saw combat in the 1991 Gulf War as F-4Gs, between them completing more than 300 sorties over Iraq. Aircraft 7234 was credited with four Iraqi radar site 'kills'.

The question of whether or not the RAAF should have kept its Phantoms after the F-111s arrived was widely discussed. Many in the RAAF wanted to retain them for the close air support role and in 1972 the USAF offered Australia the 23 surviving aircraft for what looked to be a generous $US54m. But when the offer was more closely assessed it was found there would be considerable extra expense involved as spares and ground handling equipment (which had not been purchased under the lease) would also have to be acquired. The offer was rejected.

If the RAAF had retained the Phantoms it would have been necessary for cost reasons to disband one Mirage fighter squadron and recruit and train some 320 new pilots and airmen; the pilots who had been flying them having been transferred to the F-111. It would have taken at least two years for a Phantom squadron to achieve the level of being fully operational.

Thus ended the Phantom's short life in Australian service. Happily, the F-111 proved to be a superb strike aircraft, despite its bad start, the RAAF adding to its initial 24 by acquiring ex-USAF aircraft; finally receiving 49. After 37 years, the F-111 was retired in late 2010. AN

The first batch of RAAF F-111Cs arrived at Amberley on June 1, 1973 and five days later the last 12 Phantoms began departing the base for their return to the USAF. F-111C A8-129 is in the foreground of this shot with Phantoms 0304, 0307, 7219, 7206 and one other visible behind, along with the two USAF KC-135 tankers that would accompany them back to the USA RAAF

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Testing to the Limits

Riccardo Niccoli reviews the structure, role and aircraft of Italy's Centro Sperimentale Volo (CSV, Flying Test Centre) based at Pratica di Mare

An F-2000A Typhoon and a FT-339C assigned to the RSV break for the camera
Riccardo Niccoli

The CSV of the Aeronautica Militare (Italian Air Force, AM) is one of the centres of excellence of the Italian armed forces. The Centro was instituted in 1999 through the transformation of the Divisione Aerea Studi Ricerche e Sperimentazione (DASRS, Studies, Research and Test Air Division) and placed under the control of the Comando Logistico AM (Air Force Logistic Command). It is the principal consultative agency for the AM for activities ranging from study, research, trials, experiments and testing, to the technical and operational evaluation of aircraft and weapon systems for the service, as well as performing a similar role for other Italian armed forces and state corps. It also undertakes the chemical and physical analysis and evaluation of structural materials and consumables, as well as being responsible for the physiological training and trials of flying personnel.

CSV DEPARTMENTS

Three Reparti ('departments') are parented by the CSV: the Reparto Sperimentale di Volo (RSV, Flying Test Wing); the Reparto Tecnologie Materiali Aeronautici e Spaziali (RTMAS, Aerospace Materiel Technologies Wing); and the Reparto Medicina Aeronautica e Spaziale (RMAS, Aerospace Medicine Wing). RTMAS primarily employs graduate or highly specialised personnel concerned with the materials used in aeronautical and space construction. It is also works in relation to the science of materials, their chemistry, technology and engineering. The Reparto possesses expertise in these fields and offers leading capabilities in terms of investigation, control, analysis, study and experimentation.

RMAS is the only Italian military agency with the primary function of undertaking physiological training of flying personnel in adherence to relevant national directives and legislation. Among the various structures and equipment managed by the Reparto are sophisticated environmental simulation facilities – including a hypobaric chamber, a spatial disorientation simulator, the ejection seat trainer and a laboratory for night vision training. These are used to improve the pilots' response to particular operational conditions, and coincidentally reduce the risk of flying incidents linked to associated human factors.

Of the three divisions of the CSV, it is the RSV that attracts the most interest from enthusiasts and operators, as it is the Reparto most directly involved with

Above left: **Col Igor Bruni is the current commander of the RSV** RSV

Above right: **The 311° Gruppo also operates a VC-180 Avanti; useful for liaison flights and for quick transfer of personnel** Riccardo Niccoli

flight operations. The RSV is the only organisation in Italy with the primary role of studying and conducting ground and flight testing of AM aircraft, the development of software and hardware modifications for airborne weapon systems and – not least – the Operational Test and Evaluation (OT&E) of new weapon systems in realistic conditions.

The Reparto directly supports the operational units of the AM through the experimentation, integration and validation of new or modified weapon systems.

RSV SQUADRONS AND STAFF

Progress in aerospace is continuous and keeping abreast of the latest developments requires a flexible organisation. Over time, the RSV has expanded its organisation and increased its number of staff to do so. Today the Reparto has five subordinate squadrons: the 311° Gruppo Volo (311 Flying Squadron); Gruppo Tecnico (GT, Technical Squadron); Gruppo Gestione Software (GGS, Software Management Squadron); Gruppo Ingegneria per l'Aerospazio (GIAS, Aerospace Engineering Squadron); and the Gruppo Armamento e Contromisure (GAC, Weapons and Countermeasures Squadron). Besides these Gruppi, there are several other offices, including an Ufficio Comando (headquarters); Ufficio Operazioni (operations); a Servizio Coordinamento Prove (trials co-ordination service); and Servizio Logistico e Finanziario (logistics and financial service).

The 311° Gruppo is responsible for the testing and implementation of new aeronautical systems and newly acquired aircraft. To perform its test activities it has pilots, navigators and flight test engineers, on-board system operators, prototype equipment technicians and specialised maintainers, as well as other non-flying personnel. The Gruppo Volo is the technical interface between the Italian military and industry, which guarantees an adequate level of technology to permit the air force to be effective and up to date.

The Gruppo Volo has a diverse fleet of aircraft, which are operated to support the various programmes under way. Around a dozen are currently operated by the unit, including the Eurofighter F-2000, Tornado IDS and ECR, AMX, Leonardo T-346, Aermacchi MB.339, Piaggio P.180, C-27J Spartan and NH-500 helicopter.

For all other aircraft for which flight test activity is required (such as the Boeing KC-767A, Lockheed Martin C-130J Hercules, Leonardo AW139 and Gulfstream G550 CAEW – Conformal Airborne Early Warning) the Gruppo is no longer assigned specific aircraft, instead borrowing them from the operational fleets. The actual number and composition of the types flown at any one time depends on the programmes in progress. In addition to aircraft flown from Pratica di Mare, others in service in limited numbers (such as the F-35) are utilised at their operational bases.

One of the more visible roles of the RSV is performing technical flying presentations (display flights) – usually of aircraft built in Italy – either for the benefit of international delegations hosted by the Ministry of Defence or at air displays at home and abroad, effectively serving as ambassadors for the AM and the national industry.

CSV test and trials pilots are assigned to the Gruppo Volo. Selected from the best pilots within the AM, they subsequently gain qualifications for their new role at various test pilot schools. Usually, the AM secures places on the courses run by the US Air Force Test Pilot School at Edwards AFB, California; the US Navy Test Pilot School at Patuxent River, Maryland; the École du Personnel Navigant d'Essais et de Réception (EPNER) at Istres in France; or the civilian National Test Pilot School at ▶

A Tornado IDS on the ramp at Pratica di Mare during the certification trials of the GBU-38 Joint Direct Attack Munition (JDAM) bomb for the aircraft type; two of the weapons are visible on fuselage hardpoints. The Tornado is destined to fly with the Italian Air Force until nearly the end of this decade RSV

An HH-212 was used by the RSV to assist its work on the DIRCM self-defence system RSV

Mojave, California. Flight test engineers and trials engineers are also trained at the same organisations.

TECHNICAL UNITS

The Gruppo Tecnico undertakes development and trials activities for new weapon systems, including their sub-systems, armaments and sensors, sensor fusion and innovative design methodologies, with the aim of providing the AM with cutting-edge equipment and the optimum ways of utilising it. As innovative ideas and systems are proposed by the industrial and academic sectors, the Gruppo Tecnico is tasked with making sure they adhere to the operational requirements outlined by the armed forces.

The Gruppo Gestione Software (GGS) was created in 1982 so that the AM had the capability to test on-board software on the Tornado which at the time was entering service. In the nearly 40 years since, the importance of software to military aircraft has increased greatly, as they have evolved into 'flying computers'. The majority of aircraft in service with the AM today – and all those under development – have on-board computers that use complex algorithms to assist the pilot and crew in successfully completing increasingly sophisticated missions, and without which the aircraft would not be able to fly, in some cases.

In recent years, the Gruppo has played a role in the service entry of all AM aircraft equipped with on-board software, taking the code through various phases. This process starts with the definition of the requisite requirements, then ground and flight tests, and finally clearing it for the operational units.

The current challenge is achieving integration between various aircraft types from several different generations via datalinks, permitting the exchange of information between their on-board computers. For example, this would allow a Typhoon to simultaneously share data with an F-35 and G550 CAEW within a dedicated and secure network. Changes to an aircraft's software can allow capacities to be shared with a network of systems and the ability to introduce modifications represent a strategic resource for a modern armed force.

Contrary to the need to allow networking across several platforms is the challenge of providing cyber security for aircraft software – denying access to hostile players – a field in which the GGS is an important actor.

The mission of the Gruppo Ingegneria per l'Aerospazio covers the development and operation of space-based assets. Many commonly used technologies (such as precision navigation) depend on assets in space and if compromised the consequences could be significant for everyone. The defence of such assets and its ground-based infrastructure has assumed increasing importance in recent years.

Technological research to increase self-protection for military aircraft is undertaken by the Gruppo Armamento e Contromisure. Specifically, the Gruppo has pursued the study of advanced countermeasures against the threat posed by fourth-generation infrared guided missiles, such as those that use imaging systems with a matrix capable of discriminating the target from defensive countermeasures. The Gruppo contributed to the creation of the Direct Infra-Red Counter Measure (DIRCM) system, an electro-optical on-board countermeasure system that mates traditional flares with a high performance laser to confuse missile guidance systems.

While the CSV has a hierarchical structure, almost without exception test activity is performed by a number of teams from a variety of Gruppi working together. Thanks to this synergy the RSV conducts Developmental Test and Evaluation (DT&E),

No 311° Gruppo of the RSV has a C-27J permanently assigned from 46ª Brigata Aerea, though the example on loan varies Riccardo Niccoli

Operational and Technical Certification and OT&E activities on aircraft in support of the operational units and in collaboration with industrial concerns, research centres, plus national and foreign universities.

TESTING THE TRAINER

Colonel Igor Bruni has commanded the RSV since September 2019, and provided the author with an update on some of the current activities of the RSV. The unit is working on more than 100 programmes – ranging from the testing of new aircraft to support equipment, software or radios – so the discussion focused on some of the more significant projects.

One of these concerns the new basic trainer from Leonardo, the M-345, which the AM has acquired as the T-345A. The aircraft is due to replace the MB.339 in Phases 2 and 3 of the training syllabus undertaken by students at 61° Stormo at Lecce-Galatina. All student pilots complete Phase 2, which covers the basics of flying training, while the third phase is reserved for those selected for the tactical fleets, completion of which results in the award of military wings. Today, these activities are conducted on the MB.339A MLUs (T-339A) of 214° Gruppo, followed by the MB.339CDs (FT-339C) of 213° Gruppo.

In June 2013, the Ministero della Difesa (Italian Ministry of Defence) signed a letter of intent with Leonardo for the collaboration of the development, testing and certification of the M-345 HET (High Efficiency Trainer). Then, in October 2014, an Accordo Tecnico Operativo (ATO, technical-operational agreement) was agreed covering the task of developing and testing some aspects of the design, work that would be assigned to the RSV. The AM formally selected the T-345 in January 2017, when ARMAEREO (the Directorate of Aeronautical Armaments and Airworthiness) signed the initial contract for five pre-series aircraft. A second acquisition contract, signed in June 2019, covered the purchase of 13 series examples, plus ground support equipment (AGE/GSE), spare parts and a ground-based training system (GBTS). The eventual requirement is for around 50 aircraft.

The requirement for industry, the RSV and the operational units to work together on the T-345 is even more important than was the case with the T-346. In the past DT&E has been conducted exclusively ▶

Typhoon s/n MM.7350, coded RS-22, is a Tranche 3 aircraft which is participating in several test programmes, especially software, as part of the development of the type Riccardo Niccoli

The maiden flight of the Falco Xplorer UAS was undertaken from Trapani air base, Sicily, and flown by a pilot from RSV. The HH-139A helicopter acted as the chase aircraft RSV

A T-346A from 61°Stormo on loan to the RSV performing a flying display at an airshow. The RSV also demonstrates the aircraft produced by Italian industry A Mino via Riccardo Niccoli

by the manufacturer, today the situation is very different, as from the start the Italian Air Force has the ability to interact with the design team to better clarify the requirements of the service, and constantly verify the direction of the development of the aircraft.

