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Welcome



I've always had a soft spot for the Boeing 757. As a kid growing up in the late 1990s, my dad used to take us up to Leeds Bradford Airport – or LBA – to watch the comings and goings. While my brothers quickly disappeared to make their own adventures, I was always mesmerised by the action on the tarmac.

Back then, LBA boasted types like the Short 360, 'Whisper Jet', Fokker Friendship, MD-82s, various iterations of the Airbus, early variants of the 737, the odd Tu-154 and even ageing Lockheed Electras. But it was always the 757 that caught my eye: its elegant fuselage, tall tail, long wings and rounded nose demanded attention.

You could guarantee, that within minutes of our arrival, a 757 would appear on the approach or climb into the Yorkshire skies accompanied by the roar of its Rolls-Royce RB 211 engines. It was operated by carriers long gone – such as First Choice, Monarch, Britannia, Air 2000, Flying Colours – and

Above: DHL Boeing 757 G-BMRD shows off the type's elegant fuselage, tall tail, long wings and rounded nose during its show-stopping display at the 2005 Royal International Air Tattoo KEY Collection

Below: Over the rainbow: TUI 757 G-OOBP arrives at London Gatwick from Heraklion in Greece on October 3 at the end of her last revenue flight with the type. See page 28 for more on its withdrawal and what's next for TUI's 757s Simon Fewkes

I even recall seeing a silver and red British World example and an Air Finland jet. I remember the hairs on the back of my neck standing up when the shriek of the RB 211s transformed into a heavenly whine as the crew selected full power.

As I grew older, the number of 757s got smaller and smaller. You would be lucky to see a couple a month, instead of innumerable examples every visit.

I have one lasting memory of the 757: a DHL example being thrown around the skies like a fighter during the 2005

Royal International Air Tattoo at RAF Fairford, Gloucestershire. I'd never seen an aeroplane that size flown like that before, performing tight 360° turns, 'dirty' passes, fast passes and steep climbs that showed off the type's graceful lines while its distinctive whine filled the air. To me, it could be epitomised in one word: power. Although its days as a passenger carrier are seemingly numbered, I for one am glad the 757 will be around for a few more years to come yet.

As I write this, a DHL 757 has just floated overhead, descending towards East Midlands Airport. With the sun picking out its yellow and red scheme, an age-old adage comes to mind: "If it looks right, it flies right".

I hope this month's issue brings back equally pleasant memories for you.

Jamie Ewan – Editor

Handwritten signature of Jamie Ewan in red ink.



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The little-known Lockheed RB-69A was adopted by the CIA and the Republic of China Air Force to mount covert overflights of mainland China. Dr Kevin Wright explores the career of the USAF type that never was

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The Royal Air Force's first Boeing P-8A Poseidon (ZP801 'The Pride of Moray') shortly after arriving in the UK on October 31, 2019. But why does the RAF's latest Poseidon have a grey nose cone? See Did you know? on P54 Crown Copyright 2021 - RAF SAC Iain Curlett

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First Kuwaiti Typhoons flies

The first two-seat Eurofighter Typhoons for the Kuwait Air Force (KAF) undertook their maiden flights from Italy's Turin-Caselle – home of the Leonardo Aircraft Division's main test centre and assembly plant – on October 15, 2021. Assigned the test serials CSX55243 and CSX55244 respectively, each took off separately and remained in the air for 40 minutes.

Kuwait signed an US\$87 billion contract with Finmeccanica (now Leonardo) in April 2016 for six two-seat Typhoons and 22 single seat examples of the fourth-

generation multirole platform.

The deal also included training (the first KAF pilots have already been trained by the Italian Air Force at Grosseto), operational support packages and logistics, along with the construction of dedicated infrastructures at Kuwait's Ali Al Salem Air Base. While the original plan called for the jets to be delivered between 2020-2023, the ongoing

COVID-19 pandemic has caused several delays. When they enter service, the KAF's Typhoons will be the most advanced examples of the type in the world.

USAF Pegasus reaches milestone... but is it enough?

An F-16 from the 40th Flight Test Squadron receives fuel from a 344 Air Refueling Squadron KC-46 Pegasus during a sortie investigating flutter on December 12, 2019 USAF/Tech Sgt John Raven

The Boeing KC-46A Pegasus has been approved to refuel Boeing F-15 Eagle/Strike Eagle and Lockheed Martin F-16 Fighting Falcon receivers following a decision by Gen Mike Minihan, commander of the US Air Force's Air Mobility Command (SMC), to allow another interim capability release (ICR) mission set for the tanker.

Announced on October 13, this is the third ICR for the KC-46, which has been

plagued with setbacks and is over budget, but now means the type is cleared to receive all variants of both the F-15 and the F-16 during US Transportation Command (USTRANSCOM) missions.

Brig Gen Ryan Samuelson, deputy director of strategy, AMC plans, requirements and programmes and KC-46 cross functional team lead, said: "The KC-46 can now support 62% of all receiver aircraft that request air refuelling

support from USTRANSCOM. This step forward accelerates the critical projection and connection warfighting requirements the Pegasus brings to the joint force, even before it's fully operational." (See *Problematic Pegasus*, p44)

Typhoon CSX55243 flies final for Turin-Caselle following its first flight fitted with a pair of dummy AIM-9 Sidewinder air-to-air missiles Marco Rossi



First USAF EC-37 Compass Call II flies



US defence contractor L3Harris Technologies announced on October 6 that its first Gulfstream EC-37B Compass Call electronic warfare platform had undertaken its maiden flight from an undisclosed location. The jet, N967GA, is based on the Gulfstream's hugely successful G550 business jet and is intended to replace the United States

Compass Call II: Gulfstream EC-37B, N967GA, making a rare open-air appearance at Savannah-Hilton Head International Airport, Georgia, in August this year Via Twitter

Air Force's ageing Lockheed EC-130H fleet. Reports suggest L3Harris will build ten combat-coded EC-37B airframes and one training aircraft, with deliveries commencing as early as December 2022.

Cargolux launches fuel programme

Luxembourg freight flag carrier Cargolux announced on October 25, 2021, that it was launching a sustainable aviation fuel (SAF) programme as part of the company's commitment to reducing its emissions. Having pre-emptively acted to be fully compliant with upcoming proposed European regulations and offsetting schemes, the airline aims to be carbon neutral by 2050. Richard Forson, Cargolux president and CEO, said: "The introduction of SAF in our operation is



Cargolux operates a 747 freighter fleet comprising 6 -400ERFs, 10 -400Fs and 14 -8Fs
Eric Salard

a significant step forward for Cargolux. We are pleased to be part of an industry-

wide initiative to make our business, our industry and our world more sustainable."

Rolls-Royce tests 100% SAF



On October 15, 2021, Rolls-Royce flew its Boeing 747 flying testbed, N787RR, using 100% sustainable aviation fuel (SAF) to power a single Trent 1000 turbofan, while the remaining three RB211 engines ran on standard jet fuel. Departing Arizona's Tucson International Airport (pictured), the jet landed back there three hours and 54 minutes later. Partnering with Boeing and SAF producer World Energy, Rolls-Royce reported that the tests showed no "initial indications" of engineering issues. Rolls-Royce recently confirmed plans to make all of its Trent engines compatible with 100% SAF by 2023.

Image credit:Rolls-Royce

Auf wiedersehen, jet



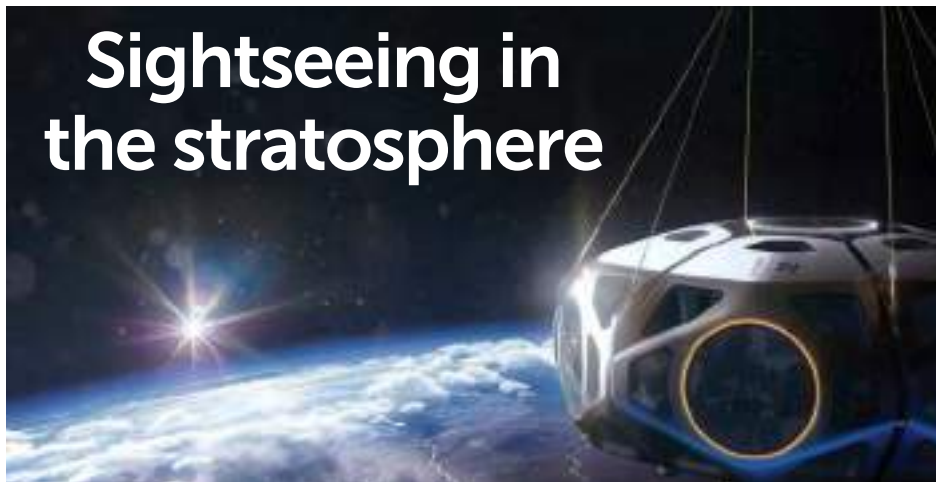
Lufthansa Cargo has retired its last McDonnell Douglas MD-11 Freighter, D-ALCC. The jet departed New York's JFK at 23:12hrs local time on October 16 and arrived in Frankfurt at 12:03hrs the following day. Stickers with 'Thank You MD-11, Farewell' were added to the fuselage and port cargo door for the trip.

MD-11F D-ALCC climbs away from JFK on October 16 for its final trip Lufthansa Cargo

Lufthansa Cargo is the last European MD-11 operator. Only three airlines, all in the US, now fly the trijet: FedEx Express Cargo Airlines (59 examples), UPS Airlines (42) and Western Global (16); D-ALCC will

continue flying with Western Global. The German freight carrier began phasing out its MD-11Fs in 2013 as more fuel-efficient Boeing 777Fs began to arrive. The carrier introduced the freighter in June 1998 and operated 19 in all, including the last MD-11 built in 2001, D-ALCN, which is now with cargo and logistics giant UPS as N262UP.

Sightseeing in the stratosphere



US start-up World View Enterprises is planning to reach the edge of space using

a balloon. Eight passengers and two crew members travelling in the purpose-built

After ascending to 100,000ft in the Explorer capsule, passengers will be able to see the curvature of the Earth World View Enterprises

Explorer capsule will ascend beneath a zero-pressure stratospheric balloon. Reaching 100,000ft, the passengers will be able to see Earth's curvature and the blackness of space. The boundary between Earth's atmosphere and space – dubbed the Kármán Line – is defined by the Fédération Aéronautique Internationale as 62 miles, or 330,000ft. In a statement, World View says its flights will be "the most affordable, longest duration and most accessible space experience on Earth." Seats will cost \$50,000 each, while flights will last between six and 12 hours. World View says its "mission is to bring as many people as possible to the edge of space."

Hydrogen-electric to Rotterdam



A modified Dornier 228 powered by a hydrogen-electric engine will fly zero-emissions commercial flights between the UK and Netherlands from 2024. Developer ZeroAvia and the Royal Schiphol Group are in "advanced talks" with airlines to agree on an operator for the route between Rotterdam The Hague Airport and London.