Leonardo and the RSV have collaborated closely on the T-345; the manufacturer providing the Reparto with all the data gathered during development of the aircraft and has been very receptive to the comments and suggestions from the test pilots and engineers. If the final product fully satisfies the air force it is to its advantage, it will also increase the chances of exporting the aircraft to other operators.

By February 2019, the RSV had completed two flight evaluation phases with the trainer, primarily covering aspects of performance, flying and handling qualities, avionics and the human-machine interface. However, the first real preview of the T-345 took place in December 2019, when a team of two test pilots and two test engineers from the RSV were able to perform several flights without the presence of Leonardo pilots, verifying some points of the flight envelope as well as providing their suggestions.

At the beginning of 2020, there were two aircraft engaged in the programme: the prototype CPX.624, owned by Leonardo, and the first pre-series example for the AM, LN-1 (MM.55233). Both are engaged in the certification programme for the type, which should have been achieved by the end of 2019, but was delayed by some 'physiological' issues. The award of the initial certification (permit to fly) of the T-345 was finally announced on May 8, 2020, following about 200 test flights carried out by Leonardo with the support of the RSV, 61° Stormo, and the 10° RMV (maintenance wing). The certification is a first for a fixed-wing aircraft, as it was gained under the new AER(EP) P-21 regulation of the Italian military airworthiness authority (DAAA), formulated in line with EMAR 21 European regulations. The military type certification of the T-345 was achieved on September 18, 2020.

The first two series aircraft to be delivered to the AM took place on December 22, 2020. They were flown to Pratica di Mare and the following day to Lecce. The aircraft in question were MM.55234 (coded 61-202) and MM.55235 (61-203), the second and third produced, while the first and the prototype remain with Leonardo at Venegono for further development work.

During the early part of this year, these two aircraft are to be flown by RSV test pilots to complete the OT&E assessment programme, during which time other examples will be delivered. Later, the first instructor pilots of 61° Stormo will be qualified on the type, and will start to study and verify the new syllabus for Phase 2 of the pilot training course.

A definitive verdict on the aircraft is still premature, as there are still many individual elements to be refined. Nevertheless, as Colonel Bruni stated: "The aircraft demonstrates enormous potential and flies well. There is still much work to do, but this remains within the [standard parameters] of the development work, which has been

proceeding in the correct direction.

"For example, the flying controls are continuously being harmonised in synergy with the expansion of the flight envelope of the machine," he added. The T-345, unlike the T-346, does not incorporate fly-by-wire controls, but uses traditional mechanical systems.

How does the T-345 compare with the T-339, the aircraft it is to replace? "In comparison with the preceding aircraft," the commander replied, "the T-345 is more efficient in every sense; in its costs, its management and so on, so that much more can be done with the same resources. As occurred with the introduction of the T-346 as a replacement for the FT-339, the 345 will permit the downloading of some activities from Phase 4 [of the training syllabus] and this will be exploited as far as possible, enabling the delivery of significant savings in the preparation of pilots."

During OT&E, test pilots will demonstrate the qualities of the aircraft and what it can do in its assigned role to instructors from 61° Stormo. It will then be up to the instructors to undertake the work of realigning the new instructional syllabus, adapting and optimising the training requirements to the new aircraft. Personnel from the RSV will closely follow those flying from Lecce at the start of this period and during the qualification phase for the initial T-345 instructors.

DIVERSE ROLES

Another interesting project that directly involves the RSV concerns the Falco Xplorer, the latest remotely piloted aircraft system designed and produced by Leonardo. It was a test pilot from 311° Gruppo who, following a request from the manufacturer, performed the first flight of the new unmanned aerial system (UAS) from the AM base at Trapani. The RSV qualified a UAS operator as a test pilot some time ago when he attended an ad-hoc course organised by the National Test Pilot School at Mojave. Pilots and support personnel from the RSV will be fully involved during further flights.

An FT-339C in the marking of 61° Stormo, but on loan to 311° Gruppo. This type is often used as a chase aircraft for flight test programmes Riccardo Niccoli

The initial results of this experience have been very positive, as Col Bruni reported: "The Falco Xplorer has performed as intended, to the great satisfaction of all the parties involved in the project." The RSV has acquired a significant amount of experience in the UAS field and in the future it plans to qualify a second unmanned aircraft test pilot.

Another platform that is involved in two programmes with the CSV is the KC-767A, the first of which covers improvements to its navigation avionics to augment flight safety, with the integration of a traffic alert and collision avoidance system (TCAS) and a terrain avoidance system. In response to a direct request from the US Department of Defense, a KC-767A will also be assigned to a series of qualification tests with some types of US fighters, so the tanker can provide support wherever necessary. This programme started at the beginning of this year. The RSV has also been busy completing the acceptance of the final operational configuration (FOC) of the Italian Air Force's P-72A (maritime patrol version of the ATR 72).

Work will shortly start at Pisa to introduce new 7.1 software into the C-130J Hercules, in collaboration with Lockheed Martin.

Other programmes, including the OT&E of the E-550 (G550) CAEW in final configuration and the completion of the FOC of the mission system for the HH-101 Caesar helicopter, means these aircraft are near to full operational status.

Although many aspects of the F-35 programme are managed by Lockheed Martin and the United States government, the RSV still conducts OT&E of the aircraft, dedicated to demonstrating its ability to operate in conjunction with other aircraft. As the number of F-35As with the AM remains small and the aircraft requires a certain level of security, OT&E missions are performed from their base at Amendola.

In general, the RSV contributes to the F-35 programme where and when it is ▶

A variety of aircraft types on the RSV flight line at Pratica di Mare Riccardo Niccoli

The AMX is today in the twilight of its career, but it is still operated by the RSV RSV

requested, a principal that also holds true for the F-35B short take-off and vertical landing variant. The programme required the presence of an RSV pilot at the Red Flag 2020-2 exercise which was staged in Nevada last March.

Preparation for Red Flag required the pilot selected to spend several months at Amendola to fly with the pilots of 13° Gruppo to achieve a high level of competence on the aircraft, so he could exploit and verify its systems during the highly realistic and complex operational environment created during the exercise.

The RSV has also advanced several projects concerning the armament carried by the AM's fast jet fleets. The principal recipient of this work is the Tornado, recently certified to use three new weapons (the GBU-32, GBU-38 and GBU-54 precision guided munitions), enabling the aircraft to remain viable in any future scenarios for the AM.

Work also continues on the Typhoon fleet, due to receive the PE2b software shortly. The Reparto will perform technical and operational certification of the new armament the software will allow the Typhoon to carry, such as the Storm Shadow cruise missile or the Paveway IV, as well as other new capabilities it will confer.

The RSV is also engaged in the technical, operational and acceptance programmes of aircraft destined for other armed forces and state corps, as in practice it acts as the technical consultant for the certification activity for all Italian military aircraft for ARMAEREO. Recent examples include the P-72B patrol aircraft and Leonardo AW169M of the Guardia di Finanza ('finance guards', the police and customs corps of the Ministry of Economics). The work also involved revision and publication of all technical manuals relating to both aircraft.

Italian organisations are increasingly paying attention to space-based systems – which in practice covers anything above an altitude of 60,000ft. Within the armed forces, everything to do with space is viewed as an inter-force area, but it is obvious the principal actor in this arena should be the Aeronautica and that activities relating to trials and exploration in the sector are entrusted to the CSV/RSV. Numerous projects are in the study phase, such as the use of a Typhoon fighter to launch small satellites, but no role has yet been assigned to the RSV. A protocol of intent was signed in December 2018 between the AM; the university La Sapienza in Rome; Centro Italiano Ricerche Aerospaziali (CIRA, Italian Aerospace Research Centre); Consiglio Nazionale delle Ricerche (CNR, National Research Board) and the Sitael company, relating to the possible use of the fighter as a low-cost launch platform for nanosatellites to operate at low altitudes (below 250km) for observation and communication roles.

The RSV is involved in the definition of the future sixth-generation combat system, primarily centred on the Tempest fighter programme, which Italy joined in 2019. The RSV is part of the working group for the project and is a leader in the technological aspects. However, the aim of the project is not simply the creation of a new aircraft, but a system-of-systems in which the Tempest will have to interact and interface with other platforms.

For example, it includes the concept of swarming UAS, involving the management of multiple remotely piloted platforms as part of the operational weapon system. UAS swarming operations will be studied by the RSV to access its potential utilisation in conjunction with fifth-generation aircraft, which will form a baseline for such activities with the sixth.

With such a broad range of expertise at its disposal the CSV is truly a centre of aeronautical excellence, which among its numerous roles keeps the Italian Air Force at the cutting edge of technology. AN

The first two examples of the new T-345A jet trainer for the Italian Air Force were delivered to 61° Stormo on December 23, 2020
Aeronautica Militare/Troupe Azzurra

Air Base Movements

A selection of the most interesting aircraft to visit air bases in the UK recently

RAF BRIZE NORTON

1/12 A41-207 C-17A 36 Sqn, RAAF n/s; 0007/F-RAFM A400M ET1/61, French AF. 3/12 CE-01 ERJ135LR 15 Wing, Belgian Defence – Air Component. 6/12 100008/008 Tp100C Royal Swedish AF. 7/12 59-1513 KC-135R 100th ARW, USAF Mildenhall diversion n/s; 166736 C-37A VR-1, USN dep 9th. 12/12 **043/F-UJCI A330 MRTT ERV2/91, French AF**. 14/12 14-5831/RS C-130J-30 37th AS, 86th AW, USAF dep 18th. **15/12 T-054 A330 MRTT NATO MMF**. 17/12 B-536 C-130J-30 Esk 721, Royal Danish AF.

RAF FAIRFORD

3/12 61-0001/MT B-52H 69th BS, 5th BW diverted in with engine problem, dep 14th. **4/12** 12-5760 MC-130J 67th SOS, 352nd SOW, USAF. 10/12 80-1085 U-2S 99th ERS, 9th RW, USAF arrived for TDY. 11/12 07-7182 C-17A 437th/315th AW, USAF. 17/12 68-10337 U-2S 99th ERS, 9th RW, USAF returned to USA at end of TDY.

RAF LAKENHEATH

2/12 87-0042 C-5M 60th/349th AMW, USAF dep 5th. 10/12 **Royal Saudi AF F-15SAs 12-1009 & 12-1083 finally departed on delivery having been present since 18/11. A test flight on 8th ended with both diverting to and night stopping at RAF Valley before returning**.

RAF LEEMING

3/12 T-785 Falcon 900EX LTDB, Swiss AF; HB-AZF E190E2 Helvetic Airways. 4/12 **J-5232 &**

USAF Boeing C-17A Globemaster III, 10-0216, of the 62nd Airlift Wing at Joint Base Lewis-McChord in Washington State visiting RAF Lossiemouth on December 23 Niall Paterson

J-5233 F/A-18Ds Swiss AF departed; J-5005 & J-5011 F/A-18Cs Swiss AF arrived for Exercise Yorknite. 8/12 T-751 Challenger 604 LTDB, Swiss AF also 10th. 14/12 T-786 PC-24 LTDB, Swiss AF also 15th & 16th. 16/12 T-784 Citation 560XL LTDB, Swiss AF also 17th. 17/12 **J-5002, J-5005, J-5011, J-5014, J-5016, J-5017, J-5020, J-5025 F/A-18Cs & J-5234 F/A-18D Swiss AF departed at end of deployment**.

RAF LOSSIEMOUTH

3/11 ZP804 Poseidon MRA1 54/120 Sqns, RAF arrived on delivery.

1/12 169339/RC & 169344/RC P-8As VP-46, USN arrived for TDY. 2/12 165832 C-40A USN; 169346/RC & 169349/RC P-8As VP-46, USN arrived for TDY. 5/12 168431/RC P-8A VP-46, USN dep 9th, returned 28th for TDY. 6/12 165158/CW C-130T VR-54, USN. 8/12 165831 C-40A USN also 13th; 168850 P-8A VP-9, USN. 9/12 ZM140 & ZM142 F-35Bs 207/617 Sqns, RAF both n/s; 169349/RC P-8A VP-46, USN arrived for TDY; 08-8601/RS C-130J-30 37th AS, 86th AW, USAF. 14/12 03-3120 C-17A 62nd/446th AW, USAF. 15/12 169332/RC P-8A VP-46, USN also 19th. 16/12 165349/JW C-130T VR-62, USN; 00-0172 C-17A 156th AS, NC ANG. 17/12 165161/BD C-130T VR-64, USN n/s also 30th n/s & 31st n/s. 18/12 169544 P-8A VP-9, USN o/s. 20/12 169036 C-40A USN n/s also 23rd. 23/12 10-0216 C-17A 62nd/446th AW, USAF. **28/12** 10-0217 C-17A 62nd/446th AW, USAF.