The project will test supply chain refuelling and integration with airport operations

ZeroAvia will test its hydrogen-electric engine technology using Dornier 228 G-HFZA, formerly G-SAYE with Aurigny ZeroAvia

to demonstrate that hydrogen-electric aviation could be adopted commercially. ZeroAvia acquired two Dornier 228s earlier in 2021 for the next phase of developing the technology. The company's UK operation has recently relocated to Cotswold Airport, Kemble from Cranfield, Bedfordshire.

eVTOLs at



Bristol-based electric vertical take-off and landing (eVTOL) aircraft developer Vertical Aerospace and Heathrow Ltd

Fresh Breeze in Alabama



Assigned the test registration C-GPWQ, Breeze's first A220 will become N203BZ in service Airbus

Airbus presented US-based carrier Breeze Airways with its first A220-300 at its Mobile, Alabama, final assembly line in October; the airline has 80 of the type on order. The jet will enter service in Q2 2022. Breeze began flying in May 2021 with Embraer E190s between destinations

around the US east coast and southern states, including Tampa, New Orleans and Charleston. Airbus said the A220 offers "non-stop service between underserved routes across the US, offering point-to-point flights from secondary airports, bypassing hubs for shorter travel times."

Global travel restrictions ease

Airlines are restoring long-haul services as COVID-19 travel restrictions ease.

With US borders due to reopen to European citizens on November 8, 2021, British Airways will resume flights from London-Heathrow to Los Angeles and Miami. It will also increase its daily New York-JFK services from three to eight in December 2021, and raise frequencies to destinations including Boston, Chicago, San Francisco, and Toronto.

Separately, Qantas Airways began a five times/week Sydney-Heathrow (via Darwin) service on November 1, 2021, followed by Melbourne to London (November 6), Singapore (November 22) and Delhi

(December 5). Qantas also plans to start flying two of its 14 A380s in spring 2022.

Aer Lingus will commence twice-weekly flights from Manchester to JFK on December 1 and Orlando on December 11. Singapore Airlines will resume its three weekly Singapore-Manchester-Houston services on December 1.

Karen Dee, CEO of the UK Airport Operators Association, recently called for more government action: "We do not see this as 'job done'. We still believe the government has some way to go in terms of setting out a pathway to where we can get back to a more normal way of international travel, with no restrictions."

The VA-X4 eVTOL is capable of flying at more than 200mph, boast zero emissions and have a range of over 100 miles Vertical Aerospace

by the mid-2020s. An official statement said the parties will be researching how eVTOLs "can fit into existing operations, build understanding of the regulatory changes that would be required, maximise potential job opportunities and minimise any potential impacts on communities surrounding the airport."

Vertical said the VA-X4 "will be able to transport four passengers from Heathrow to the City of London in 12 minutes, with zero operating emissions at a cost similar to a taxi." The developer is planning to fly the VA-X4 in 2022. Airlines and lessors including American Airlines, Virgin Atlantic, Avolon and Japan Airlines have already placed pre-orders for 1,350 examples of the aircraft so far.

have agreed a "milestone" partnership to explore how Vertical's VA-X4 eVTOL could operate from London-Heathrow Airport

In brief...

During the presentation of its Q3-2021 results on October 13, leading US carrier Delta Airlines revealed it has added two additional Airbus A350-900s to its fleet. According to several sources, the jets – currently registered OE-IPK and OE-IPX and in storage at Teruel in Spain – have been acquired from Irish-based lessor Avolon. The acquisition marks another expansion of the Delta's A350-fleet after the airline announced its plans to lease seven former LATAM examples via AerCap in July. With this pair, Delta will eventually boast 44 of the type.

Royal Jordanian



On October 17, Royal Jordanian (RJ) unveiled Boeing 787 JY-BAH in a special livery to promote the historic city of Petra, one of the seven new world wonders and also a United Nations Educational, Scientific and Cultural Organization world heritage site. Royal Jordanian vice chairman and CEO Samer Majali commented: "As the national carrier, RJ feels it is its duty to act as a bridge that connects Jordan to the world, and thus it has become the roving ambassador of Jordan."

Greek airline Olympic Air is poised to replace its current fleet of eight de Havilland Canada DHC-8-400s with up to six leased ATR 72s. While the exact variant of the European-produced turboprop-powered regional airliner it plans to lease is not known, it is reported that Olympic will introduce the aircraft in March 2022. The carrier currently operates a fleet of four ATR42-600s, two DHC-8-100s and eight DHC-8-400s.



Private Pakistani carrier airblue took delivery of its first Airbus A321neoLR, AP-BOE on October 15, making it the first airline in the south Asian country to operate a variant of the A320neo-family. Arriving in Karachi direct from Hamburg-Finkenwerder, airblue has leased the twinjet from leading aviation lessor and financier GECAS.

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Heathrow



Norway to withdraw its F-16s by year end



The Royal Norwegian Air Force (RNoAF) will retire its fleet of F-16AM/BM (MLU) Fighting Falcons by the end of 2021, leaving the service reliant on its new fifth-generation F-35A Lightning IIs for all fixed-wing combat duties from 2022 onwards. Revealed as part of the Nordic nation's proposed 2022 defence budget on October 12, the Norwegian Ministry of Defence

RNoAF F-16AMs fly off the wing of a USAF B-52 during integration training as part of Bomber Task Force Europe 20-1 on October 30, 2019 USAF – Tech Sgt Christopher Ruano

(MOD) stated that the RNoAF is expected to operate 34 F-35As – 24 of which will be based in Norway, while the other ten airframes will remain in the US for training purposes. Confirming the retirement,

a Norwegian MOD spokesperson told *Aviation News* that some aircraft will be made ready for onward sale, while those deemed unfit for continued use would be scrapped, and that the F-35A will take over operational responsibilities “before Christmas”. According to other sources, the Romanian Air Force will buy two squadrons of F-16s from Norway.

Sukhoi to exhibit Checkmate overseas

Russia aims to promote Sukhoi's new light tactical aircraft – dubbed the Checkmate – for export by exhibiting it at defence events around the world. Yuri Slyusar, head of the state-owned United Aircraft Corporation, said: “Judging by the visits by delegations to the pavilion at MAKS, the interest (in the Checkmate) is great. And, of course, we will now carry this plane to exhibitions if they return to their usual offline mode.”

Indian Mirage 2000 upgrades delayed

Sources have revealed that India will not be upgrading 51 of its Dassault Mirage 2000H Vajra (Thunderbolt or Diamond) multirole platforms to 2000-5 standard for about 36 months. The fatal accident in February 2019 involving an upgraded Mirage, the effects of COVID-19 and various logistical issues all played a part in the delay. Twenty-five examples have already been modernised under a US\$2.33 billion deal agreed between India's Hindustan Aeronautics, Dassault Aviation, Thales and MBDA in 2011.

In brief...



ON OCTOBER 8, the US State Department approved a possible Foreign Military Sale valued at US\$986 million for 12 Sikorsky MH-60R Seahawks to the Royal Australian Navy (RAN). Australia currently has 23 examples of the type on strength, having recently lost one during a routine flight over the Philippine Sea. The crew were rescued with minor injuries, but RAN temporarily suspended Seahawk operations as a precaution.

ON SEPTEMBER 29, the USAF's 41st Rescue Squadron at Moody Air Force Base, Georgia, officially retired its last HH-60G Pave Hawk, serial 91-26356, as it continues its transition to the HH-60W Jolly Green II variant of the famed Sikorsky helicopter. Conducting the unit's final sortie with the type during a special ceremony at Moody, 91-26356 had served with the 41st for just over 27 years.

THE SOLE Dassault Falcon 7X bound for the Hellenic Air Force was spotted in mid-October at Lelystad, Netherlands, prior to its delivery to the 352 VIP Transport Squadron at Elefsis near Athens. The jet was noted carrying the French registration 'F-HHED', as well as its HAF serial '327'.

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Royal Navy Wildcat debuts operational Martlet missile



On October 16, a Royal Navy AgustaWestland Wildcat HMA2 from 815 Naval Air Squadron conducted the first operational firing of a Thales Martlet lightweight multi-role missile (LMM) while operating from the air defence destroyer HMS *Defender* cruising in the Indian Ocean's Bay of Bengal. The laser beam riding air-to-surface missile successfully hit its intended target, which had been designated by the launch aircraft (ZZ518, pictured). This is a significant step towards the introduction of the LMM into service and adds another important element of fleet defence for the UK's Carrier Strike Group. MOD Crown Copyright 2021 – Royal Navy

F-15EX programme gains momentum

The USAF's Boeing F-15EX Eagle II undertook its first operational test missions alongside F-15Cs and F-15Es from Nellis Air Force Base, Nevada, from October 18-25, as the fourth-generation multirole platform enters the operational test and evaluation (IOT&E) phase of its procurement.

Air Force Operational Test and Evaluation Center F-15 tester Lt Col Kenneth Juhl commented: "We've never done full, large-scale operational tests with the F-15EX because it's only been in the USAF's hands for six months. The fact that we're going this fast is definitely owing to the air force's chief of staff 'accelerate change

or lose mentality' ethos." Colton Myers, project manager for the Operational Flight Program Combined Test Force F-15EX, added: "The main focus is to provide the initial push for operational tests and evaluation to really evaluate the platform from an end-to-end perspective with the addition of a robust threat environment that we have here at Nellis. That way, when we write our initial test reports, we're giving an accurate look to the combat air force and the guard as to what the platform is capable of when it initially fields."

(For more details on the F-15EX, see the July 2021 issue of *Aviation News*)

ASRAAM Block 6 on schedule for UK F-35 and Typhoon fleets



It was announced by defence procurement minister Jeremy Quin on October 21, that the MBDA-manufactured AIM-132 advanced short-range air-to-air missile (ASRAAM) Block 6 will enter UK service on the Eurofighter Typhoon in 2022 and on the F-35B Lightning II in 2024. He also noted that the ASRAAM sustainment programme "continues to be delivered within [the] Complex Weapons Portfolio contract price." Developed to meet

RAF Eurofighter Typhoon FGR4 ZK433, call sign 'Apollo 12', taxis out at RAF Coningsby, Lincolnshire, on October 12 carrying what is reported to have been a Block 6 AIM-132 (inset) KEY-Jamie Ewan

UK requirements, the Block 6 ASRAAM incorporates new and updated sub-systems, including a new-generation seeker of increased pixel density and a built-in cryogenic cooling system.

Contracts for Finnish Hawk spares awarded

On October 13, a notice posted on the official EU contracts database revealed that Finland has placed a series of ten contracts – valued at US\$630,000 – with ten companies for spare parts for the Finnish Air Force (FAF) Hawk Mk.51, Mk.51A and Mk.66 fleet. The FAF currently operates 32 examples of these aircraft – nine Mk.51s, seven Mk.51As and 16 Mk.66s – in the advanced and fighter lead-in training roles.

Firms involved include Hawk Original Equipment Manufacturer BAE Systems, fellow UK companies Aviation & Defence Spares, British International Industries, CoTech Trading, Global Dynamic Support and Saywell International, US-based S3 AeroDefence and Simtech, Fokker Services of the Netherlands and OEM Defence Services of France. The completion date for the contracts was undisclosed.

In brief...



Saab

THE SWEDISH Armed Forces announced a formal request to buy Saab's GlobalEye multi-role airborne early warning & control platform on October 1, 2021, eight months after Sweden committed to the Bombardier Global 6000-based system. While the exact number it will order was not reported, there is a pressing need for Sweden to supplement or replace its maturing and overworked airborne surveillance and control Saab S100D fleet

IN A September 8 speech during the 29th International Defence Industry Exhibition at Kielce, Poland, JR McDonald, vice president of business development, integrated fighter group at Lockheed Martin, inadvertently revealed that the Polish Air Force's second F-35A squadron will most likely be based at the 21st Tactical Air Base in Świdwin.



Via Chinese Internet

HAVING MADE what is thought to be its international debut in Russia during Exercise Aviadarts 2019, the People's Liberation Army Air Force officially unveiled an example of Xi'an Aircraft Corporation's JH-7A2, serial '73076', maritime and land attack platform for the first time during Airshow China 2021 at Zhuhai. Although the type looks almost identical to the JH-7, it reportedly incorporates superior surface attack capabilities and a larger warload, including stand-off air-to-surface missiles, laser-guided bombs and munitions dispensers.

ON SEPTEMBER 27, Lockheed Martin (LM) announced it had delivered the 700th production example of its fifth-generation F-35 Lightning II. The jet was Royal Netherlands Air Force F-35A F-020 (pictured). Furthermore, LM has agreed to deliver 133-139 aircraft this year, 151-153 examples in 2022, and anticipates delivering 156 aircraft in 2023 and for the foreseeable future until completion.



Vliegbasis Leeuwarden

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TFC Nimrod airborne!



The Fighter Collection's (TFC) Hawker Nimrod Mk.I, G-BWWK, flew for the first time in three years on October 9. Taking to the skies in the capable hands of noted warbird exponent Pete Kynsey, the 1931-built machine gave a very spirited display during the Imperial War Museum Duxford's final Flying Day of the year. With the aircraft undertaking engines runs the day before, the aircraft completed an air test in the hazy Cambridgeshire skies on the morning of event, marking the first flight of a Rolls-Royce Kestrel-powered aeroplane in two years KEY-Jamie Ewan

Can you help Sywell Aviation Museum?



It's been a strange couple of years for everyone, especially the volunteers at Sywell Aviation Museum on the historic Northamptonshire aerodrome of Sywell.

Founded in 1998, the museum doesn't charge an entry fee and relies solely on donations to survive. The museum's Ben

Brown told *Aviation News*: "Due to COVID restrictions across 2020-21, the museum's open season was severely shortened, resulting in a loss of income. This, combined with the arrival of the Handley Page Jetstream G-RAVL in March 2021 – which is to be restored as a classroom

Currently undergoing restoration at Sywell, Jetstream G-RAVL is the museum's biggest and costliest project to date KEY-Jamie Ewan

and is the biggest and most expensive project the group has undertaken – has really taken its toll."

Now closed for the remainder of 2021, the museum is actively seeking donations of military and aviation books, model kits, paints, accessories and diecast models to put together a sale in January 2022 to help raise funds to continue its work before reopening again at Easter.

Ben said: "If anyone has any items for donation, please contact me on 0796 8061708 or email sywellaviationmuseum@gmail.com. We are more than happy to collect items! Thank you."

Stirling crew remembered



On October 12, a striking new sculpture titled *Rise* was unveiled at the Almere Resistance Memorial Park in the Netherlands in honour of the crew of 218 Squadron Short Stirling Mk.III BK716.

The work of noted contemporary artist Laura O'Neill, *Rise* depicts a World War Two airman sitting on top of a Bristol Hercules XVI engine salvaged from BK716's wreck at bottom of Lake Markermeer, near Amsterdam, in 2020. While no one can be sure what happened to BK716, it is

believed the aircraft was shot down by a night-fighter while returning from a raid on Berlin on the night of March 29-30, 1943. Official records reveal BK716's crew consisted of pilot Fg Off John Frederick Harris, flight engineer Sgt Ronald Kennedy, wireless operator/air gunner Sgt Charles Armstrong Bell, air gunners Fg Off John Michael Campbell and Sgt Leonard Richard James Shrubsall, and Flt Sgt John Francis James McCaw, with Fg Off Harry Gregory Farrington acting as observer.

Seen shortly after its official unveiling in the Netherlands on October 12, *Rise* represents "an invitation to today's youth to commemoration and dialogue" Lex Beers via Lilian v Mourik

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Greece's love affair with McDonnell Douglas' indomitable F-4E Phantom dates back to 1972 when it signed a contract for 36 jets in a deal named Peace Icarus I (PI I). With the first four jets arriving at Andravida Air Base, located on the nation's west Peloponnese peninsula, on April 5, 1974, the Hellenic Air Force (HAF) stood up its first Phantom squadron – 339 Mira 'Aias'

(or Ajax, a Greek mythological hero). Two months later a second unit, 338 Mira 'Ares' (Ares being the Ancient Greek God of War), started its conversion at Andravida.

With the delivery of the PI I Phantoms completed by November 1974, two additional examples were ferried to Greece in June 1976 as attrition replacements.

However, due to increased tensions with Turkey, the Greek government addressed

the need for additional Phantoms and a second contract, dubbed Peace Icarus II (PI II), was signed on July 16, 1977 for another 18 F-4Es and eight photo reconnaissance RF-4Es. Equipped with the TISEO (Target Identification Sensor Electro-Optical) acquisition and tracking sensor, the F-4Es were assigned to 337 Mira 'Ghost' and the RF-4Es joined 348 Mira 'Eyes'. While the new F-4Es were delivered between May



and December 1978, the RF-4Es arrived on Greek soil between September 1978 and April 1979.

Enhancing capability

The HAF acquired its F-4Es as standard without any self-protection electronic countermeasure (ECM) or radar warning receiver (RWR) systems.

In the late 1970s, the HAF searched for suitable ECM. However, in order not to reduce external armament capacity, it was decided to focus on internal systems. Candidates included the Sanders AN/ALQ-126A and the Kuras-Alterman (KA) Digital Integrated Avionic

Suite (DIAS) – also known as ‘ASPEC’ or Airborne Self-Protection and Electronic Countermeasures. While the AN/ALQ-126A was already in use with the US Navy, the DIAS was still under development. After a prolonged and intensive period testing both systems during 1980, the DIAS was selected. As such a US\$19.5m contract was signed with Raytheon (which had acquired KA) for 60 units. The reason Greece opted for the DIAS was mainly financially driven as the costs for the same number of AN/ALQ-126A reached almost US\$30m.

The DIAS consists of an internally mounted software-driven ALQ-187 transponder, along with the ALE-47

Right: **Gods of war! 338 MDV 'Ares' patch worn by the unit's crews**

At least 23 of the PI I jets are known to have been retrofitted with the DIAS.

Avionics Upgrade

After the type had completed more than 20 years' service, Greece launched a study to either replace or upgrade its original F-4Es. Because the Phantom was still a very capable platform and buying new aircraft would be too expensive, it was decided to enhance the combat effectiveness of the PI I and II jets. Although a batch of ex-USAF Air National Guard F-4Es with better avionics was delivered to the HAF in 1991, these airframes were considered less suitable for upgrade due to their age and airframe hours.

In 1993 Greece requested proposals to extend the life of the existing airframes and an upgrade or replacement for the original APQ-120 fire-control radar. Three contenders, Daimler-Benz Aerospace (DASA), Rockwell (now Boeing) and Israel Aircraft Industries (IAI) submitted bids. Greek authorities quickly ruled out IAI because it was involved in upgrading Turkey's Phantoms. That said, DASA's and Rockwell's original proposals did not meet HAF requirements, and both were forced to submit new bids after the initial tender was closed in 1996.

Based on Germany's F-4F Improved Combat Effectiveness (ICE) upgrade, DASA's proposal included the Hughes AN/APG-65 digital multi-mode radar, a GEC Avionics

CPU-143/A air data computer and the Honeywell H-423 inertial navigation system. This would enable the aircraft to carry advanced medium-range air-to-air (A/A) missiles like the AIM-120 AMRAAM. Rockwell's package comprised an update similar to the then-latest USAF F-4E/G versions – including an APG-68 radar equal to that fitted in the Greece's Block 30 and 50 F-16s. In March 1997, DASA submitted its final proposal offering a completely new cockpit suite with multi-function colour displays.

On August 11, 1997, DASA (now EADS) was awarded a US\$317m contract to upgrade Greece's F-4Es; the programme was dubbed 'Peace Icarus 2000' (PI 2000). At the same time Hellenic Aerospace Industry (HAI) was given a contract to complete a Service Life Extension Program (SLEP) to allow Greece to keep its Phantoms flying beyond 2015.

According to the contract, PI 2000 was divided into four milestones. During Initial Operational Test and Evaluation (IOT&E), the prototype modification and flight testing were executed. System integration flight tests (IOT&E1) would be carried out in Germany, while the air-to-ground (A/G) weapon delivery and accuracy tests (IOT&E2) were to be completed in Greece.



The second phase would operationally certify the AUP (Avionics Upgrade Program) – including the Initial Operational Clearance (IOC) – followed by the Final Operational Clearance Recommendation (FOCR). The third consisted of the actual modification of the airframes.

Initially 39 jets were selected, comprising of 29 PI I and 10 PI II airframes; this was reduced to 36 after three were written off. The final element covered ground support equipment, training, supply of spare parts and documentation.

The updates were complex: a new avionics suite, including a MIL standard 1553B digital data bus interfaced with a modified Hughes AN/APG-65GY radar; a Collins AN/APN-153Y TACAN; a Hazeltine AN/APX-113(V) Advanced Identification Friend or Foe system and a Have Quick II type Magnavox AN/ARC-164 communication system, data transfer and video recording systems. Introducing new avionics and sophisticated mission software increased crew workload, so an advanced Human-Machine Interface (HMI) was added featuring hands-on throttle-and-stick (HOTAS) controls, colour multi-function displays (MFD), a state-of-the-art head-up display (HUD) and an enhanced audio warning system.



This package, together with the integration of an advanced weapons suite, the Autonomous Free Flight Dispenser System, and an Airborne Laser Designator, gave the updated Phantoms capabilities similar to Greece's fourth-generation F-16 Block 52+.

Two prototypes were selected, one of each original batch delivered. The first – 01523, nicknamed 'Princess of Andravida' – was sent to the EADS Flight Test Centre in Germany to serve as a proof-of-concept demonstrator. With 01523 completing its first post upgrade flight on April 28, 1999, IOC followed in March 2001. In the meantime, the first HAI-modified kit-proof aircraft was rolled out at Tanagra on March 3, 2000. During IOT&E1, several serious software issues were identified that delayed the programme – although DASA managed to fulfil the integration of all specific and advanced weapons, it failed to integrate general-purpose weapons. This wasn't

Above right: **Phantom plyer:** A pilot assigned to 338 MDV performs his walkaround before a sortie. Evident is F-4's sheer size

Right: **Phantom aircrew/groundcrew co-operation** is key for 338 MDV's mission at Andravida. Here, a member of the groundcrew removes the 'pins' from the pilot's ejection seat prior to a sortie

Below right: **The pilot of this F-4E AUP** watches his instruments come alive as he starts the jet for a training sortie. Note the 339 Mira patch on his shoulder, which carries a rather uncompromising motto!

One of the original 'Peace Icarus I' jets delivered to Greece, McDonnell Douglas F-4E (AUP) 01508 taxis off the 'last chance' point at Andravida following a local sortie. Note the Litening pod under the port intake



Right: With the Aegean sun showing off the type's three-tone grey and blue wrap around 'Ghost' scheme, F-4E AUP 71750 pops its 'chute after a training sortie out of Andravida

Far right: A 338 MDV Phantom taxis for the active at Andravida carrying an AGM-65 Maverick air-to-ground drill round under starboard wing. Air-to-ground makes up some 70% of the unit's sorties

helped by the lack of proper installations in Greece to measure accuracy, meaning some elements of the IOT&E2 A/G weapon tests had to be carried out in Germany. In July 2001, several sorties with inert Mk.82 and BDU33 bombs were flown from Rheine-Hopsten to the German Armed Forces test range in Meppen. After 154 test flights, the 'Princess of Andravida' returned to Greece towards the end of 2001. With the IOT&E2 completed in February 2002, FOCR followed eight months later.