RAF MILDENHALL

3/12 165378/JW C-130T VR-62, USN also 8th n/s. 6/12 165158/CW C-130T VR-54, USN dep 11th. 9/12 91-1235 C-130H 165th AS, Ky ANG. **10/12** 63-13186 C-130E Turkish AS n/s. 12/12 87-0041 C-5M 337th AS, AFRC n/s. 14/12 58-0100 KC-135R 100th ARW, USAF returned to USA. 16/12 05-4613 C-40C 73rd AS, AFRC. 17/12 168850 P-8A VP-9, USN o/s. 18/12 60-0344 KC-135T arrived on delivery to 100th ARW as replacement for 58-0100. 19/12 168069/BH KC-130J VMGR-252, USMC n/s. 20/12 09-0540 C-40C 73rd AS, AFRC dep 22nd; 98-0002 C-32A 1st AS, 89th AW, USAF n/s; **1502 C-130E 14 Eltr, Polish AF**. 23/12 01-0030 C-37A 76th AS, 86th AW, USAF. 28/12 84-00162 C-12U E/1-214th Avn, US Army. 28/12 169533/BH KC-130J VMGR-252, USMC also 29th. 29/12 900530 C-26D AOD Sigonella, USN n/s.

RAF VALLEY

3/11 N2786B/G-CLTZ (ZM340), N2789B/G-CLUC (ZM341), N2790B/G-CLUF (ZM342) & N2811B/G-CLUA (ZM343) Texan T1s arrived on delivery to 72 Sqn. Their UK civil registrations were allocated on 26/11.

8/12 12-1009 & 12-1082 F-15SAs Royal Saudi AF, weather diversions from Lakenheath, both n/s.

Key: n/s night stop; o/s overshoot

Airbus A330 MRTT, T-054, of the NATO Multinational Multi-Role Tanker and Transport Fleet (MMF) on approach to RAF Brize Norton on December 15 Richard Eccleston

Airport Movements

A round-up of notable aircraft visiting UK airports

Azur Air Boeing 767-300ER, VP-BRA, on approach to Heathrow Airport on December 20 Richard Vandervord

ABERDEEN INTERNATIONAL AIRPORT

6/11 N586WD PC-12. 13/11 G-ETPK RJ70 QinetiQ. 18/11 N915CA Tecnam P2012 on delivery to Cape Air. 19/11 OO-FAE Falcon 7X 15 Wing, Belgian Defence – Air Component. 22/11 D-CXLS Citation 560XLS+. 26/11 ZZ178 C-17A 24/99 Sqns, RAF. **29/11** N945CA Tecnam P2012 on delivery to Cape Air. 30/11 2-RBTS CitationJet 525B CJ3; G-PERD AW139 & G-REDF AS365N2 Babcock MCS Offshore returned from Blackpool at end of contract.

BIRMINGHAM AIRPORT

1/11 I-ADJU E195LR Air Dolomiti. 2/11 D-AFAN Challenger 850; ES-LSC Saab 340A/F Aerotranscargo also 17th; SP-MRB Saab 340A Sky Taxi; **TC-LLM 787-9 Turkish Airlines f/v**; UR-CQV An-26B Vulkan Air; 81 Xingu 28F, French Navy. 3/11 ES-NSA Saab 340B/F NyxAir also 6th & 19th; HB-ALM ATR 72-202(F) Zimex Aviation also 19th; SP-KPZ Saab 340A/F Sprint Air. 4/11 D-FUNK Cessna 208 IAS f/v; D-CAWX Citation 680 Sovereign+; OE-GDF Phenom 300. 5/11 UR-CAJ An-12BK Meridian; N515JM Legacy 600; N288Z Gulfstream G650. 6/11 ES-LSA Saab 340A/F Aerotranscargo; D-CKHG Citation 560XLS. 8/11 UR-CSJ An-26B Eleron also 11th, 25th & 26th. 9/11 EI-NEW 787-9 Neos f/v; OY-SRJ 767-25E(BDSF) Star Air also 16th; **TC-LLE 787-9 Turkish Airlines f/v**. 10/11 ES-NSG Saab 340B/F NyxAir also 18th. 11/11 LY-MRN 737-36E(BDSF) KlasJet; F-HGPG CitationJet 525 CJ1. 12/11 **HA-EFD PA-31T Cheyenne II**; OH-ZRH PC-12. 13/11 084/YH Xingu EAT319, French AF. 14/11 N360PZ Falcon 7X also 30th. **15/11** D-AERO Legacy 600; N461GT Gulfstream G450. 16/11 **TC-LLD 787-9 Turkish Airlines**; 69 Xingu 28F, French Navy; 2-FLYT PC-12. 18/11 SP-KPE Saab 340A Sprint Air; D-IBBS CitationJet 525A CJ2+. 19/11 LX-FLY Global 6500 also 20th. **20/11** 2-JSEG Eclipse EA500. 21/11 UR-CQE An-26B Vulkan Air also 28th; 15004 CC-150 437 Sqn, RCAF f/v. 22/11 2-JEZA Eclipse EA500. 23/11 OY-SRI 767-25E(BDSF) Star Air; **TC-LLF 787-9 Turkish Airlines f/v**; YL-RAI ATR 72-202(F) RAF-Avia. 24/11 D-ACLW 737-48E(SF) CargoLogic Germany f/v; 281 PC-12NG 104 Sqn, Irish Air Corps; F-HBZA Citation 550 II; **HA-YFK Beech 400**; PH-CJM Citation 680 Sovereign. 26/11 UR-CGW An-12BP Meridian also 27th; D-CJPG Learjet 35A. 27/1 LZ-BVL 737-31S Bul Air f/v; 086/YI Xingu EAT319, French AF. 28/11 M-JCBB Gulfstream G650. 29/11 M-INES AW109SP Grand New. 30/11 092/YL Xingu EAT319, French AF; N673HA Gulfstream G650.

BRISTOL AIRPORT

1/11 LX-JFE PC-12; N542MP Hondajet. 4/11 **OK-PHM Phenom 300**; PH-SVY PA-31T Cheyenne 2. 7/11 D-AFAG Challenger 604. 8/11 **YU-TBA Citation 560XLS+**. 19/11 D-BPMI Challenger 350; D-CNUE Learjet 60. 23/11 **TU-TST A319-112 ex-Air Côte d'Ivoire dep 5/12**. 26/11 F-HBIR Citation 510 Mustang. 27/11 F-HAJD CitationJet 525 CJ1.

GATWICK AIRPORT

3/12 N339JM Gulfstream G550 f/v. 7/12 D-CMXM Phenom 300 f/v; 8/12 HB-IBJ Falcon 2000LX f/v. 11/12 EC-NFM 787-9 Air Europa f/v; 130602 CC-130J 436 Sqn, RCAF f/v. 14/12 N8AL Gulfstream G650ER f/v; 130601 CC-130J 436 Sqn, RCAF f/v. 19/12 EC-NGN 787-9 Air Europa f/v; OO-KOR CitationJet 525A CJ2+ f/v. **22/12** N400BC Global 6000 f/v. 23/12 EC-LXK A330-302 Iberia f/v; PH-TFK 787-8 TUI Airlines Netherlands f/v. 24/12 **EC-MKJ A330-202 Iberia f/v**; SP-LWB 737-89P LOT Polish Airlines f/v; YL-RAI ATR 72-202(F) RAF-Avia f/v. 25/12 016 C-295M Polish AF f/v. 27/12 **EC-MJA & EC-MLB A330-202s Iberia both f/vs**; 012 C-295M Polish AF f/v. 28/12 **EC-JQL ATR 72-500(F) Canary Fly f/v**. 29/12 G-POWP 737-436(SF) Titan Airways f/v; G-TAWH 737-8K5 TUI Airways re-registered SE-RFN for TUIfly Nordic f/v. 30/12 HB-ALM ATR 72-202(F) Zimex Aviation f/v. 31/12 OO-MAP PC-24 type f/v.

Exeter Airport hosted Nextant 400XTi, OK-NTU, on December 14 Ian Simpson

GLASGOW PRESTWICK AIRPORT

1/12 168850, 169544, 169546, 169547 (dep. 27th), 169548 (dep.27th) P-8As VP-9, USN remained based through the month; LY-MRN 737-36E(BDSF) Klas Air mail flights; 14+02 Global 5000 FBS, German AF o/s; 01-0076 C-37A 76th AS, 86th AW, USAF also 16th & 18th. 2/12 09-0546 MC-12W 185th SOS, Ok ANG dep 4th; N350PT Beech 350ER USSOC dep 4th; 177704 CC-177 429 Sqn, RCAF n/s, also 7th n/s. 3/12 96-00109 UC-35A A/52nd Avn, US Army. 4/12 01-0188 C-17A 137th AS, NY ANG. 5/12 KAF343 C-17A 41 Sqn, Kuwait AF n/s; 91-1234 C-130H 165th AS, Ky ANG dep 11th; 57-1427 KC-135R 117th ARS, Ks ANG n/s. 6/12 06-6166 C-17A 436th/512nd AW, USAF; 61-0314 & 60-0320 KC-135Rs 6th ARW, USAF; **290 KC-707 120 Sqn, Israeli Air Force n/s**. 7/12 06-6157 C-17A 60th/349th AMW, USAF n/s; 63-8019 & 60-0342 KC-135Rs 6th ARW, both n/s; CS-CHA Challenger 350 NetJets Europe training; 62-3515 KC-135R 108th ARS, IL ANG n/s; 168431/RC P-8A VP-46, USN; 61-0315 KC-135R USAF 100th ARW, n/s; 04-4136 C-17A 183rd AS, Ms ANG, dep 9th. **8/12** 91-1235 C-130H 165th AS, Ky ANG, dep 10th; 01-0188 C-17A 137th AS, NY ANG; 59-1450 & 61-0317 KC-135Rs 197th ARS, Az ANG, both n/s; 14+07 Global 6000 FBS, German AF o/s. **9/12** 165831 C-40A VR-59, USN also 13th & 14th; HB-FQZ PC-12 c/n 2059 & N954AF PC-12 c/n 2054 both on delivery. 11/12 14+05 Global 6000 FBS, German AF o/s; 84-0085 C-21A 76th AS, 86th AW, USAF also 12th; N95CK TBM 940 on delivery, dep 12th. 14/12 03-3120 C-17A

62nd/446th AW, USAF n/s. 15/12 84-0087 C-21A 76th AS, 86th AW, USAF also 23rd; 165161/BD C-130T VR-64, USN dep 17th; 63-13186 C-130E 222.Filo, Turkish AF dep 17th. 16/12 D-CAWK Citation 680A Latitude; 165349/JW C-130T VR-62, USN n/s; SP-KPR Saab 340A Sprint Air; G-CLBA 747-428F(ER) CargoLogicAir. 17/12 HB-FRB PC-12 c/n 2061 on delivery. 18/12 169036 C-40A VR-61, USN also 30th; 177703 CC-177 429 Sqn, RCAF n/s. 19/12 169332/RC P-8A VP-46, USN; 11-00286 MC-12S-V & 12-00280 MC-12S-G B/15 MIB, US Army, both n/s; 130602 CC-130J 436 Sqn, RCAF. 20/12 F-HFRF Beech 200; N977MD TBM 940 on delivery; 164998/AX C-130T VR-64, USN n/s. 22/12 N894PT Cessna 182T. 23/12 02-0202 C-40C 201st AS, DC ANG; CS-DLJ Falcon 2000EX NetJets Europe; 900530 C-26D AOD, Sigonella, USN n/s. 24/12 M-YSPC CitationJet 525 CJ1 on delivery; LX-NCL 747-4EVF(ER) Cargolux retro colours. 30/12 SE-KXP BAe ATP/F West Atlantic mail flight; M-ODEL Gulfstream G450.