Greek Odyssey

With support from EADS, HAI upgraded 35 F-4Es to PI 2000 standard. Phantoms that had not been through the SLEP before the update received both their structural and avionics upgrade at the same time. Two post modification test flights were then carried out – a functional check flight to assess basic systems and the other to verify the new avionics. With the first AUP handed over on December 18, 2002, it signalled the start of the HAF's 117 Combat Wing re-equipping with upgraded F-4Es. With 338 Mira assigned 15 airframes and 339 receiving 21, the final example was delivered in October 2005.

Pilot conversion to the new variant took about four months, with the first devoted to ground school, followed by three-months flying training. To help familiarise the crews with the new cockpit, Elbit developed a dedicated flight simulator dubbed the 'Cockpit Trainer'. In operating the F-4E (AUP) equipped with its new multi-mode radar, the Rafael Litening II targeting pod and new armament, both 338 and 339 Mira focused on their primary assigned missions – ground attack and air defence respectively. This continued until October 31, 2017, when 339 was disbanded and merged with 338 to form a multirole Mira Dioxis Vomvardismou (MDV) – or Fighter Bomber Squadron. Subsequently, the unit



has devoted around 60% of its sorties to A/G and 40% to A/A. It is reported that 338 MDV currently has some 25 jets on strength. However, some of these are used by the MEAE (Moira Ekpaidefsis Aéros Kai Edáfous or Flight and Ground Training Squadron) at Andravida.

MEAE's mission

Aviators selected to fly the Phantom are first assigned to the MEAE as a co-pilot – or 'back seater'. When they acquire the necessary flying hours to be deemed combat-ready, they move to the front seat.

The 'back seater' course is

made up of three phases and takes four to six months, depending on the number of students and aircraft availability. Typically there is one class a year starting in the summer.

The first phase, a month-long 'ground school', teaches students about the aircraft structure, systems, performance, limitations and regular and emergency procedures. The latter also examines the underlying logic and why certain steps are necessary in a particular order to create a 'specific way of thinking'.

The last part of this phase is dominated by simulator training. Each student is allocated six 'sim' sessions covering ground procedures, including the complete start-up and take-off sequence, along with groundcrew co-operation. The students are tested before progressing.

Phase two sees a gradual introduction of procedures to give students familiarity in operating a combat aircraft, and how to respond to system malfunctions and emergency situations to ensure the aircraft's

and crew's safety – both in peacetime and wartime conditions.

With the quantity of avionics in upgraded F-4 making it quite a challenge for inexperienced co-pilots to gather needed data, the sim is a perfect tool to learn how to do it in the most effective way possible. Students receive 20 hours of simulator training across two weeks, before proceeding to the third phase. These hours will be used to train standard procedures, 'flow patterns' and the use of various systems, with further emphasis on system malfunctions and emergencies.

Sixty hours are 'flown' in the sim, including two 'check rides' to evaluate the handling of both standard and emergency procedures. The remaining 'sim hours' are used to prepare for both A/G and A/A sorties.

The final phase is the actual flight – or basic training – which takes on average three months. Students fly 30 hours from

Left: Since October 31, 2017, 338 MDV are the HAF's sole Phantom operators



"The inconvenient position and jet's sluggish response to the rear stick, makes it even more difficult to fly"



the backseat with the objective of testing and improving their skills and abilities in the air. However, first flights in the Phantom are not always pleasant for ab initio co-pilots as Maj Karachalios, flight commander and MEAE instructor points out: "One of the main issues during their first flights is sickness caused by the combination of full flight gear, an upright seat and exposure to G forces during unexpected manoeuvres. It is likely that stress to perform well also contributes to the physical problems experienced during these initial flights." He continued: "Next to sickness, a total loss of situational awareness – or SA – is also common, which means they are unable to process any more information. When the instructor is aware of such a situation he will fly straight and level, enabling them to remove their mask, provide conditioned air and give them time to relax."

To prevent future co-pilots becoming

disorientated and losing SA, more tasks and scenarios are gradually added. Flying the Phantom from the backseat is a challenge due to the cockpit architecture allowing only limited visibility. The inconvenient position and the jet's sluggish response to the rear stick make it even more difficult to fly, so co-pilots must first learn how the aircraft reacts to the movement of the stick. During the first eight flights the co-pilot 'has the controls' while the instructor teaches basic flight and aerobatic manoeuvres. However, the main focus during initial flight training is to learn how to land the aircraft from the back seat. Forward vision is provided by a HUD repeater that generates the same view displayed on one of the MFD screens; ground reference is judged by looking sideways following touchdown. The co-pilot has to manage the delays of control input when configuring the aircraft for landing, while also maintaining the

correct speed and approach angle. For crew safety reasons, the future co-pilot also learns to fly in formation should the need arise for assistance from a 'wingman' during both approach and landing.

The next 12 flights are dedicated to A/G training with emphasis on low-level flying and bombing – including terrain awareness, navigation, general combat manoeuvres, using the radar, how to operate the various targeting systems and weapon release techniques. On joining 338 MDV, crews will learn more in-depth subjects including advanced weapons and how to avoid enemy threats. Low-level training flights conducted by the MEAE are limited to 500ft above ground level (AGL); 338 MDV are cleared as low as 300ft.

Night flying training comprises three sorties. The new co-pilots learn to avoid disorientation, including being distracted by afterburners during nocturnal departures. ►

With its J79-GE-17C engines each kicking out some 17,900lb st, F-4E (AUP) 71758 gets airborne from Andravida. Note this jet lacks the rear-facing tail mounted RWR antenna, meaning this Phantom has been updated with Kuras-Altman's Digital Integrated Avionic Suite



Right: **An original Peace Icarus I jet upgraded to AUP standard – 01528 – drags its 'chute back to 338's flight line following an instructor-led sortie**

Next is basic A/A training, which entails ten sorties, each with increased difficulty. Starting with straightforward air combat manoeuvring (ACM) and 1v1 interceptions, these are followed by more complex defensive and offensive scenarios, including 1v2 and 2v2 at both high and low altitudes. Students are also exposed to basic fighter manoeuvres (BFM) and how to co-operate with the 'front seater'.

Throughout the 'back seater' course, the importance of proper crew co-ordination is stressed. Maj Karachalios explained: "Good crew co-ordination is important in maintaining SA when it comes to flying the aircraft, accurate navigation and performing weapons release at the right moment." After MEAE, the new co-pilots transfer to 338 MDV with a specific mindset crucial to safely operate the aircraft as a crew. "As co-pilot you don't have the responsibility of the aircraft and it is easy to fully rely on the pilot," said Karachalios. "We teach them not to rely solely on the pilot, but to be vigilant at all times. In the past there have been at least three mishaps where the 'back seater' initiated the ejection and saved the crew."

'Gods of War'

On joining 338, co-pilots continue training for another three to four months before being considered combat-ready. The duration of this follow-on course depends



on the availability of aircraft, instructor pilots (IP) and the weather. The new co-pilots are mentored by an experienced 'back seater'. The philosophy not to allocate instructors is mainly driven by age, as Maj Backalakos, a 338 MDV IP explained: "It is believed that young co-pilots and experienced co-pilots closer in age will work well together and understand each other better compared to the older IPs. The new co-pilots are educated in flight by instructors and experienced pilots, but what they know is mainly from the books and the older co-pilots." The syllabus is mainly focussed on A/G. First the co-pilots learn how to use general-purpose weapons. Later, they

will be taught how to use more specific weapons such as laser guided bombs and the Litening pod – the squadron's primary weapon systems. Use of the special and general-purpose weapons will come during the final stage of the A/G phase.

When the co-pilots have gained a broad knowledge of A/G, they will move on to A/A. Although not 338's primary task, it is an important aspect as Maj Backalakos revealed: "If you encounter enemy aircraft during an air-to-ground mission, air-to-air skills are required to fight them off in order to survive – so it is important to know air-to-air as well." Defensive aerial combat training will work

One of one of two airframes delivered to the HAF in June 1976 as attrition replacement for F-4E 01506, which was written off in a landing incident at Heraklion on July 21, 1974, 01618 is seen carrying a GBU-16 Paveway II laser-guided bomb





The brutish and unmistakable lines of the Phantom are clear in this head-on study. Note the four-nose mounted IFF antennas in front of the windshield (dubbed 'bird slicers') and the RWR antennas for the DIAS on either side of the air intakes



up to 2v2 engagements as low as 300ft. Major Backalakos continued: "There are restrictions in air-to-air engagements under 5,000ft, but flying below this altitude is essential for our training. We are trained to deliver bombs in enemy territory and flying close to terrain is the best way to avoid – or at least delay – detection by the enemy. However, if an interceptor finds us, he will most likely descend to face us. Due to missile limitations when intercepting low-level targets, we will most likely engage in dogfights below 5,000ft."

The co-pilots learn how to use their knowledge and improve co-operation with the pilot to become a successful crew.

Right: The MEAE – or Flight and Ground Training Squadron – is responsible for the F-4s co-pilot, pilot and instructor pilot training



Important tasks include monitoring the pilot's manoeuvres during ACM and to keep him updated on the 'bandit's' position by using strict communication. By doing this, they enhance the pilot's SA during an engagement. "The Phantom's two-man crew is a major advantage compared to single pilot operation like the F-16 where it is easier to lose SA," said Maj Backalakos. After evaluation of the co-pilot's capabilities during the locally held Exercise Ierakas, he or she will be declared combat-ready.

'Swapping' seats

After three to four years as a 'back seater', the co-pilot returns to the MEAE to be trained as a 'front seater'. This typically takes around eight months. On this course, the new pilot will log 80 flight hours – 70% of which is dedicated to A/G training. Although an F-4 co-pilot will have accumulated more than 500 flight hours, they will not have developed flying skills and other knowledge crucial for flying, so they need to refamiliarise themselves with the type's characteristics – using the more sensitive stick in the front. The initial seven flights of the training syllabus encompass ten hours purely focused on aircraft handling and landings. The Phantom is a rather demanding aircraft as the needed control inputs change during the course of the flight. "The centre of gravity is shifts continuously due to the fuel burn, while different factors influence the engine performance such as temperature, altitude and humidity," said Maj Karachalios. "Energy management is important throughout – it's vital not to lose power too quickly while conserving the energy. Once you lose speed, the F-4 becomes difficult to handle." In order to preserve energy and speed for

the next manoeuvre, the HAF's Phantoms are limited to 5G.

During the eighth flight, the student pilot has to prove they can land the aircraft with an experienced co-pilot in the back, instead of an IP. The rest of the course is primarily dedicated to BFM up to 2v2, advanced fighter tactics (AFT) and A/G tactics, including using the nose-mounted M61A1 Vulcan canon. Mainly used in Close Air Support missions, it is also a last line of defence when facing enemy aircraft.

The AFT element includes four-ship attack profiles,

low flying, advanced manoeuvres and flying at high altitudes and slow speeds. With BFM primarily taught for self-defence, Maj Karachalios pointed out: "If you are caught, you have to be able to survive in the arena." Night flying sorties primarily focus on A/G

and are usually flown when the pilots have completed two-thirds of

their training. All night flights are conducted under special visual flight rules down to 500ft AGL without the use of night-vision goggles. Initially, the focus is on landing the Phantom in darkness. At night, the pilot has to rely on his co-pilot for navigation and positional awareness, while constantly looking outside to avoid disorientation. "The pilot 'creates' his own embedded NVG," major Karachalios explained. "By continuously looking outside your eyes adjust to darkness and, after some time, it will be like flying in daylight. It is important to get confidence in attack manoeuvres in darkness, like a 30° dive, and the use of visual references to search for the target."

When conducting formation flights at night, different flight levels are used for safety; in the event of conflict the jets would operate at the same level.



Right: A trio of HAF 'Ghosts' streak towards the Aegean Sea during a low-level training sortie in the hands of MEAE IP and students

Far right: Almost 50 years after the type's deliveries, Andravida is one of the few Phantom strongholds worldwide today with 25 of the potent jets still present. Here, a sheltered F-4E AUP awaits its next night sortie

After successful completion of the MEAE training syllabus, new pilots return to 338 MDV for a period of advanced A/G and A/A training – with emphasis on tactics and co-operation with their co-pilots. To ensure the A/A training is realistic, the trainee gets the opportunity to fight against other types of aircraft – like the F-16 or Mirage 2000 – during Exercise 'Ierakas'. The A/G training sees more complex mission profiles of up to four aircraft, with an A/A element for self-defence. The new pilot is evaluated by the squadron leader, mission officer and two IPs responsible for planning and training such a mission. When cleared as 'combat-ready', the pilot is able to fly in mixed-packages of more than four aircraft. Complex scenarios can involve up to 30 aircraft, depending on the mission type.

To become an IP, applicants need a minimum of 500 hours as pilot in command. Although selection requirements exist on paper, all pilots meet the criteria. Depending on the need, pilots are appointed to start training at the MEAE. The course includes 15 hours in the 'back seat' with emphasis on determining the right moment to intervene in order not to compromise safety. The course takes two months and is relatively slow due to the responsibilities involved and the amount of preparation. Once back at 338, the IP can train both experienced pilots and co-pilots from either seat.

'Fly low, hit accurate'

The merger with 339 was important for 338, as the same aircraft were used in a different way before. Different mindsets and views associated with each squadron's principal role, were brought together in a way that was beneficial to the crews and the Phantom's efficiency. The former 339 pilots required training in A/G and the use of special weapons, while 338's pilots benefited from the A/A knowledge passed on in return, all of which improved the overall skills of the crews.

Today, special attention is given to low flying to teach crews how to exploit terrain. However, low-flying missions require



careful preparation: primarily for noise abatement and welfare of inhabitants, they are only conducted during the day.

The standard low-flying routes in Greece are located across the Peloponnese peninsula and the mountain ranges at Pindos and Thessalian.

Although A/G training is typically simulated, several ranges are available to conduct weapon training, three of which 338 frequently uses. The closest – known as 'Kastro' – lies just nine miles south of Andravida and is used to train with general-purpose weapons and the M61A1. At

'Kronea', northwest of Larissa, targets include surface-to-air missile sites, vehicles, buildings and a dirt runway. However, before attacking the runway at Kronea with real weapons, 338's Phantoms will simulate strikes on nearby airfields – including Kalamata or Araxos.

The range at the Karavia Islands, located between the Peloponnese Peninsula and the island of Milos, consists of two small uninhabited, rocky islands and is used for live ordnance.

For one week every three to six months, depending on the availability of munitions, 338 will use Karavia, with the aim of verifying weapon accuracy. Despite its upgrades, the Phantom is an aged platform and regularly requires adjustments to its weapon delivery systems.

In general, there is not much difference between simulated and live weapons delivery; however simulated munitions are more difficult to assess in terms of

accuracy, while the Phantom is far more agile without a war load.

While practice bombs generate smoke on impact, no actual weapons will be carried during a simulated attack, meaning a computer has to calculate whether you missed or hit the target. The use of live weapons is regarded easier by Phantom



Above left: The patch proudly worn by HAF Phantom IPs

"The Phantom still plays an important part in the aerial defence of Greek territory"



crews. In parallel to its A/G role, 338 also conducts maritime strike in co-operation with the Hellenic Navy.

Although ageing, the Phantom still plays an important part in the aerial defence of Greek territory. The AUP greatly enhanced the Phantom's mission effectiveness by the implementation of a sophisticated

radar, new sensors, and advanced weapon systems. As such, the F-4E (AUP) can even compete with more modern aircraft like the F-15 Eagle or F-16 Fighting Falcon. While the type's retirement is believed to be connected with the future availability of an adequate number of F-16Vs, a more specific timeframe has not yet been disclosed. Given

the fact that co-pilots are still being trained by the MEAE and progress to the front seat takes an average of four years, it is expected that the Aegean 'Ghosts' will defend the Greek skies for some time yet.

The authors would like to thank Maj's Karachalios and Backalakos for their help and support in preparation of this article. **AN**



With the sun setting, a pair of Hellenic Phantoms fly a day-into-night sortie from Andravida

And the winners are...

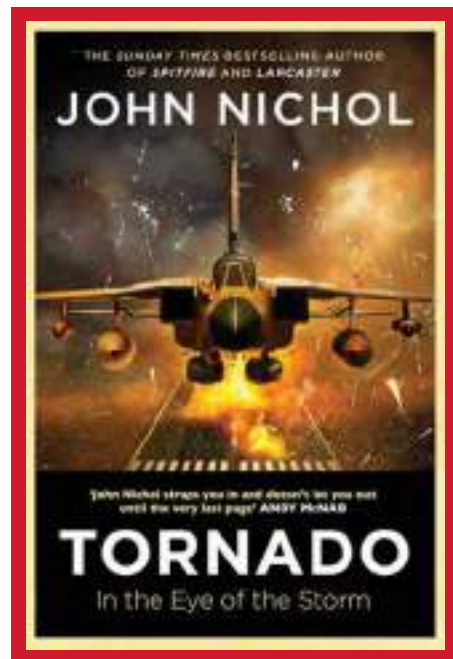
Richard Porter



Andrew Ratcliffe



Chris Bosworth



It gives me great pleasure as the editor of *Aviation News* to announce the winners of the competition to win one of three signed copies of noted career fast jet navigator turned journalist, motivational speaker, and author John Nichol's new book *Tornado: In the Eye of the Storm* are:

Richard Porter

Trusted delivery: You can hear the roar of the Tornado GR4's RB199 engines in Richard's wonderful study of ZA607/EB-X departing Lincolnshire's RAF Coningsby for a sortie while on strength with 41 Squadron. Accepted by the Royal Air Force on July 1, 1982, ZA607 was withdrawn from use in January 2019. Selected for preservation, the jet is now the 'gate guardian' for the Defence Electronics and Components Agency facility at MoD Sealand in Flintshire, northeast Wales

Andrew Ratcliffe

Swept-wing warrior: Andrew caught Tornado GR4 ZD793/091 pulling into the vertical following a 'show of force' during the Tornado Role Demo's appearance at the 2011 Southport Airshow. Flown by aircrew from XV Squadron out of Scotland's RAF Lossiemouth, the two-ship – callsign Poker 1 and 2 – demonstrated the type's tactics and strike capabilities while providing Close Air Support for 'Troops in Contact'

Chris Bosworth

Fairford finale: Bedecked in an iconic Gulf War 'desert pink' paint scheme to celebrate 25 years of continuous Tornado combat operations and carrying a trio of Paveway IIs, Chris Bosworth captured GR4 ZG750 air-to-air on its way to the 2017 edition of the Royal International Air Tattoo at RAF Fairford in Gloucestershire. The show was the final public appearance by the jet nicknamed 'Pinky'

Congratulations to Richard, Andrew, and Chris! And thank you to ALL who entered.
Jamie Ewan



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"It's causing quite a

Aviation News shares images captured by ex-military aircraft specialist Jet Art Aviation, as it made history in North Yorkshire with its newly restored Sea Harrier FA2



"It's causing quite a stir!" Chris Wilson laughed, as we talked all things Sea Harrier. Chris is the managing director of renowned ex-military aircraft specialist Jet Art Aviation (JAA), and the Sea Harrier in question was FA2 ZH798. Chris continued: "Over the last nine months, we have been restoring ZH798 to ground run and taxi. At this moment in time, it is the only example of the type, outside the USA, that lives and breathes!"

The project started in January, when JAA dismantled and removed three Sea Harriers from Royal Naval Air Station (RNAS) Culdrose in Cornwall and moved them to Jet Art's HQ for reassembly and onward restoration. Chris explained: "The aircraft were formerly part of the 'Dummy Deck' at the Royal Navy School of Flight Deck Operations, and were disposed of by the MOD via a competitive tender at the back end of 2020. One of the aircraft, ZH798, was found to be very complete and in great order. It was one of the final UK 'new build' first-generation Harriers and entered service in 1996."

"At this moment in time, it is the only example of the type, outside the USA, that lives and breathes"

When retired '798 had only been in service for ten years and had accumulated just 1,558 hours on the airframe, and boasted a very low fatigue index number. "It was also discovered, during the restoration, that the engine had over 400 hours remaining," revealed Chris. "Storage in a suitable hangar was deemed the only real responsible option, as her new custodians, and hangarage at the former RAF Church Fenton – now Leeds East Airport – was provided by Makin Air." Delivered to Leeds East on February 1, 2021, ZH798 was reassembled and finished

in the 801 Naval Air Squadron markings it wore when last flown.

Chris commented: "Having previously restored a Harrier GR3 back to ground-running standard in 2016, the temptation for us to attempt the same thing with a Sea Harrier was huge. After an in-depth appraisal, ZH798 was found to be the perfect candidate, and, although missing several components, the bulk of the systems were found to be present and in good order." After inspections, systems testing and going through the aircraft with a fine-tooth comb, the first engine runs and leak checks were carried out on September 27. "We ran the jet twice that day and carried out a six-minute taxi test."

With tests revealing a few minor snags that needed rectifying, the second runs were carried out on October 15. "We ran ZH798 twice that day, including a much longer 16-minute taxi test in the hands of a serving RAF pilot – the aircraft behaved beautifully," said Chris.

With a huge amount of money, time and effort having been invested in the project,

a stir!"