GUERNSEY AIRPORT

3/11 N229EA Eclipse EA500 new resident on delivery, rolled out as 2-TABS on 23rd. 4/11 2-RICH Navion Rangemaster H; 2-TAKA Eclipse EA500 dep 6th; ZZ171 C-17A 24/99 Sqns, RAF type f/v. 7/11 M-ARIE Hawker 850XP. 8/11 RN-02 NH90-NFH 40 Sqn, Belgian Defence – Air Component o/s. 12/11 N209DW Lancair LC41-550FG n/s also 27th n/s. 20/11 2-SALA PA-32-300. 24/11 F-BRTL CEA DR.340; 2-MARS PA-46-500TP. 26/11 EI-FII Cessna 172RG. 27/11 N400XT Extra EA400.

HEATHROW AIRPORT

1/12 YR-BML 737-82R Blue Air f/v. 2/1 OE-LWP E195LR Austrian Airlines f/v. 3/12 JA833J 787-8 Japan Airlines f/v; TC-JOU A330-243F Turkish Airlines f/v. 4/12 166377 C-37B, USN f/v; SP-ENP 737-8AS Enter Air f/v. 5/12 B-2769 787-8 XiamenAir f/v; T7-ME7 A321-271NX MEA f/v. 6/12 9K-APF A330-841N Kuwait Airways f/v; VQ-BUP 767-33AER Azur Air f/v; YR-BMN 737-82R Blue Air f/v. 7/12 B-LRP & B-LRS A350-941s Cathay Pacific both f/v; B-2760 787-8 XiamenAir f/v; TC-LJO 777F Turkish Airlines f/v. 8/12 9K-APG A330-841N Kuwait Airways f/v; A6-EVL A380-842 Emirates f/v; T7-ME4 A321-271NX MEA. **9/12** 4K-SW888 747-4R7F Silk Way West Airlines f/v; B-2762 787-8 XiamenAir f/v; JA834J 787-8 Japan Airlines f/v. 10/12 B-304K A330-343E Hainan Airlines f/v; JU-1021 767-34GER MIAT Mongolian Airlines f/v; VP-BUV 767-3Q8ER Azur Air f/v. 11/12 B-LRN A350-941 Cathay Pacific f/v; **HB-JME A340-313E Edelweiss Air op. for Swiss f/v**. 12/12 JA823J 787-8 Japan Airlines f/v. 13/12 B-2768 787-8 XiamenAir f/v; B-8362 A330-343E China Southern Airlines. 15/12 A6-EVM A380-842 Emirates f/v; B-1357 787-9 XiamenAir; OK-TSF 737-8GJ SmartWings op. for CSA; TC-JOY A330-243F Turkish Airlines f/v. **16/12** F-HBNE A320-214 Air France f/v; SX-NAB A321-271NX Aegean Airlines f/v. 17/12 9V-SMB A350-941 Singapore Airlines f/v. 19/12 A6-ENW 777-31H(ER) Emirates f/v; LY-LEO A330-302 GetJet f/v; OK-TVL 737-8FN SmartWings f/v; UR-EMA E190STD Ukraine International Airlines f/v. **20/12** UR-EMB E190STD Ukraine International Airlines f/v; VP-BRA 767-33AER Azur Air f/v. **21/12** CS-TUA A330-941N TAP Portugal f/v; SP-LSF 787-9 LOT Polish Airlines f/v. 23/12 F-HAPE Beech 1900D Twin Jet f/v. 24/12 **D-AIGU A340-313X Lufthansa f/v**; TF-AMN 747-4F6F Magma Aviation f/v; UR-PSO 737-8Q8 Ukraine International Airlines f/v. 25/12 **ER-BBC 747-433F Aerotranscargo f/v**; TF-AMM 747-4H6(BDSF) Astral Aviation f/v. 27/12 **F-GZNK 777-328(ER) Air France f/v**. 28/12 9V-SME A350-941 Singapore Airlines f/v. 29/12 F-GRYL Beech 1900D Twin Jet f/v; F-GSQE 777-328(ER) Air France f/v; TC-LJT 777F Turkish Airlines f/v. 30/12 LX-KCL 747-4HAF(ER) Cargolux f/v; TC-MCG A300-622R(F) MNG Airlines f/v. 31/12 D-AHGN Global 6000 f/v; TC-MCZ A330-243F MNG Airlines f/v; TF-AMI 747-412(BDSF) Magma Aviation f/v.

Robinson R44 Raven I, OK-LTM, visited Gloucestershire Airport on December 19
Aviation Image Network/Noah Gregory

JERSEY AIRPORT

2/11 N91JS Gulfstream IVSP. 3/11 2-PLAY TBM 700C-2 also 4th, 6th & 17th. 4/11 2-TAKA Eclipse EA500. 6/11 OE-DBJ DA40D. 9/11 F-HASP DA40D also 29th. 10/11 2-AKOP Commander 114B. 18/11 D-IBBS CitationJet 525A CJ2; HZ-A9 Hawker 900XP. 22/11 2-JSEG Eclipse EA500. **26/11** VP-CGC EC130T-2. **30/11** D-CKJM Citation 560XLS; F-HEND Citation 510.

LEEDS BRADFORD AIRPORT

2/11 CS-TFQ Learjet 45; D-CEFO Citation 560XLS+. 3/11 OE-FZC Citation 510 Mustang; SP-TTA Hawker 400XP. 4/11 CS-GLI Global 6500 NetJets Europe. 11/11 CS-DVZ Citation 550 II; ZK371 Typhoon FGR4 3 Sqn, RAF o/s; ZM312 Prefect T1 3FTS, RAF o/s. 18/11 N950M Citation 750X. 19/11 SE-RMO Learjet 45; D-AVIB Legacy 600. 23/11 ZZ171 C-17A 24/99 Sqms, RAF o/s. **28/11** 9H-TDI Global 5000. 30/11 D-CTIL Learjet 35A.

LIVERPOOL JOHN LENNON AIRPORT

3/10 D-IAAS Phenom 100; F-HVLJ CitationJet 525A CJ2. 4/10 CS-DTR Falcon 2000EX; ZJ780 & ZJ785 AS365N3s 658 Sqn, AAC. 13/10 SP-MRB Saab 340A Sky Taxi; D-CHIC Phenom 300 also 30th; SE-RIZ Citation 560XLS. 14/10 HA-KAM ATR 42-320(F) Fleet Air International n/s. 15/10 D-AWIN Legacy 650E; F-HLRZ Phenom 100; 2-LAND Commander 114B. 16/10 D-CULT Do.228-212 Business Wings. 19/10 OH-ZRH PC-12; HA-TAB Saab 340A/F Fleet Air international. 21/10 ES-NSG Saab 340A/F NyxAir n/s. 22/10 ZZ507 Shadow R2 14 Sqn, RAF o/s. **26/10** TF-BBH 737-4Y0(F) Bluebird Nordic; OY-GDA E195LR Great Dane Airlines; OY-SWO Falcon 2000S **n/s.** 27/10 **VT-IBG Global 5000 also 28th**. 28/10 HA-KAN ATR 42-320(F) Fleet Air International also 29th; SP-KPK Saab 340A/F Sprint Air. 29/10 EJ-ROXY Challenger 605. 30/10 YL-RAG Saab 340A/F RAF-Avia; 283 PC-12NG 104 Sqn, Irish Air Corps o/s. 31/10 N267DW Challenger 605.

LONDON BIGGIN HILL AIRPORT

1/11 ES-PAL Avanti EVO; OE-FEB DA42NG dep 8th. 3/11 N40GN Quest Kodiak 100 n/s; OH-MIG PC-12. 4/11 N59EH Eclipse EA500; **OK-NTU Nextant 400XTi**; 253 CN-235-100MPA 101 Sqn, Irish Air Corps. 6/11 OO-SUN Citation 510 Mustang. 7/11 OE-FXJ Eclipse EA500. 12/11 D-CQAA Learjet 45; 2-AERO ERJ135LR Aero Airlines n/s. 15/11 OY-GIC Learjet 45; 9H-ARE Global 5000 dep 21st. 16/11 EI-TAT Challenger 605 dep 28th. 19/11 N1054T Maule M-7-260. **20/11** 2-FAST Avanti II. 21/11 N216B Beech 350 dep 23rd. 22/11 P4-FJA Falcon 900DX. 23/11 N940RW & N940SN TBM 940s. 26/11 N619CJ CitationJet 525B CJ3. 28/11 OY-LGI Global XRS n/s. 29/11 9H-SAL Citation 550 Bravo n/s. 30/11 **S5-CMS Citation 510 Mustang**.

LONDON LUTON AIRPORT

1/11 T7-CIF Gulfstream G280. 2/11 **VT-AKU Falcon 900EX**; N1955M Global 6000. 4/11 EI-GEA CRJ900LR SAS. 5/11 **OK-PFY Hawker 400XT**; D-ITOC Premier 1A Cranfield diversion.

Lufthansa Cargo Boeing 777F, D-ALFF, on finals to Doncaster Sheffield Airport on December 31 Les York

San Marino-registered Bombardier Learjet 31A, T7-TFC, passed through Edinburgh Airport on December 30 Martin Third

6/11 PH-CGV Falcon 2000LX. 7/11 9H-VTD Global 6000 VistaJet. 8/11 N814LL Global 5000. **10/11** D-AWSI E190LR WDL Aviation. 14/11 LZ-VJT Citation 550 Bravo. 16/11 N702LT Gulfstream G400; **VH-TGG Global 7500**. 17/11 D-BDDE Challenger 350. 19/11 D-CMXM Phenom 300. **21/11** N522AC Challenger 350. 25/11 9H-BSG CRJ200LR; D-FORH PC-12. 28/11 9H-TDI Global 5000; OE-ISX Falcon 7X.

2/12 N350PT Beech 350 USSOC. 3/12 PR-FTR Challenger 605; N652MP Gulfstream G650ER. **4/12** N500AN Gulfstream G500. 5/12 15003 CC-150 437 Sqn, RCAF. 11/12 F-HGIM Citation 680A Latitude; 9H-SAL Citation 550 Bravo; OE-LCZ Gulfstream G550. 12/12 ES-CKH Falcon 2000 Oxford diversion; **YU-TUU Citation 550 Bravo**. **14/12** N40VC Gulfstream IVSP. 15/12 2-JSEG Eclipse EA500. 17/12 N561SK Gulfstream G550; CS-REU Global 6000; D-ACLO 737-4H6(SF) CargoLogic Germany. 19/12 LX-PCE PC-24. **20/12 ES-VSC Gulfstream G150**; OY-IUV Gulfstream G200. 23/12 **HA-JEX Citation 650 VI**. **24/12 C-GZOX Falcon 20F**. 25/12 T7-KIA Global XRS. 31/12 RA-09617 Falcon 900C.

LONDON SOUTHEND AIRPORT

2/11 N940PS TBM 940 f/v; G-EZWL A320 easyJet dep to Gatwick after storage. 3/11 M-SHRM AW139 f/v; 2-DRDR Cirrus SF50 f/v. **4/11** PH-VIR Pipistrel Virus SW121 f/v; OE-KTB DA40D; 2-YULL Cirrus SR22 f/v; ZZ385 Wildcat AH1 659 Sqn, AAC. 6/11 G-EZAG A319-111 easyJet arrived from Luton for storage, returned there 4/12; G-EZTG A320 easyJet arrived from Maastricht for parking, f/v, dep to Gatwick 15th; G-EZTZ A320 easyJet dep to Maastricht after storage, returned 9th for further storage, dep to Luton 4/12. 8/11 EC-MSS Citation 560XLS+ f/v. 9/11 G-EZFR A319-111 easyJet arrived from Luton for storage, dep to Luton 14th; G-EZDB A319-111 easyJet arrived from Luton for storage; G-EZDL A319-111 easyJet arrived from Luton for storage, returned to Luton 7/12; G-EZAX A319-111 easyJet dep to Luton after storage; G-EZAP A319-111 easyJet dep to Gatwick after storage. **11/11** 9H-BOM Challenger 650 f/v. 13/11 G-EZAN A319-111 easyJet arrived from Luton for storage, dep to Bristol 11/12; G-EZRZ A320 easyJet arrived from Luton for storage, f/v; D-CAAL Do.228-212 Arcus Air. 14/11 G-EZDU A319-111 easyJet arrived from Luton for storage. 15/11 G-EZUA A320-214 & G-EZNM A319-111 easyJet arrived from Gatwick for storage, both dep to Manchester 14/12; G-EZGG A319-111 easyJet dep to Luton after storage. 16/11 G-EZOP A320 A319-111 easyJet arrived from Luton for storage, dep to Edinburgh 13/12; G-EZAC A319-111 easyJet arrived from Gatwick for storage, dep to Edinburgh 14/12; N940PK TBM 940; G-EZFI A319-111 easyJet dep to Gatwick after storage; G-EZTL A320 A319-111 easyJet dep to Luton after storage. 23/11 CS-TFQ Learjet 45 dep 25th. **25/11** 281 PC-12NG 104 Sqn, Irish Air Corps f/v. **27/11** EC-GPS Metro 3 Flightline. 29/11 D-CHIC & D-CMXM Phenom 300s both f/vs. 30/11 OE-FNP Citation 510 Mustang.