Main image: **With the sun setting, ZH7989 cools down following its successful October 15, 2021, taxi test at Leeds East** All images Jet Art Aviation-Chris North unless stated

Right, top to bottom: **Leeds East Airport resonates to the scream of ZH798's Rolls-Royce Pegasus engine on October 15**

Jet Art's Chris Wilson (right) signals Ollie Suckling in the cockpit of ZH798, while running through the functional checks

One chapter closes, another opens: Sea Harrier ZH798 loaded up at RNAS Culdrose in February 2021, ready for its move north Jet Art Aviation-Chris Wilson

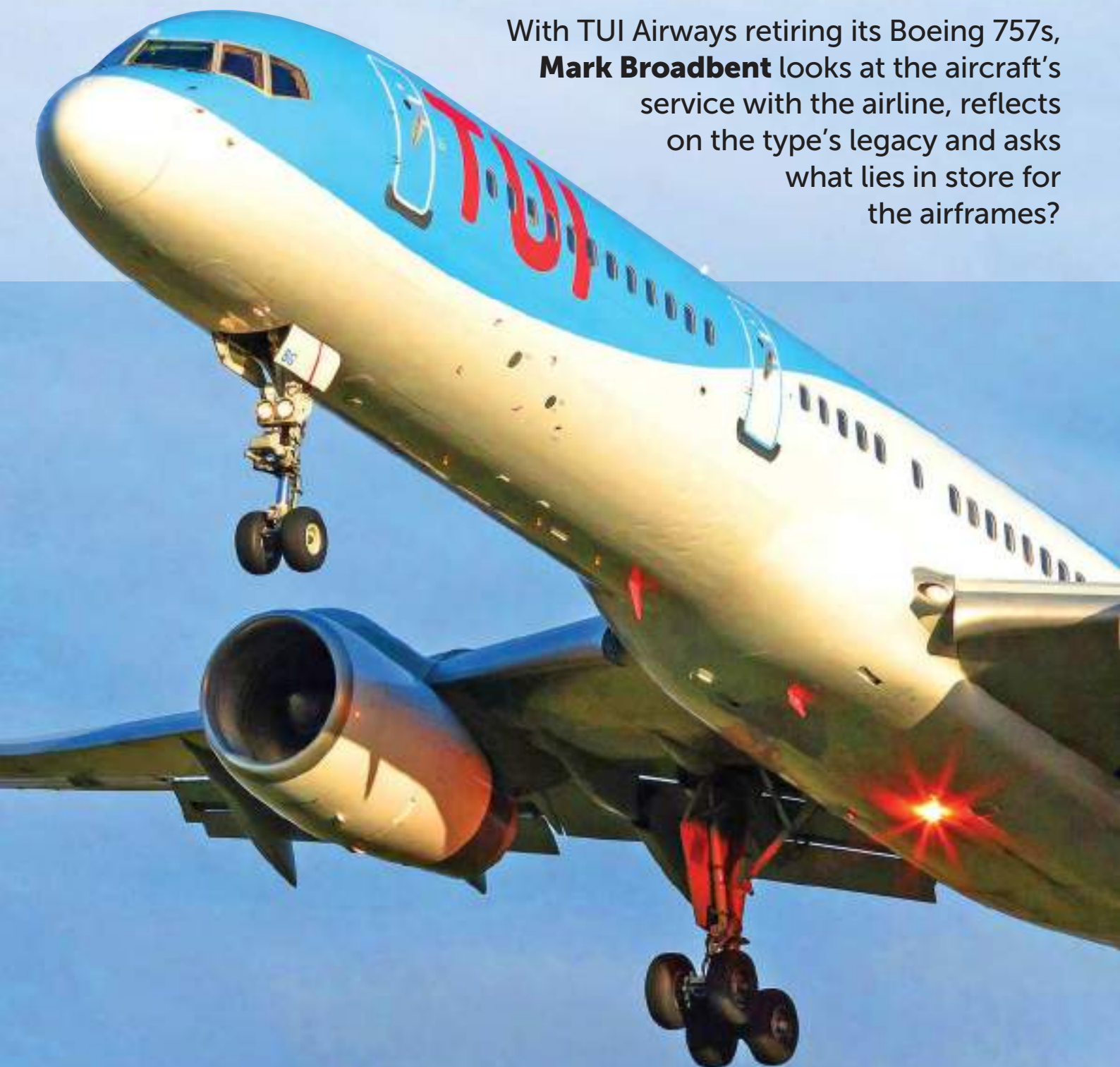
Harrier by night: Having been restored to taxiable condition by Jet Art Aviation, Sea Harrier FA.2 ZH798 is currently for sale Jet Art Aviation-Neil Atterbury

the aircraft is now for sale. Signing off, Chris told *Aviation News*: "We achieved our goal of making the aircraft function once again, and it's now for sale as a ground-runnable Sea Harrier that lives, breathes and moves under its own power." **AN**



'Pocket Rocket' farewell

With TUI Airways retiring its Boeing 757s, **Mark Broadbent** looks at the aircraft's service with the airline, reflects on the type's legacy and asks what lies in store for the airframes?



TUI Airways Boeing 757 G-OOBG flies final for Birmingham Airport on April 4, 2017. This jet officially joined the carrier on October 2, 2017 v1 Images-Paul K Ferry



In early October 2021, TUI Airways retired the last of its Boeing 757s. On October 3, BY4707 from Heraklion, Greece to London/Gatwick was operated by G-OOBP. The next day, BY7723 from Paphos, Cyprus to Birmingham was flown by G-OOBB.

For so many passengers, who associated the 757 with nostalgic memories of jetting off on their holidays, it marked the end of an era. The same sense of loss was felt by the people who flew the type

professionally. Captain Alastair Pease, director of safety, compliance and AOC at TUI Airways Flight Operations, told *Aviation News* the phase-out was "quite emotional. There are many, many people, both with the airline right now and those who have retired or gone on to different jobs, who have really fond memories. It's been a longstanding aeroplane in this airline and others around the world."

It was also a firm favourite with enthusiasts due to its elegant looks,

'Bravo Papa' touches down at MOD St Athan, South Wales, on October 15 for storage. One of three ex-TUI 757s obtained by global investment manager BlackRock, the aircraft will be converted into a freighter Simon Fewkes

sprightly performance and the distinctive whine from its Rolls-Royce RB211s.

A pilot's view

Captain Pease spent seven years flying the 757, first with Air 2000 and later Thomson Airways. He revealed: "It's a great aeroplane. People always say 'If it looks right, it'll fly right'. And that aeroplane looks right and still flies right.

"Empty on a full-thrust take-off, it had very impressive performance. It was benign to fly – although it could be challenging when light at full thrust, but it was very stable. Coming in to land, it was very well behaved and you had a nice balance on the controls. What I liked was how connected you felt – there's very good feedback and confidence in the performance. In pitch, it's quite sensitive; in roll, less so. But it wasn't a case of taking a breath, counting to five and the aeroplane responded – it would do what you wanted it to do when you wanted to do it. In my second year flying the aeroplane, there was a very, very windy day in the UK coming back from Paphos, but the aeroplane behaved remarkably given the conditions.

"I've positioned an aeroplane with two other pilots from Luton to Orlando in one hop. It was empty and filled to the gills with fuel. It was an interesting exercise in fuel management all the way down the [US] east coast, but we got there with fuel to spare, which was really impressive."

"It's very rarely limiting on take-off and therefore [enabled] us to go into some quite interesting places – in the ski programme, for instance, going to Innsbruck and Chamberg. Very rarely did we have to limit passenger loads or make any compromises. When we took people up to Lapland for Santa flights, going in and out of short-runway, mountainous airfields, there was less challenge for pilots than there would be in other aeroplanes.

"It had the advantage of having relatively long legs for a short-to-medium-haul aeroplane – we were able to fly them



Where have TUI's 757s gone?*

G-BYAW c/n 27234	Used from February 1995 by Britannia Airways, Thomsonfly, Thomson Airways and TUI Airways. Withdrawn from use November 2019. Arrived at Lasham in Hampshire on November 11, 2019, and currently awaiting Excalibur testbed conversion (see panel on p33).
G-BYAY c/n 28836	Used from April 1999 by Britannia Airways, Thomsonfly, Thomson Airways and TUI Airways. Withdrawn from use in October 2020. Now owned by Bank of Utah, registered N28836, and currently in Xiamen, China, awaiting freighter conversion.
G-CPEU c/n 29941	Used from May 1999 by BA, then by Air 2000, First Choice Airways, Thomson Airways and TUI Airways from 2002. This jet was also leased to Canada's SkyService Airlines. Withdrawn from use in October 2019. Stored at Shantou Jieyang Chaosan and Goodyear Litchfield before undergoing freighter conversion in China. Operated by SF Airlines as B-20AW since March 2020.
G-CPEV c/n 29943	Used from June 1999 by BA, then by Air 2000, First Choice Airways, Thomson Airways and TUI Airways from 2002 (with leases to SkyService Airlines). Withdrawn from use in October 2019. Stored in Shantou Jieyang Chaosan and Goodyear Litchfield before undergoing freighter conversion. Operated by SF Airlines as B-20EF since March 2020.
G-OOBA c/n 32446	Used from February 2001 by Air 2000, First Choice Airways, Thomson Airways and TUI Airways, again with leases to SkyService Airlines. Withdrawn from use in November 2020 and now in storage.
G-OOBB c/n 32447	Used from February 2001 by Air 2000, First Choice Airways, Thomson Airways and TUI Airways, again with leases to SkyService Airlines. Withdrawn from use in November 2020 and now in storage.
G-OOBC c/n 33098	Used from March 2003 by Air 2000, First Choice Airways, Thomson Airways and TUI Airways. Withdrawn from use in March 2020. Stored at Goodyear Litchfield before undergoing freighter conversion in Chengdu. Operated by SF Airlines as B-220Z since October 2021.
G-OOBD c/n 33099	Used from March 2003 by Air 2000, First Choice Airways, Thomson Airways and TUI Airways. Withdrawn from use in March 2020. Stored at Goodyear Litchfield before undergoing freighter conversion in Chengdu. Operated by SF Airlines as B-220J since March 2021.
G-OOBE c/n 33100	Used from May 2003 by Air 2000, First Choice Airways, Thomson Airways and TUI Airways. Withdrawn from use in March 2020 and stored at Goodyear Litchfield before undergoing freighter conversion in Chengdu. Operated by SF Airlines as B-220C since January 2021.
G-OOBF c/n 33101	Used from April 2004 by First Choice Airways, Thomson Airways and TUI Airways. Withdrawn from use March 2020 and stored at Goodyear Litchfield before undergoing freighter conversion in Chengdu. Operated by SF Airlines as B-220A since January 2021.
G-OOBG c/n 29942	Used from June 1999 by National Airlines as N544NA and from May 2004 as G-OOBG by First Choice Airways, Thomson Airways and TUI Airways, and leased to SkyService Airlines. Withdrawn from use in November 2019. Underwent freighter conversion at Chengdu. Operated by SF Airlines as B-22E9 since April 2020.
G-OOBH c/n 29944	Used from June 1999 by National Airlines as N545NA and from March 2004 by First Choice Airways, Thomson Airways and TUI Airways, as well as being leased to SkyService. Withdrawn from use March 2019 before undergoing freighter conversion in Chengdu. Operated by SF Airlines as B-20CX since May 2019.
G-OOBN c/n 29379	Leased by International Lease Finance Corporation (ILFC) to Balair as HB-IHR from new in April 2000, then to Air Berlin from November 2007. Leased by ILFC and later AerCap to Thomson Airways and TUI Airways from June 2010. Withdrawn from use in September 2021 and placed in storage at St Athan, South Wales, on October 1.
G-OOBP c/n 30394	Leased by ILFC to Balair as HB-IHS from new in April 2000 and then to Air Berlin from January 2008. Leased by ILFC and later AerCap to Thomson Airways and TUI Airways from June 2010. Withdrawn from use in October 2021 and stored at St Athan, South Wales, on October 15.

*NB: These are only the 757s operated by TUI Airways since the airline's 2017 renaming



around the world. In the winter, we converted some of them into a business-class fit and flew them for American customers. One of the other good things was we were able to adapt it. They were retrofitted with GPS and winglets to make them more efficient and satcom and datalink for transatlantic flights. The ability to add all that technology into a 1970s-designed aeroplane was a significant advantage. It really is a fantastic workhorse that did what it was meant to do."

Fleet changeover

Having operated 14 221-seat 757s at one time, TUI Airways began steadily reducing its fleet as new Boeing 737 MAX 8s and 787 Dreamliners arrived, in what Capt Pease calls "a step-change to more modern aircraft in terms of noise, fuel consumption and emissions."