MANCHESTER AIRPORT

1/12 9H-YES 737-5Q8 Air X Charter. 3/12 G-VXLG 747-41R Virgin Atlantic departed to Tel Aviv, the last Virgin 747 to depart Manchester. **4/12** G-VOWS 787-9 Virgin Atlantic f/v, to op Bridgetown service 5/12, first Virgin Atlantic passenger service from Manchester since March; G-VTEA A350-1041 Virgin Atlantic on delivery from Toulouse for short term storage. 7/12 5B-DCW A319-114 Cyprus Airways f/v; 9H-MPW 737-484 Air Horizont; LX-GJM Challenger 350 f/v. 8/12 D-ACJJ E190LR German Airways/ WDL f/v; EC-MTF A319-111 Volotea f/v; TF-BBL 737-490(SF) Bluebird Cargo f/v, East Midlands weather diversion. 10/12 G-VOWS 787-9 Virgin Atlantic op. inaugural Manchester-Islamabad service; EI-SLP ATR. 72-212(F) ASL Airlines Ireland f/v; YL-RAG Saab 340A RAF-Avia; OY-GIC Learjet 45 f/v. 11/12 N950M Citation 750 X f/v. 14/12 A7-AEB A330-302 Qatar Airways tech stop Doha-Dallas n/s. 15/12 SE-MKD ATR 72-600 Braathens Regional. 16/12 A6-EVM A380-842 Emirates f/v. **17/12** A6-EVD A380-842 Emirates f/v; D-AFAL Global Express f/v. 19/12 9H-LOP A320-232 Lauda Europe f/v, op for Ryanair. 20/12 9H-LON A320-214 Lauda Europe f/v, op. for Ryanair; D-IENE & D-ILUI CitationJet 525A CJ2+s both f/v. 21/12 ES-NSA Saab 340F NyxAir. 25/12 A6-EVL A380-842 Emirates f/v. 26/12 9H-QBG 737-800 Malta Air f/v. 27/12 9H-LOA A320-214 Lauda Europe f/v, op. for Ryanair. 28/12 9H-NED A320-251N(SL) Air Malta f/v.

Silk Way West Airlines Boeing 747-4R7F, 4K-SW888, just about to land at Heathrow Airport on December 9 Paul Phillips

NORWICH AIRPORT

1/12 9H-WII Citation 650 VII; F-GZHM 737-8K2 Transavia France dep ex storage; OO-NST H145 NHV also 11th. 2/12 LN-RGE 737-86N SAS to KLM UK Engineering; ZZ416 Shadow R1 14 Sqn, RAF o/s also 17th o/s. 3/12 F-GZHZ 737-86P & F-HTVI 737-8K2 Transavia France both dep ex storage; OO-VKB Beech A36; PH-EUK AW139 CHC Helicopters Netherlands. 4/12 EC-III 737-86Q Air Europa dep ex storage; F-GZHF 737-8HX Transavia France dep ex storage. 6/12 9H-AYS Global Express. 7/12 LN-RRT 737-883 SAS dep ex KLM UK Engineering. 9/12 EC-KYP E195LR Air Europa arrived for storage; **EZ-S721 S-92A Turkmenistan Government o/s**. 10/12 D-AHXG 737-7K5 TUIfly to Air Livery; G-LCYI E170STD BA CityFlyer arrived for storage, dep 11th; G-LCYT E190SR BA CityFlyer arrived for storage; G-LCYJ & G-LCYK E190SRs BA CityFlyer dep ex storage. **11/12** G-LCAF E190SR BA CityFlyer arrived for storage; HB-JSK Global 6000. 14/12 D-ABMV 737-86J TUIfly to Air Livery, dep 18th; G-LCYH E170STD BA CityFlyer arrived for storage; G-LCYN E190SR BA CityFlyer dep ex storage. **15/12** D-AFUN Legacy 650 dep ex Air Livery; EC-KYO E195LR Air Europa arrived for storage; OY-NPD Metro 23 North Flying n/s. 17/12 F-GZHO 737-8K2 Transavia France dep ex storage; PH-BXZ 737-8K2 KLM to KLM UK Engineering, dep 24th. 18/12 D-CAWB Citation 680 Sovereign; D-IAAY Phenom 100 n/s; SE-RJX 737 SAS to KLM UK Engineering. 19/12 D-ISJP CitationJet 525A CJ2. 20/12 OK-IHS PC-12 n/s. 21/12 PH-EUA AW139 CHC Helicopters Netherlands, dep after ops. 22/12 P4-KCH E190LR Air Astana arrived for storage. 23/12 D-AJET Legacy 650. 24/12 PH-BXL 737-8K2 KLM to KLM UK Engineering. 28/12 OY-NDP CitationJet 525A CJ2+. 30/12 EC-KXD E195LR Air Europa arrived for storage; G-LCYZ E190SR BA CityFlyer arrived for storage; PH-BXT 737-8K2 KLM dep ex KLM UK Engineering; LN-RRE 737-85P SAS dep ex KLM UK Engineering.

TEESSIDE INTERNATIONAL AIRPORT

1/10 ZH002 Defender R2 651 Sqn, AAC o/s; ZJ186 Apache AH1 673 Sqn, AAC; 4/10 SE-RIZ Citation 560XLS n/s. 10/10 LX-LMD PC-24. 12/10 ZJ120/D Merlin HC4 845 NAS, RN. 13/10 D-CHIC Phenom 300. 14/10 D-AUKE Challenger 604 n/s. **27/10** TC-KJA Beech 400XP.

Key: f/v first visit; n/s nightstop; o/s overshoot.

With thanks to. D Apps, D Bougourd, S Boyd, J Brazier, N Burch, P A Clarke, I Cockerton, KW Ede, M Farley, N French, P Gibson, G Green, J Gregory, I Grierson, D Haines, M Harper, G Hocquard, S Lane, G Morris, S Morrison, R Roberts, RJ Sayer, A Smith, D Turner, Blackpool Aviation Society, Solent Aviation Society/'Osprey', South Wales Aviation Group, CIAN, GSAE, The Aviation Society, EGPE ATC, www.dtvmovements.co.uk, Aerodata Quantum Plus and RHADS.

Register Review

The latest changes on the UK, Irish, Isle of Man and Guernsey registers

A new addition to ASL Airlines fleet is ATR 72-212A (60F Variant), EI-GUL which flies for Federal Express AirTeamImages.com/Oisin Tierney

RESTORATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-AHXE	401413	Taylorcraft Plus D	171	Historic Aircraft Flight Trust, Middle Wallop, Hampshire
G-BIGK	401EEC	Taylorcraft BC-12D	8302	MJ Kirk, (Taunton, Somerset)
G-BJWL	407B37	Britten-Norman BN-2A-26 Islander	166	Air Alderney Ltd, Biggin Hill, Greater London
G-BMZP	402816	Everett Gyroplane Series 1	10	PA Gardner, (Shrewsbury, Shropshire)
G-BUBT	40357C	Stoddard-Hamilton Glasair II-SRG (built by MD Evans)	PFA 149-11633	Signs Plus Ltd, Biggin Hill, Greater London
G-BVVO	407B5A	Yakovlev Yak-50	853007	R Ellingworth, Spanhoe, Northamptonshire
G-BXUX	403F9B	Brandli BX-2 Cherry	PFA 179-12571	MF Fountain, Clipgate Farm, Denton, Kent
G-CIMH	406DA9	P & M Quik Lite	8706	C Clarkson, Nicolton Road Airstrip, Polmont, Falkirk
G-EZTN	406017	Airbus A320-214	4006	Easyjet Airline Company Ltd, London Luton, Bedfordshire (NB)
G-TTEN	40692E	Tecnam P2010	8	Fisfir Aviation Ltd, Larnaca International, Cyprus
EI-AVE	4CA5A3	Piper PA-18-95 Super Cub	18-7375	AH Hassett and P Morgan, Graigs, Navan, Co. Meath
EI-FHT	4CA548	Boeing 737-8JP	40867	SMBC Aviation Capital Ireland Leasing 3 Ltd, (stored Ostrava, Czech Republic)

NEW REGISTRATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-CLRW	407B66	Piper PA-28R-201 Arrow III	28R-7837199	Midlands Aviation Ltd, (London N1)
G-CLSS	407A1E	Schempp-Hirth Arcus T	91	A Aveling, Trustee of Sixty-Six Group, Lasham, Hampshire
G-CLST	407B0D	Cessna U206F Stationair	U206-01942	CG Aviation Ltd, Perth, Perth & Kinross
G-CLTT	407AFB	Cameron Sport-70	12415	HK Powell, (Pucklechurch, South Gloucestershire)
G-CLUL	407B3F	Airbus BK117D-2	20351	Airbus Helicopters UK Ltd, Oxford, Oxfordshire
G-CLVH	407B68	Embraer 175	17000342	Drake Jet Leasing 3 DAC, Maastricht-Aachen, Netherlands
G-CLVK	407B69	Embraer 175	17000343	Drake Jet Leasing 3 DAC, Maastricht-Aachen, Netherlands
G-CLVN	407B6A	Embraer 175	17000345	Drake Jet Leasing 3 DAC, Maastricht-Aachen, Netherlands
G-CLVT	407B6B	Embraer 175	17000346	Drake Jet Leasing 3 DAC, Maastricht-Aachen, Netherlands
G-CLWM	407AEB	Schempp-Hirth Ventus-3T	124 TS	WJ Murray Lasham, Hampshire
G-CLWO	407B79	Pipistrel Virus SW121	VSW1210073	Fly About Aviation Ltd, Church Farm, Shipmeadow, Suffolk
G-CLWS	407B94	Airbus EC130T2	8897	Airbus Helicopters, Marseille International, France
G-CLWU	407B7B	Boeing Stearman D75N1	75-3851	TW Gilbert, Enstone, Oxfordshire
G-CLWW	407B7A	Pipistrel Virus SW121	VSW1210074	Fly About Aviation Ltd, Church Farm, Shipmeadow, Suffolk
G-CLWX	407B97	Robinson R66 Turbine	110	Eastern Atlantic Helicopters Ltd, Brighton City, West Sussex
G-CLXA	407B85	Agusta AW119 Mk.2 (built by AgustaWestland Philadelphia Corporation)	14770	Artonjet Ltd, Denham, Buckinghamshire
G-CLYM	407A03	Schleicher AS 33 ES	33005	MC Foreman and PJ O'Connell, Lasham, Hampshire
G-CLYO	407987	Schleicher AS 33 ES	33004	JE Gatfield, Wycombe Air Park, Buckinghamshire
G-CLYY	407B83	Dyn'Aero MCR-1 BanBi (built by O Groesz)	161	PG Leonard, (Somersham, Cambridgeshire)
G-CLZD	407B8A	Offpiste Discovery Tandem 210	14748	J Soper, (Kingston St. Mary, Somerset)
G-CLZK	407B4F	Schempp-Hirth Ventus-3M	125 MP	D Latimer, Sutton Bank, North Yorkshire
G-CLZT	407B89	Aeros 31 AM9 (built by RJ Clements)	3	RJ Clements, (Bath, Somerset)
G-DIYA	407B78	TAF Sling 4 Tsi (built by AA Thamarakshan)	LAA 400A-15689	Inditu Air Services Ltd, (Chislehurst, Greater London)
G-DRLA	407AF6	Leonardo AW109SP Grand New	22423	Sloane Helicopters Ltd, Sywell, Northamptonshire (for Derbyshire, Leicestershire & Rutland Air Ambulance)