The retirement of TUI's 757s leaves few other UK-based operators. At the time of writing in October 2021, Nottingham East Midlands Airport-based DHL Air operates 23 freighter-converted 757s, comprising 17 -200PCFs, one -200PF and five -200SFs. Low-cost leisure airline Jet2 boasts eight -200s, although the impact of COVID-19 on demand means only four of them are active, with the remainder parked at Manchester. London/Luton Airport-based Titan Airways has -200s G-POWH and G-ZAPX available for charters on an aircraft, crew, maintenance and insurance basis. Titan's 757s have also previously





Above left: **TUI 757 G-OOBP** arrives at London Gatwick from Heraklion on October 3 at the end of her last flight with the airliner Simon Fewkes



Above right: **Before joining TUI in October 17, G-BYAY served with both Britannia and Thomson. She is seen here landing at Bristol International Airport on October 7, 2007, bedecked in Britannia's incredibly smart scheme** KEY Collection

backfilled capacity for other operators – for example, Jet2 leased G-POWH in both 2016 and 2018.

An era of 757s

It is a far cry from the days when 757s in TUI livery and its forerunners were commonplace at the major 'non-London' UK airports such as Manchester, Birmingham, Newcastle, Bristol and Glasgow.

Britannia Airways operated 24 757-200s, the first arriving in 1991. Monarch Airlines flew 11 -200s from 1983 to 2015, British Airways (BA) subsidiary Caledonian Airways had seven -200s in 1988-1998 and Air Europa operated seven -200s from 1983 until the airline's demise in 1991.

Manchester was a focal point for 757 activity thanks to Britannia, Monarch, Caledonian and Air Europa services, and as the base for Air 2000, Airtours International and Flying Colours Airways. Four of Airtours' six examples had previously flown with the Cardiff-based Inter-European Airways from 1987 to 1993.

The waves of travel industry consolidation meant that UK 757s changed in appearance over the years. Acquisitions by Thomas Cook AG resulted



Captain Alastair Pease of TUI Airways Flight Operations: "It is a fantastic workhorse that did what it was meant to do" Via Alastair Pease

in the 2000 merger of Caledonian and Flying Colours into JMC Airlines, itself rebranded as Thomas Cook Airlines in 2003. Air 2000 became First Choice Airways and Airtours was rebranded as MyTravel Airways. The TUI Group's acquisition of the Thomson Travel Group meant Britannia's 757s received new colours from 2004, with the Britannia name disappearing a year later when it was renamed Thomsonfly. The 2007 merger of Thomas Cook AG and MyTravel Group resulted in MyTravel Airways being subsumed into Thomas Cook Airlines, which ceased operations with the collapse of the Thomas Cook Group in 2018. Thomson Airways was formed in 2008 by merging Thomsonfly and First Choice Airways. As a result the jets were repainted into the summery blue and white 'Dynamic Wave' livery. Thomson Airways was renamed TUI Airways in 2017.

Another memorable moment in the type's history came courtesy of Astraes Airlines, operational between 2002 and 2011, which used five 757-200s for ad-hoc charter services.

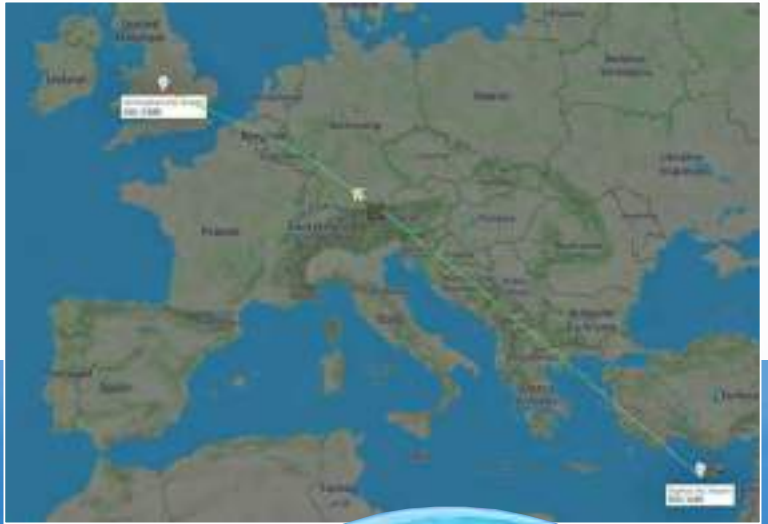
Bruce Dickinson, front man of the heavy metal band Iron Maiden was one of its 757 captains and, in support of the ►

Delivered new to British Airways on May 1, 1999, G-CPEU is pictured on approach to Zurich, Switzerland, on February 6, 2000, bearing the carrier's 'China World' livery. The aircraft went on to join TUI on October 2, 2017 KEY Collection



Right: The route flown by G-OOBB during TUI's last ever 757 service on October 3, according to data available from US-based global real-time flight tracking and data service provider AirNav Systems AirNav RadarBox

Below: TUI's G-CPEV turns onto the runway at Greece's Skiathos Airport under the deep blue skies of the Aegean on May 31, 2019. Leased by the carrier from Dublin, Ireland-based Avolon, it was returned to them in November 2019 as N223SA
v1 Images-Aleksis Hämäläinen



With Austria's Nordkette mountain range forming a backdrop, TUI's G-OOBA powers out of Innsbruck-Kranebitten Airport on February 1, 2020. Withdrawn from service in November that year, the aircraft is currently reported as being in storage, having been leased by US-based Castle Harbour Leasing KEY Collection





band's 2008/2009 tour, G-OJIB (now N938FD with FedEx Express) gained special markings. Nicknamed 'Ed Force One' in honour of 'Eddie', the band's skeletal mascot, it was flown by Dickinson himself. Another Astraeus 757, G-STRX, later received a different Iron Maiden scheme before its withdrawal and subsequent scrapping in 2011.

The holiday aircraft

Most people associate the 757 with holiday flights, for which it was ideal.

The 757 offered a mix of around 200-280 seats (up to 230 in the -200 variant and 280 in the larger -300), a range of up to 3,915nm in the -200 and 3,400nm in the 300, extended twin-engine operations – or ETOPS – clearance, useful payload (57,160lb on the -200, 68,140lb on the -300 and 84,420lb for the freighter) and short-field take-off and landing capability.

John Strickland, director of London-based JLS Consulting, told *Aviation News*: "It's proven to be very adaptable, both in

'Ed Force One', the second of two Astraeus Airlines 757s used by British heavy metal group Iron Maiden as a tour bus, G-STRX supported the band's 'The Final Frontier World Tour' in 2011. It was piloted by the band's lead singer, Bruce Dickinson KEY Collection

Excalibur

One ex-TUI Boeing 757 will have a unique new life. Built in 1995, G-BYAW was purchased by innovative aviation service provider 2Excel Aviation and is currently at Lasham, where it will be completely overhauled internally and converted into a testbed named Excalibur. Expected to fly again in 2023, 2Excel will operate Excalibur for Leonardo to support the development of integrated sensors and communications systems for Tempest, the UK's Future Combat Air System. According to a September 2021 Leonardo statement, Excalibur will be a "real-world environment" to develop complex technology, adding that the aircraft could also serve as a control hub for uncrewed platforms undergoing tests.

the high-density way that charter operators like TUI used it on short flights, a couple of hours down to Malaga or somewhere, and longer routes across to the Caribbean."

Although the 757 is synonymous in the UK with leisure airlines, BA was the joint launch customer with US carrier Eastern Air Lines. British Airways operated 61 examples between 1983 and 2010. Strickland noted that, for BA, the 757 was "good for high-volume European routes [to] places like Paris, Milan and Rome and great on domestic routes like the Shuttles, where you wanted to take lots of people in one go. Better to fly a 180-seater than something with 140 seats and then put [on a separate flight] and carry another 50. It was very versatile."

All these operations made the 757 a UK aviation fixture. It whisked people to the capital for business, the Med for summer breaks and the Canaries for winter sun. It took skiers to the Alps, flew to the Arctic Circle on festive specials and went transatlantic to the azure Caribbean ▶



Agile airliner

Adding to the 757's popularity among UK enthusiasts is the type's airshow-flying history, although TUI Airways never showed off its jets in this way.

Air 2000 flew aircraft at the 1991 and 1994 Manchester Airshows at Barton and the 1992 Airshow Europe at North Weald (that year's show being renamed Fighter Meet) in close formation with two Spitfires.

Airtours International displayed 757s at the Southport, Woodford, Southend and Jersey shows during the late 1990s and 2000, flying in formation with the Red Arrows at the last of these events.

DHL Air's 757s appeared at Southend, Biggin Hill, Cosford, Eastbourne and the Royal International Air Tattoo (RIAT) in 2005, then again at RIAT in 2012.

The Royal New Zealand Air Force's 40 Squadron has made a huge effort to fly its 757-2K2s halfway around the world to the UK several times: for RIAT (2003/2009), Waddington (2006/2012), Kemble (2006) and RAF Cosford (2018).

Performing tight 360° turns, flaps/gear-down passes, medium-speed fly-bys and steep climbs, the DHL, RNZAF and Airtours displays showed off the 757's graceful lines, top surfaces and power while being accompanied by the type's distinctive whine.

Right: With the retirement of TUI's 757s, DHL Air is now one of just three UK-based carriers operating the sleek Boeing type – including G-DHCF, seen here during the freight carrier's salute to healthcare and logistics workers for keeping crucial infrastructure operating at the height of the COVID-19 pandemic DHL

Below: Delivered to First Choice Airlines on April 19, 2004, G-OOBF is seen departing Manchester Airport on August 6, 2009. By then it had joined Thomson Airways. It was handed over to TUI in October 2017 Scott Wright



waters. Air travel is luxury not routine for most, so the public's affection for this iconic aircraft is unsurprising – for many travellers it represents past times, trips and places.

More retirements

TUI is among several carriers to have recently retired the 757, along with Aer Lingus, Air Astana, American Airlines and French boutique airline La Compagnie.

American had intended to keep its examples flying until the mid-2020s, but the impact of COVID-19 hastened the airline's fleet renewal efforts and led to a faster withdrawal.





Following its withdrawal from TUI in October 2018, G-CPEV was converted for use as a freighter and joined China's SF Airlines. It's pictured here shortly after delivery on July 19, 2020. The jet was the 60th aircraft to join the cargo carrier's fleet **SF Airlines**

All of these carriers' 757s have been replaced by the Airbus A321neos (new engine option) family, notably the forthcoming XLR (extra-long range) variant. Similarly, Titan has plans to retire its 757 examples in favour of A321s, while

'Thin' routes

None of this means that 757s will disappear completely. Delta Air Lines still has 129, while Icelandair operates 23, including the distinctive TF-FIU 'Hekla Aurora', TF-FIR 'Vatnajökull' and TF-ISX 'Thingvellir'

"Air travel is luxury not routine for most, so the affection for the aircraft is unsurprising"

Jet2 ordered 36 A321neos in September 2021 to replace its all-Boeing fleet from 2024. United Airlines signalled the end for its 61 757s in its latest fleet plan after placing a 270-aircraft order for A321neos and 737 MAX 9/10s; the first of these are expected in 2023.

depicting the Northern Lights, a glacier and Iceland's national colours respectively. Other major operators include Condor (13 -300s) and Azur Air (eight -200s) and its sister carrier, Azur Air Ukraine, with two.

One reason why 757s endure is that, despite the efficiency of newer aircraft

(Airbus claims the A321XLR burns 25% less fuel than a 757), they have lower ownership costs, having been in service for longer.