Thunder Aviation has imported new Leonardo AW109SP GrandNew, G-THDR

Brian G Nichols

G-EIAR		Jodel DR250/160 Capitaine (built by Centre Est Aeronautique)	98	DG Holman, Leicester, Leicestershire
G-ENTO	407B60	American General AG-5B Tiger	10166	DM San, Trustee of G-ENTO Group, Elstree, Hertfordshire
G-FKKR	407B99	Fokker D.VII Replica (built by PD Ford)	LAA 387-15264	PD Ford, (Foston, Derbyshire)
G-FLFX	407AEO	Embraer Praetor 600	55020122	Flexjet Ltd, Birmingham, West Midlands
G-GBVN	407B81	Robin DR400/180 Regent	1408	G Tvalashvili, Trustee of Bicester Robin Crew, Bicester, Oxfordshire
G-GUIN	407A55	UltraMagic B-70	70/30	AM Holly, (Breadstone, Gloucestershire)
G-JBHL	407B18	Bell 505 JetRanger X	65312	Jones Brothers (Henllan) Ltd, (Cross Hands, Carmarthenshire)
G-JBLE	4079C2	M & D Flugzeugbau JS-MD 3	3.MD099	LMP Wells, (Stratford-upon-Avon, Warwickshire)
G-LAMO	407B29	Bombardier Global 5000	9602	Concierge U Ltd, Biggin Hill, Greater London
G-LAPW	405C61	Piper PA-46-350P Malibu Mirage	4636327	DP Wood, Cotswold, Gloucestershire
G-LCAF	4079D1	Embraer 190	19000548	BA Cityflyer Ltd, stored at Norwich International, Norfolk
G-LCTO	407B0E	Piper PA-28-181 Archer TX	2881220	Escola de Aviacao Aerocondor SA, Cranfield, Bedfordshire
G-MCSO	407B52	Airbus EC175B	5048	Babcock Mission Critical Services Offshore Ltd, Aberdeen International, Aberdeenshire
G-NHAE	401141	Eurocopter AS365N3 Dauphin 2	6779	Multiflight Ltd, Leeds-Bradford, East Yorkshire (for Great North Air Ambulance Service)
G-NHVG	407B2C	Airbus EC175B	5008	NHV Helicopters Ltd, Norwich International, Norfolk
G-NHVJ	407B4D	Airbus EC175B	5026	NHV Helicopters Ltd, Norwich International, Norfolk
G-NJAA	407AAE	Cessna 560XL Citation XLS	560-5787	Netjets Europe Sociedade Unipessoal Lda, (London W8)
G-NJAB	407AAF	Cessna 560XL Citation XLS	560-5789	Netjets Europe Sociedade Unipessoal Lda, (London W8)
G-NJAC	407AB0	Cessna 560XL Citation XLS	560-5791	Netjets Europe Sociedade Unipessoal Lda, (London W8)
G-OASL	407ACD	ATR 72-202	265	ASL Airlines UK Ltd, East Midlands, Leicestershire
G-OORB	407B65	Diamond DA40D Star TDi	40.084	Gemstone Aviation Ltd, Retford Gamston, Nottinghamshire
G-OVIR	407B7A	Pipistrel Virus SW121	VSW1210007	Ifly Electric UK Ltd, Damyns Hall, Upminster, Greater London
G-PAWA	401725	Piper PA-28-180 Cherokee C	28-4025	A Barnett, Trustee of Lanpro Group, North Weald, Essex
G-PTPA	407AC8	Pipistrel Virus SW115 (built by S Edwards)	BMAA/HB/723	Cold Air Flying Machines Ltd, Duxford, Cambridgeshire
G-SGWA	407A4F	Ikarus C42 FB100 Charlie (assembled by The Light Aircraft Company Ltd)	2008-7607	C and A Williams, (Tonypandy, Rhondda Cynon Taf)
G-SMBA	407B6F	Cessna P210N Pressurised Centurion II	P210-00808	Northumbria Aerospace Ltd, trading as NAL Engineering Ltd, Newcastle International, Tyne & Wear
G-STBO	407994	Boeing 777-300ER	66584	British Airways PLC, Heathrow, Middlesex
G-STBP	407995	Boeing 777-300ER	66633	British Airways PLC, Heathrow, Middlesex
G-SUTY	405D50	Robinson R44 Raven II	12388	Heli Air Ltd, Wellesbourne Mountford, Warwickshire
G-THDR	407ADB	Leonardo AW109SP GrandNew	22420	Thunder Aviation Limited Partnership acting by its general partner Thunder Aviation Ltd, Denham, Buckinghamshire
G-TTNM	407930	Airbus A320-251N	10144	British Airways PLC, Heathrow, Middlesex
G-TUKC	4079A2	Boeing 737-8FZ	31713	TUI Airways Ltd, trading as TUI, London Luton, Bedfordshire (NB)
G-XTUG	407B8C	Lambert Mission M108	LAA 370-15736	Lambert Aircraft Engineering BVBA, Kortrijk-Wevelgem International, Belgium
G-XWBH	407944	Airbus A350-1041	448	British Airways PLC, Heathrow, Middlesex
EI-GPR	Not allotted	Noble-Hardman Snowbird Mk.IV	SB-006	P Cattigan & J Selman, (Claregalway, Co. Galway)
EI-GRY	4CAADE	Mooney M.20R Ovation	29-0045	DK Innovation Ltd, St Brieuc, France
EI-GSV	4CAB02	Airbus A320-232	2587	ECAF I 2587 DAC, (stored at Shannon. Co. Clare)
EI-GTC	4CAB25	Robin HR200/120B Club	257	Nogaro Ltd, Graigs, Navan, Co. Meath
EI-GTI	4CAB59	Embraer 190	19000564	GY Aviation Lease 1707 Co. Ltd, Warsaw Okecie, Poland
EI-GUA	4CAB69	Boeing 737-490(SF)	28888	Aircraft 23810 QC Holdings Ltd, Naples International, Italy (operated by Poste Air Cargo)
EI-GUL	4CABC3	ATR 72-212A (60F Variant)	1653	ASL Airlines Ltd, Paris-Charles de Gaulle, France (operated for Federal Express)
EI-GUY	4CABED	Beech 1900D	UE-379	Acia Aero Leasing (Ireland) Ltd, Toulouse-Blagnac, France
EI-GUZ	4CABEE	ICP MXP-740 Savannah S	20-11-54-0744	FunFly Aerosports Ltd, Limetree, Portarlington, Co. Laois
EI-GVA	4CABF0	Airbus A320-232	3674	Pembroke Aircraft Leasing 13 Ltd, (stored at Abu Dhabi, United Arab Emirates)
EI-GVB	Not allotted	Piper PA-28-140 Cherokee F	28-7325409	M Sun & D Conway, Abbeyshrule, Co. Longford
EI-GVC	4CABE4	Aerospool WT9 Dynamic LSA Club	18003	D Conway, Ireland West Airport Knock, Co. Mayo
EI-GVG	4CABF3	Rockwell Commander 112A	227	Iomys Ltd. Graigs, Navan, Co. Meath
EI-GVT	4CAB5D	Beagle A.61 Terrier 3	B.626	N O'Brien & F Hopkins, Kilkenny, Co. Kilkenny
EI-JAM	4CABE2	Cessna 172RG Cutlass RG II	172RG-0010	Mannion Automation Ltd, Abbeyshrule, Co. Longford
EI-LRE	4CABD1	Airbus A321-253NX	10245	Aer Lingus Ltd, Dublin, Co. Fingal
EI-NYE	4CAB80	Boeing 787-9	38756	Celtago II Leasing Ltd, (for Neos, Milan-Malpensa, Italy)
EI-XIN	4CAB8A	Boeing 787-9	38774	Quadrant MSN 38774 Ltd, (for Neos, Milan-Malpensa, Italy)
M-ABNK	424B90	Embraer 190	19000524	CLC Aircraft Leasing (Shanghai) Ltd, (for Myanmar Airways International)
M-ABNV	424BA4	Embraer 190	19000524	Aero Power Leasing Company Ltd, (stored Guangzhou, People's Republic of China)
M-ASER	424B96	Embraer Phenom 300	50500590	Maser Aviation Ltd, Dublin, Co. Fingal
M-CNZI	43EA87	Bombardier Global 6000	9678	Lavenda Services Inc, TBA
M-DAWN	424B95	Beech B200GT King Air 250	BY-238	Dawn Meats Group UC, Waterford, Co. Waterford
M-EKSL	424BA1	Airbus A330-243F	1124	DHL Air Ltd, Dresden, Germany
M-FUAD	424B9F	Gulfstream G650	6430	Future Aviation (IOM) Ltd, Farnborough, Hampshire
M-KNOX	424B9E	Cessna 525C CitationJet CJ4	525C-0343	Cabbane Ltd, Isle of Man
M-LWCW	424B6B	Bombardier Global 7500	70043	Eircraft Ltd, Dublin, Co. Fingal
2-ACSD	TBA	Airbus A320-232	1663	ACS Aero 2 Omega Ltd, (stored St Athan, Vale of Glamorgan)

Bombardier Global 7500, M-LWCW passed through Isle of Man Airport on December 29 during its delivery to Eircraft Martin Nelson

2-ACSG	TBA	Airbus A319-112	3406	ACS Aero 2 Omega Ltd, (stored St Athan, Vale of Glamorgan)
2-ACSH	TBA	Airbus A319-112	3452	ACS Aero 2 Omega Ltd, (stored St Athan, Vale of Glamorgan)
2-ACSJ	TBA	Airbus A320-214	1873	ACS Aero 2 Alpha Ltd, (stored St Athan, Vale of Glamorgan)
2-ACSM	TBA	Boeing 737-76N	33420	ACS Aero 1 Alpha Ltd, (stored St Athan, Vale of Glamorgan)
2-AOBG	TBA	Boeing 737-8FZ	29664	Horizon II Aviation 2 Ltd, (stored Lleida-Alguaire, Spain)
2-AODZ	TBA	Airbus A330-343	1427	QIC Europe Ltd, (stored Teruel, Spain)
2-AVLD	TBA	Airbus A320-214	5166	Avolon Aerospace (Ireland) AOE 45 Ltd, (stored Ostrava, Czech Republic)
2-DBRV	43EDDF	Cirrus SF50 Vision	237	Ferimare Ltd, TBA
2-FALA	TBA	Embraer 170	17000107	Rapide Aircraft Leasing 1 Ltd, (stored Middle Georgia Regional, Macon, Georgia, USA)
2-FALC	TBA	Embraer 170	17000141	Ravelin Jet Leasing 1 DAC (stored Middle Georgia Regional, Macon, Georgia, USA)
2-FALD	TBA	Embraer 170	17000146	Ravelin Jet Leasing 1 DAC (stored Middle Georgia Regional, Macon, Georgia, USA)
2-HXHU	TBA	Airbus A320-232	6749	CBA A320 6749 Pty Ltd, (stored Tarbes-Lourdes, France)
2-TABS	43EDD9	Eclipse EA500	229	TAK Aviation LLC, Guernsey
2-VSYF	TBA	Boeing 737-85R	34797	Crolly Aviation Ltd, (stored Shannon, Republic of Ireland)
2-VSYG	43ED87	Boeing 737-85R	34798	Mardal Aviation Ltd, (stored Tucson, USA)
2-VSYM	TBA	Boeing 737-8BK	29685	CIT Group Finance (Ireland) Ltd, Ltd, (stored Shannon, Republic of Ireland)
2-VSYO	TBA	Boeing 737-7BK	33025	Wells Fargo Trust Company NA, (stored Shannon, Republic of Ireland)
2-VSYP	TBA	Boeing 737-7BK	33026	Sapphire Leasing (AOE6) Ltd, (stored Shannon, Republic of Ireland)
2-WZIE	TBA	Airbus A320-214	3626	SMBC Aviation Capital Ltd, (stored Ostrava, Czech Republic)

CANCELATIONS

REG'N	TYPE	C/N	REASON
G-AOJR	DHC-1 Chipmunk 22	C1/0205	To France
G-ARCT	Piper PA-18 Super Cub 95	18-7375	To Republic of Ireland as EI-AVE
G-AVRU	Piper PA-28-180 Cherokee C	28-4025	Re-registered as G-PAWA
G-BEEH	Cameron V-56	250	Cancelled as Permanently WFU (CofA expired 05.11.10)
G-BFOF	Reims Cessna F152	1448	To Greece
G-BGAX	Piper PA-28-140 Cherokee F	28-7325409	To Republic of Ireland as EI-GVB
G-BJDF	SOCATA MS.880B Rallye 100T	3000	Cancelled by CAA (CofA expired 07.07.13, last noted Santarem, Portugal 11.15)
G-BMTA	Cessna 152	152-82864	To Portugal
G-BMXA	Cessna 152	152-80125	To Portugal
G-BNLY	Boeing 747-436	27090	Cancelled as Permanently WFU (flown to Dunsfold, Surrey for use as film set & training facility 05.12.20)
G-BOZZ	Gulfstream American AA-5B Tiger	AA5B-1155	To Germany as D-EHNM
G-BTBV	Cessna 140	12727	To Germany as D-ETBV
G-BVFU	Cameron Sphere-105	3137	Cancelled as Permanently WFU (CofA expired 04.12.20, was based in Netherlands)
G-BVKF	Europa Aviation Europa	PFA 247-12638	Cancelled as Permanently WFU (Permit to Fly expired 18.05.12)
G-BVXM	Aérospatiale AS350B Ecureuil	2013	To Austria as OE-XSC
G-BWJG	Mooney M20J	24-3319	To Czech Republic
G-BXJM	Cessna 152	152-82380	To Portugal
G-BXJS	Schempp-Hirth Janus CM	35	To Germany
G-BXUX	Brandli BX-2 Cherry	PFA 179-12571	Cancelled as Permanently WFU (but restored again the next day)

PREVIOUS IDENTITIES

REG'N	P.I.	REG'N	P.I.
G-BJWL	ex 5B-CHD	EI-GSV	ex YU-APG
G-BVVO	ex SP-YYH	EI-GTC	ex G-GMKE
G-CLRW	ex D-EAWW	EI-GTI	ex B-3209
G-CLST	ex SE-KFF	EI-GUA	ex N288AU
G-CLVH	ex EI-RDJ	EI-GUL	ex F-WWEX
G-CLVK	ex EI-RDK	EI-GUY	ex HB-AEM
G-CLVN	ex EI-RDL	EI-GVA	ex VH-VNG
G-CLVT	ex EI-RDM	EI-GVB	ex G-BGAX
G-CLWU	ex N62842	EI-GVC	ex G-LXAA
G-CLWX	ex A2-HDD	EI-GVG	ex G-EHXP
G-CLXA	ex I-PHAS	EI-GVT	ex G-NTVE
G-CLYY	ex PH-GSZ	EI-JAM	ex G-PARI
G-DRLA	ex I-EASJ	EI-LRE	ex D-AZAE
G-EIAR	ex D-EIAR	EI-NYE	ex LN-LNX
G-ENTO	ex D-ENTO	EI-XIN	ex LN-LNT
G-EZTN	ex HB-JYE	M-ABNL	ex B-3137
G-FLFX	ex PR-LBI	M-ABNV	ex B-3210
G-JBHL	ex C-GAEP	M-CNZI	ex M-MAXX
G-LAMO	ex CS-LAM	M-DAWN	ex G-NYCO
G-LAPW	ex D-EKCC	M-ESKL	ex D-AAED
G-LCAF	ex EI-GTG	M-FUAD	ex N630GA
G-LCTO	ex N8018Q	M-KNOX	ex N5136J
G-NHAE	ex G-DOLF	M-LWCW	ex C-GJHK
G-NHVG	ex OY-HLV	2-ACSD	ex ES-SAW
G-NHVJ	ex OY-HPV	2-ACSG	ex OK-NEM
G-NJAA	ex CS-DXW	2-ACSH	ex OK-NEO
G-NJAB	ex CS-DXX	2-ACSJ	ex YL-LCO
G-NJAC	ex CS-DXY	2-ACSM	ex SE-RJR
G-OASL	ex EI-SOA	2-AOBG	ex A4O-BG
G-OORB	ex OE-KTB	2-AODZ	ex A4O-DZ
G-OVIR	ex PH-VIR	2-AVLD	ex F-WXAT
G-PAWA	ex G-AVRU	2-FALA	ex XA-ALK
G-SMBA	ex D-EJDK	2-FALC	ex XA-GAQ
G-SUTY	ex G-HOCA	2-FALD	ex XA-GAM
G-THDR	ex I-EASQ	2-HXHU	ex VH-XUH
G-TTEN	ex (5B-***)	2-TABS	ex N229EA
G-TTNM	ex F-WWIN	2-VYSF	ex VT-SYF
G-TUKC	ex EI-FHH	2-VSYG	ex VT-SYG
G-XWBH	ex F-WZHD	2-VSYM	ex VT-SYM
EI-AVE	ex G-ARCT	2-VSYO	ex VT-SYO
EI-FHT	ex SE-RRT	2-VSYP	ex VT-SYP
EI-GPR	ex G-MTXL	2-WZIE	ex SU-BSM
EI-GRY	ex G-BVZY		

Hughes 369HE, G- DIGS, has become F-HMOS on the French register Ian Simpson

G-BYGG	Boeing 747-436	28859	Cancelled as Permanently WFU (flown to St. Athan 23.11.20 for parting out)
G-CBMU	Whittaker MW6-S (modified SS)	PFA 164-13339	Cancelled as Permanently WFU (SSDR microlight, no Permit to Fly required)
G-CBZK	Robin DR400/180 Regent	2543	To France
G-CERT	Mooney M20K	25-1134	To Belgium as OO-TSE
G-CFJN	Diamond DA40D Star TDi	40.295	To France
G-CFJO	Diamond DA40D Star TDi	40.296	To France
G-CHDE	Pilatus B4-PC11AF	223	To Germany
G-CHGI	Beech A36 Bonanza	E-1754	To France
G-CIVC	Boeing 747-436	25812	Cancelled as Permanently WFU (flown to St. Athan 06.11.20 for parting out)
G-CIVU	Boeing 747-436	25810	Cancelled as Permanently WFU (flown to St. Athan 13.11.20 for parting out)
G-CJYX	Rolladen-Schneider LS3-17	3289	Cancelled by CAA (CofA expired 06.08.14, was based in Spain)
G-CKBY	Eurocopter AS365N3 Dauphin 2	6949	To Tunisia
G-CKTR	Tecnam P2006T	7	To Greece
G-CKUT	Eurocopter EC155B1	6655	To Netherlands
G-CKVB	Eurocopter EC155B1	6658	To Netherlands
G-CKZV	Piper PA-28-161 Warrior III	2842068	To Spain as EC-NNI
G-CLTB	Airbus EC175B	5038	To Denmark as OY-HHZ
G-CRFX	Embraer Legacy 600	145780	To USA as N904FL
G-DFMG	Schempp-Hirth Discus B	242	To Switzerland as HB-3470
G-DHGY	SZD-24C Foka	W-180	To Poland
G-DIWY	Piper PA-32-300Cherokee Six	32-40731	Cancelled as Destroyed (crashed on landing at North Coates, Lincolnshire 23.06.20)
G-DKEM	Bell 407	53750	To Greece
G-DOEA	Gulfstream American AA-5A Cheetah	AA5A-0895	To France
G-DOLF	Eurocopter AS365N3 Dauphin 2	6779	Re-registered as G-NHAE
G-DOWN	Colt 31A	1570	Cancelled as Permanently WFU (CofA expired 08.06.00)
G-DTFT	Czech Sport Aircraft PS-28 Cruiser	C0506	To Germany
G-EDEN	SOCATA TB10 Tobago	86	To Russia
G-EDGK	Cessna TR182 Turbo Skylane RG	R182-00941	To Germany as D-EDGK
G-EENO	Cessna T210N Turbo Centurion II	210-64162	To Germany
G-EFAM	Cessna 182S Skylane	182-60442	To Germany
G-EHXP	Rockwell Commander 112	227	To Republic of Ireland as EI-GVG
G-EZAA	Airbus A319-111	2677	To USA as N5307U
G-EZAL	Airbus A319-111	2754	To USA as N9312U
G-EZIV	Airbus A319-111	2565	To USA as N2302U
G-GMKE	Robin HR200/120B Club	257	To Republic of Ireland as EI-GTC
G-GREY	Piper PA-46-350P Malibu Mirage	4636155	To Germany
G-HAFT	Diamond DA42 Twin Star	42.057	To France
G-HAGU	Agusta A109C	7665	To USA
G-HANG	Diamond DA42 Twin Star	42.026	To France
G-HOCA	Robinson R44 Raven II	12388	Re-registered as G-SUTY

The rest of the cancellations will appear in the next issue.

Key: NB – Nominal Base
A place name in brackets relates to the owner's address, as where the aircraft is based is unknown.

UPDATES & CORRECTIONS

REG'N	DETAILS
G-BJSV	Became PH-VFD 16.11.20
G-BKBV	Became D-EYAZ 03.11.20
G-BVZY	Became EI-GRY 02.12.20
G-CBBR	Became N625XT 30.12.20
G-CEEZ	Became T7-TAS 01.20
G-CEXO	Became SX-GAO 11.19
G-CHHJ	Type officially changed to a EuroFOX 912(1) 09.12.20
G-CIJU	Became D-ERMT 10.20
G-CIMH	Fate was Cancelled by CAA, but restored again this month & delete extraneous G-CFMB (corrects Page 73 February 2021)
G-CIVF	Flown to Newquay Cornwall for parting out (corrects Page 73 February 2021)
G-CIVY	Flown to St. Athan for parting out (corrects Page 73 February 2021)
G-CIVZ	Flown to Newquay Cornwall for parting out (corrects Page 73 February 2021)
G-CJVF	Became N9754 3.12.20
G-CKSK	Became OE-5750 13.11.20
G-CLFK	Type officially changed to a EuroFOX 912(S) 10.12.20
G-CLGH	Became 5N-BXN 03.20
G-CLSC	Type officially changed to an Ascent Industries SportStar SLM 14.12.20
G-CLVB	C/n is 17281584 (corrects Page 72 February 2021)
G-CLWG	Delete extraneous 0805-6972 (corrects Page 72 February 2021)
G-CLWZ	C/n is 24-20-2956 (corrects Page 72 February 2021)
G-COBO	Became F-WNUI 12.20
G-DDHH	Became HA-4046
G-DDUF	Became D-1119 10.09.20 (corrects entry for G-DDUR on Page 76, February 2021)
G-DIGS	Became F-HMOS 27.11.20
G-EGHP	C/n is 0805-6972 (corrects Page 72 February 2021)
G-EMHB	Became I-PIKI 11.20
G-EXLT	Became PH-ZWZ 11.20
G-EXTC	C/n is LAA 252-15728 (updates Page 72, February 2021)
G-FAGK	Type officially changed to a de Havilland DH.60M Gipsy Moth 10.12.20
G-FHFX	C/n is 550020121 (corrects Page 72 February 2021)
G-FIFA	C/n is 404-0644, Sold in Latvia (corrects Page 74 February 2021)
G-FLXY	C/n is 2843927 (corrects Page 72 February 2021)
G-FTAC	C/n is 28-8416082 (corrects Page 72 February 2021)
G-FTAD	C/n is 28-8016123 (corrects Page 72 February 2021)
G-INKO	Became S5-DRI 10.20
G-JKMJ	Became SX-SAA
G-JOET	Type officially changed to a EuroFOX 912(S) 01.12.20
G-KDRZ	Type is a PA-28-181 Archer LX, c/n 2881415 (corrects Page 72 February 2021)
G-KMLA	Fate actually Sold in Finland as OH-KML (corrects Page 74 February 2021)
G-LBHA	Became SP-ZIW 12.20
G-LILE	C/n 525-0429 (corrects Page 73 February 2021)
G-LXAA	Became EI-GVC 15.12.20
G-MTXL	Became EI-GPR 01.12.20
G-NTVE	Fate actually Sold in Republic of Ireland as EI-GVT 07.12.20 (corrects Page 74 February 2021)
G-OARS	Fate actually Sold in Belgium as OO-JDH 16.12.20 (corrects Page 74 February 2021)
G-OGGI	Became PH-DOG 03.11.20
G-PBIG	Became RA-07344 02.11.20
G-RAYY	Fate actually Cancelled by CAA (CofA expired 15.06.18. Was based in Spain) (corrects Page 74 February 2021)
G-SJPC	C/n is LAA 303-15507 (corrects Page 73 February 2021)
G-SOOM	Became D-KKOM 13.10.20
G-SXII	Became D-KOVA 30.10.20
G-TUKU	Became D-KAYD 19.10.20
G-WARH	Became SX-GAP 09.20
G-WIRG	Fate actually Sold in USA as N1184U (corrects Page 76 February 2021)
G-XHOT	Became PH-DED 27.11.20
EI-DJM	Became SX-GAV 03.20
EI-GTH	C/n is 19000560 (corrects Page 73 February 2021)
EI-IIN	Became VQ-BVA 11.20
EI-LBR	Became N751AL 12.20
M-ABNL	C/n is 19000556 (corrects Page 73 February 2021)
M-EAGL	Became F-GCAF 11.20

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WEB DIRECTORY

From Jodel to Jumbo

A Life of Flying

As a boy, he was told he was "stupid" to think he could ever become a pilot, but **Scott Birrell FRAeS** enjoyed a distinguished career in aviation as an airline captain, head of pilot training and a senior examiner

Above: **Capt Scott Birrell in the left-hand seat of Thomson Airways 757-200, G-OOBP, in 2015** Via Scott Birrell

Main photo: **In 1990-92, Scott flew 747s for Virgin Atlantic, which he describes as not demanding to fly, but with a differing landing technique to the smaller Boeings** AirTeamImages.com/Carl Ford

I have spent a lifetime in the air – and it all happened because I walked through a wrong door.

I was 14 and had seen a newspaper ad for pleasure flights from Glasgow Airport for £8. My pals and I put in £1 each and cycled out to the airport. I said: "Wait outside" and went in – into the flying club. I said to the first person I saw: "I've come for a pleasure flight." The chap said: "We don't do that. We teach people to fly." This struck me like a bolt of lightning: "Teach people to fly!" The gentleman I saw that day was Jim Beaton who was the club's chief flying instructor and this individual would transform my life. Many years later, when I was a flying instructor myself, kids would walk in, just as I did.

About two weeks later I went up for a first lesson and it was the best thing that had ever happened to me – but it wasn't so great for him. We flew to Loch Lomond, and he let me fly the aircraft straight and level, a bit of turning... and then I was sick. I threw up every time I went flying. Jim had to clean up after his star pupil had pedalled off home on his bike. Eventually, he told me to clean up the aircraft myself.

But I knew then what I wanted to do with my life. I hadn't exactly been a stand-out at school. I was academically backward and lacking any kind of prowess at sports. I was dreadful at maths but, to fly a jet later in life, all I would need was my three- and eight-times tables: three for altitude for descent planning, and eight for speed.

When I left school, at the earliest possible opportunity, the head asked me: "What are you going to be, Birrell?" I replied proudly: "I'm going to be a pilot, sir." I have never forgotten or forgiven his reply: "Don't be stupid, boy!"

Above: **In the 1970s, Scott (on the left) bought an old Jodel D112 with friends and built flying hours at Glasgow** Via Scott Birrell

Below: **One of the aircraft types flown by Scott early on in his career from January 1980 to October 1981 was the Trislander for Loganair** Richard Vandervord

I wasn't put off – I took every opportunity to get airborne and spent all my spare time at the flying club. Most airline pilots these days have a degree, but I needed money so I started the hard way: loading 'planes as a baggage handler at Glasgow Airport. It taught me respect for the ground crew who make commercial aviation possible.

A group of us bought a Jodel D112, an old and very basic aircraft with a canvas wing and no electrics – but we got it for just £1,200. That little 'plane taught me so much, as did my experience in a Victa Airtourer, when I nearly dived straight into Loch Lomond. That taught me that aerobatics and I weren't really suited.

AIRLINE JOB

At that stage, the height of my ambition was to become a flying instructor and I achieved that in my early 20s. But I slowly realised I could go further, and I was offered a job with Loganair as a second officer. I got a call from the chief pilot: "Can you start Monday? We're putting you on the Shorts SD-330." For our flying training on the Shorts 330 myself and two other pilots, all second officers, were sent to Belfast, and flew with the Shorts chief test pilot.

Later, I moved on to the Trislander, a three-engined version of the twin-engined Britten-Norman Islander, with a high wing and a fixed undercarriage. They were rugged ten-seater aircraft used by Loganair in the Orkneys and Shetlands for inter-island flights. They were also used as an air ambulance service because they could get into a farmer's fields on most of the Scottish islands. At night, if there was an emergency, the locals would light up the temporary strip with car lamps.

On the first day of my line training on the Trislander, we went off, with passengers aboard, to Machrihanish aerodrome at the bottom of the Mull of Kintyre, an RAF airfield with a small passenger terminal. We were flying in cloud – and when we popped out of it, we were facing a ▶

The first type Scott flew for Loganair was the Shorts SD330 Bob O'Brien Collection

hillside. I pulled back hard on the elevator and slammed the throttles fully forward. At the same moment, I could hear air traffic on the radio as I was trying not to hit the hill: "Loganair 411, pull up, pull up!" I pulled up hard, almost into a chandelle. The aircraft, with almost no flying speed, just fell to the right into the valley and the loch, but not before the landing wheels had almost brushed through the bracken at the top of the hill, inches from disaster. As I was visual with the loch and the runway in the distance, I continued and landed on the westerly runway, in stunned silence.

A few days later, I was called in to see the boss and thought I was going to be fired. He played a tape supplied by the RAF and I thought there was something odd about it. It wasn't my voice on the tape. RAF ATC had confused two different calls, on two different frequencies, and another pilot had given the wrong call sign. The RAF had left me to fly into the hillside. I completed my line training and got promoted after all and I received a letter of apology from the RAF, saying: "We've shot the controller!"

JUMP TO JETS

I learned a lot flying the Highlands and Islands, but I heard that Britannia Airways was hiring and I fancied flying a jet. I was taken on as part of a mixed group of civilian and ex-military guys who were all going to be trained to be first officers on the Boeing 737-200. I quickly learned that this jet was not an aircraft I could fly in the manner I had been taught. My biggest problem was over-controlling the aircraft. I was used to climbing the Trislander at

Moving to Britannia Airways, Scott began flying the Boeing 737-200 in 1982 Bob O'Brien Collection

400ft a minute – this thing was climbing at 3,000ft a minute.

The 737 was an animal, a monster that needed to be tamed, and it took a while before I could land it well. I was hitting the ground hard. When I got to my final line check, I was released to the line – but I was not allowed to do the landing unless I was with a training captain. Landing into Luton, where Britannia was based, was not easy because it is on a hill. The winds swirl around and the runway has a hump in the middle, so when you land at one end, you can't see the other end. I have hit that runway hard, but it still has its famous hump. I should have flattened it by now!

Scott Birrell says that the Boeing 767-200 was "the nicest 'plane I have ever flown". He first flew the type in July 1987 with Britannia Bob O'Brien Collection

Landing a jet is a bit of an art. There is no one who can 'grease it on' every time – and, of course, that is not the correct way to land a jet. The aircraft has to touch down firmly enough for all the sensors to register contact so you can get ground spoilers and reverse thrust. But pilots know passengers like a smooth landing so they will generally try to achieve that if they have lots of room on the runway. Later, when I was a trainer and checking a crew, if they 'greased it on' inappropriately, they would be in for a talking-to. The passengers might be going "Oh great", but the poor chap at the controls would be getting a hard time from me.

The nicest 'plane I have ever flown is the Boeing 767-200 with the later higher thrust engines which climbs 'like a homesick angel'. It has inboard and outboard ailerons, unlike the 757, so it has a great roll rate. I could usually tell if someone flew the 767 occasionally and was more used to the 757. The same thing happened if I hadn't flown a 767 for a while. You come down the ILS rolling because the ailerons are powerful and sensitive. I always had to say to myself: "Take your hands off the controls!" Then the self-induced pilot roll stopped.

FERRY FLIGHT

A colleague and I once collected a brand new 767-200 from Seattle. We were shown around the huge Boeing factory, where they built the 767s and 747s. This factory was the biggest building, in terms of volume, in the world, and inside there was a line of 747s and another line of 767s. It was so enormous that they said there could be weather inside it.

When we took off in our new 'plane for Luton, there were only a few of us on board. My wife Ruth was on the flight deck, and in the back there were a few engineers – and an accountant to make sure all the finances were in order. We were going

Scott Birrell was qualified on the 747 in 1990, flying with Virgin Atlantic until April 1992. One of the fleet at the time was G-VIRG, *Maiden Voyager* Bob O'Brien Collection

direct, Seattle to Luton, taking a very northerly route, high up over northern Canada and Greenland.

By the time we reached the Atlantic, we were well north of all the NAT tracks on a random route. We took off in the evening and, over northern Canada, the Aurora Borealis was magnificent. Everyone was down on their knees looking out of a side window because there were only a couple of rows of seats in the whole aircraft. In all the years since, I have never seen the like again. We landed back in Luton and met the media. At that time, BEA was flying Tridents and Dan-Air still had Comets, so we were way ahead.

Britannia promoted me to captain, but when it was looking for redundancies, I moved to Virgin Atlantic for a while and the difference was apparent straight away. The first time I flew the Boeing 747, we all arrived at the aircraft in a coach which stopped at the bottom of the steps because it wasn't parked on a jetty. It was awe-inspiring. So much so, that I deliberately averted my gaze, scampered up the steps and then, without looking left or right, up the spiral steps and into my seat. Was I nervous? You bet. Was I surprised? Yes, because it turned out that it flew just like any other aircraft. But that experience, from a pilot's point of view, certainly does tick some boxes. The 747 flew very like the 767: the general handling qualities of the two Boeings were very similar, but when it came to sheer power, it was gutless by comparison.

With the cockpit of the 747 being so high up a slightly different technique was needed for landing. When the RADALT said: "50, 40, 30", at 30ft you flared. You didn't look out of the window and think: "Am I still a bit high?" If you did, you would bury the jet into the runway. In crosswinds, if you had a bit of wing down, you had to watch the outer engine pod, which could be a bit close to the ground. But, overall, it wasn't a demanding aircraft to fly.

THE VIEW FROM ABOVE

I returned to Britannia Airways (which later became Thomson Airways), where I went on to be head of pilot training and a senior examiner, before retiring in 2015. I loved the camaraderie among aircrew and also the sheer awesomeness of looking out of the flight deck window on the Earth beneath us. It is pretty obvious but I have seen some amazing sights, just as all commercial airline pilots must have.

I will never forget the moon rising over the Atlantic. I'd suddenly see a faint glow and then I'd watch the moon come up quite quickly from our dark cockpit. We'd usually darken the cockpit lights so we could do a bit of stargazing as well. First officers often had a star chart with them.

Another awe-inspiring sight which never fails to impress is looking down across Greenland at the ice floes, the glaciers and the pack ice. I have crossed the Equator quite a few times, and every time I found the southern sky breath-taking. There is something amazing about the view as we crossed India on the way to the Far East. These sights are what I missed when I stopped flying professionally.

Closer to home, coming into Luton might not sound the most glamorous approach in the world, but because it is just north of London, flying in on a clear night over the city is spectacular.

Many years ago, flying into LA as a first officer, I was asked by ATC to 'side-step' over to the parallel runway. I was only three or four miles out. I tried but failed to get stable on the final approach to the new runway and had to go around. My captain phoned the tower when we got down and had a blazing row with them for the late ▶

In 1965 Britannia Airways was bought by tour operator Thomson and later the airline's name was changed to Thomson Airways. Scott was a First Officer on the Boeing 767-200 from July 1987 to November 1988 and then later flew the type as a Captain from 1993 until 2015 as well as the 767-300 (pictured) and Boeing 757-200 AirTeamImages.com/Simon Willson

instruction on approach. "What do you think we are? A Cherokee?"

There are not many small seaplanes like the Lake Buccaneer I landed on Loch Lomond many years ago, but something from even earlier that still makes me go "Oh yes!" would be the Otter, or the Beaver, its little brother, both built by de Havilland Canada. I flew the Twin Otter when I was in Loganair (although only for a month) but the single Otter was a classic 1950s aircraft, a great big brute.

Of course, like everyone, I look up when I hear the wonderful sound of the Rolls-Royce Merlin engine and watch a Lancaster, Spitfire or Hurricane. Other military aircraft have never really done much for me. My passion has always been for civilian aircraft. However, there are not many aircraft that fly over my head where I don't glance up just to identify them.

I may be retired now but I have no plans to give up flying. I even thought I might renew my flying instructor's rating, but on second thoughts, I realised I would be dealing with a lot of formality again. A group of us bought a top-of-the-range Cirrus SR20 GTS, which I love. Even if I sold my share in the Cirrus, I would continue to fly out of Turweston Aerodrome in Buckinghamshire. That sounds good to me. AN

This article is adapted from Scott Birrell's new book *Your Captain Speaking: Views From The Flight Deck* (ISBN: 9781527273641), available in paperback or Kindle from Amazon, or as an e-book from Apple, Kobo or Barnes & Noble.

The author retired in August 2015 after 36 years of airline flying, much of it spent on Boeing twinjets including Thomson's 757-200s Via Author

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