For the US majors, the 757 remains well suited to their transcontinental trunk routes between the east and west coasts and 'thin' transatlantic services to 'secondary' European destinations such as Manchester or Edinburgh. As Strickland explained, these niche routes are where "there's not as much demand, but [airlines] want to operate a non-stop service". For smaller operators, the 757's payload/range capabilities still mean it's very useful for niche missions, as Titan showed in 2020 and 2021 by flying one of its aircraft to the remote Atlantic Ocean island of St Helena.

'Perfect freighter'

Numerous converted 757s also continue to fly as freighters worldwide. A February 2021 IBA consultancy analysis described the 757 as "the pre-eminent freighter aircraft with a fleet of 298 aircraft", including the 114 jets with FedEx Express Airlines, 69 at UPS Airlines, 37 with China's SF Airlines and 23 with DHL Air.

There is continued appetite for 757 conversions. Ten -200s underwent the change in 2020, while 20 more are due to follow by the end of 2021. The 757 is "going to be around for a very long time" as a freighter, said Robert T Convey, senior vice-president at Aeronautical Engineers Inc, during the October 2021 IBA presentation, *The Future of the Passenger to Freighter Conversion Market*.

Convey noted: "I think it's the perfect freighter. It's got the right legs [range], the right payload, the right structure." On that note, many former TUI 757s now fly cargo, mostly with SF Airlines. In fact, a June 2021 CH Aviation report revealed global investment manager BlackRock has acquired the carrier's last trio of 757s – G-OOBB, G-OOBP and G-OOBN – for conversion. Seattle's 'Pocket Rocket' will be a familiar sight for many years yet. **AN**

Left: This digital rendering shows what the future holds for former TUI 757 G-BYAW. Dubbed Excalibur, the aircraft is currently undergoing conversion to support the development of integrated sensors and communications systems for Tempest, the UK's Future Combat Air System Leonardo



Midsized matters



Back in 2015, Boeing proposed a new concept to fill the 'middle of the market' gap between narrowbody and widebody aircraft in its portfolio to succeed the 757. So where is the New Midsize Airplane? **Mark Broadbent** reports

During the 2010s there was increased focus on how and when Boeing and Airbus might offer a new 'middle of the market' aircraft, which until recently was dominated by the US aviation giant's unmistakable 757.

Broadly speaking, the term 'middle of the market' – widely used by analysts, media, and manufacturers – refers to a twin-engine, single-aisle (or narrowbody) airliner boasting between 220 to 300 seats and a range of around 5,000 nautical miles (nm).

The 'middle' denotes how this capacity and range configuration fits between Airbus' largest A320 and Boeing's 737, which offer 180 to 240 seats and a range around 3,000nm, and the smallest twin-aisle (or widebody) jets – the A330 and 787-8 – which typically boast 240 to 330 seats and a 7,000nm range.

'Growing need'

Boeing researched the business case for a 757 replacement from the mid-2010s through its New Mid-market Airplane (NMA) studies. It should be noted, the 'M' can also stand for 'Midsize' – the two terms are used interchangeably.

Steven Udvar-Hazy, CEO of the lessor Air Lease Corporation – long an influential voice in shaping aircraft manufacturers' product decisions – was quoted by *Aviation International News* at the 2017 International

Society of Transport Aircraft Trading conference in San Diego, California as saying: "You have to look at infrastructure, airport constraints, capacity constraints, frequency constraints, and then see if you



Irish flag carrier Aer Lingus' currently has eight A321LRs in service – including A321LR EI-LRA, seen here on July 26, 2019, departing on its delivery flight Airbus

can superimpose an airplane that's between the 787-8 and 737, or between the A330 and A321. There will be a growing need for an airplane in that category."

During that year's Paris Air Show, *FlightGlobal* quoted Domhnall Slattery, CEO of Irish-based lessor Avolon: "There's no question in our mind, and has been for a long time, that there's a very significant opportunity in terms of market size."

Enthusiasm for a fresh mid-market aircraft was unsurprising given the 757 was designed through the late 1970s and early 1980s (the prototype flew for the first time on February 19, 1982) and Boeing stopped building it in 2005. During the 22 years of production 1,089 examples rolled off the production line.

"Call it a 797"

In 2017, Udvár-Hazy was quoted as saying of the potential new midsize Boeing: "Call it a 797". The manufacturer itself did not do so, using only the NMA moniker when talking publicly about the concept.

Not that Boeing gave many specifics about the notion in public other than limited information, such as that given during a 2017 Paris Air Show presentation about new aircraft development.

It revealed the NMA would feature a 'fifth-generation' wing, a hybrid fuselage cross-section, a new-generation efficient turbofan engine, extensive use of carbon fibre composites and digital architecture.

Asked further by this author at the time, a Boeing spokesperson replied: "It will carry between 220 to 270 passengers with a range of up to 5,000 nautical miles. We're looking to provide twin-aisle comfort with single-aisle operating costs."

The following year Boeing told the author: "We don't see the next new aircraft, if we do middle of the market, as being a 'technology push' aircraft. There is significant technology reuse on things

like composites manufacturing and we would be more focused on manufacturing transformation for the NMA."

Clean sheet approach?

As the talk about the NMA was brewing, Boeing trailed 2025 as a possible service-entry date for the new jet – prompting speculation among analysts and media that the company might launch an NMA at an upcoming edition of Paris or Farnborough.

In March 2018, *The Air Current* reported that Boeing's concept studies were focused on two variants, a 225-seat model called the NMA-6X with a range of

"Enthusiasm for a fresh mid-market aircraft was unsurprising given the 757 was designed through the late 1970s and early 1980s and Boeing stopped building it in 2005"

5,000nm and a larger version, the NMA-7X, with 275 seats and a 4,500nm range.

In a mid-2018 statement, the aviation giant told the author that it was "diligently working" on its NMA concept, confirming discussions had been held with more than 60 operators on "both the business case and technology solutions" for the new aircraft. In June 2018, at an event at the National Press Club in Washington DC, Delta Air Lines CEO Ed Bastian revealed:

"We've had discussions with Boeing about being a potential launch customer." In the end, nothing happened.

The 737 MAX's grounding following the Lion Air and Ethiopian Airlines disasters in October 2018 and March 2019 respectively, together with delays to the forthcoming 777X and 787 production issues, meant an NMA launch dropped down the firm's agenda. In early 2020, Boeing president and CEO David Calhoun confirmed during the manufacturer's Q4 2019 earnings call that designers were "going to start with a clean sheet of paper" for a midsize product.

Speaking to *Aviation News* John Strickland, director of the consultancy JLS Consulting, remarked: "Had [Boeing] not had the massive challenge of the MAX and the issues that need to be addressed on the 787, they might have done it. Then of course COVID-19 dealt another blow."

Longer-range A321s

In the meantime, Airbus sought to address the 757 replacement/mid-market requirement by launching new longer-range variants of its A321 'new engine option' – or neo – with increased maximum take-off weight (MTOW) and fuel capacity.

First came the A321LR (Long Range), which with a range of 4,000nm can fly further than the baseline A321neo's 3,200nm. Flying for the first time on January 31, 2018, the 'LR' received its regulatory certification on October 2, 2018.

Arkia Israeli Airlines was the first carrier to put the variant into service the following month, with Aer Lingus, Air Transat, Gulf Air, TAP Portugal and Scandinavian Airlines among others, introducing it since.

Airbus then launched the A321XLR (Xtra Long Range) during the 2019 Paris Air Show. With a range of 4,700nm (around 15% more than the LR), the XLR is the



Right: **Boeing intends to use the NMA to fill the evident gap between its 737 and 787 twinjet families** Boeing

Below right: **Boeing's then vice president and general manager of airplane development, Mike Delaney, presents the first proper details of the NMA during the 2017 Paris Air Show**

KEY Collection

In numbers...

1,049

Boeing 757s built

450

Airbus A321XLR orders

25%

Lower fuel burn on A321XLR

220-270

Seats in Boeing NMA studies

2023

Target for A321XLR service entry

longest-range single aisle narrowbody airliner ever developed.

Structural assembly on the centre and rear fuselage sections for the first XLR commenced in May 2021. With flight testing due to begin in 2022, certification and the start of customer deliveries is currently scheduled for 2023.

Airbus has secured more than 450 orders for the XLR from 22 customers, attracting large bookings from several current or former 757 operators including two of the US 'majors' – American Airlines and United Airlines.

Successor's suitability

Reflecting on the LR/XLR orders, Strickland told *Aviation News*: "Ideally you want to replace [the 757] with something that embodies the same diversity of mission but with the lower cost possible now with new aircraft and engine technology. The A321 is the next best substitute."

Flexibility is one reason for the 757's long-standing presence in airline fleets. The aircraft's configuration enables operators to access markets that would be commercially unviable with a larger aircraft, while also adding capacity to shorter-haul flights where required.

The A321XLR is yet to enter service, but Strickland highlighted Aer Lingus' use of the LR as "a really good demonstration"

Above right: **Can Boeing's NMA find that middle of the market sweet spot?** Boeing

Right: **Boeing began looking into the business case for a 757 replacement through its 'New Mid-market Airplane' studies in the mid-2010s**

v1 Images-Simon Fontimpe





Above: **June 27, 2019: Boeing 737 MAX lie in wait adjacent to Seattle’s Boeing Field, following the type’s grounding in March 2019. This, together with delays to the forthcoming 777X and 787 production issues, meant that the NMA launch dropped further down the firm’s agenda**
 Getty Images-Stephen Brashear

Below: **Major American low-cost airline JetBlue is operating A321LRs to London/Gatwick (pictured) and Heathrow from New York. As of February 2019, the Airbus A321LR held more than 80% of the middle-of-the market category** JetBlue Airways

of the European aircraft’s effectiveness in providing a 757-like capability. He said: “They can [operate] US East Coast flights from Dublin, use it on short European hops, to Heathrow over from Dublin and leisure flights down to places like Faro. A widebody is too big to do both those things effectively... but this aircraft can.”

Strickland explained: “You can squeeze extra useful hours out of the day. You can fly a super long-haul flight [with a widebody] but at the end of the day you’ve only carried two lots of passengers and one round trip. [With the A321LR] you can do one long trip and one shorter trip, and that’s four lots of passengers.”

Major American low-cost airline JetBlue Airways has also introduced A321LRs to serve flights from New York/JFK to London/Heathrow and London/Gatwick, its first services outside America. Aer Lingus was one of the operators, along with the mentioned US ‘majors’, to fly 757s between Europe and the US ▶



A321XLR: the new mid-market force?

Airbus sought to address the need to replace the 757 with the 'LR' and 'XLR' variants of its A321neo. Both versions seat between 180 and 220 passengers in a two-class layout, with the LR offering a range of 4,000nm and the XLR 4,700nm.

The variants can fly further because of increased maximum take-off weight (MTOW). With a permanent rear centre tank (RCT) aft of the main landing gear wheel bay, the XLR's MTOW will be 101,000kg. The RCT will carry 12,900lit of fuel, with an optional forward additional centre tank, giving a 40,000lit total fuel capacity.

An optimised wing trailing edge flap configuration preserves the same take-off performance and engine thrust requirements as the standard A321neo, according to Airbus. It also claims the XLR will burn 25% less fuel than the 757.

The company explains: "The new optimised RCT holds more fuel than several optional additional centre tanks did previously, while taking up less space in the cargo hold, freeing-up underfloor volume for additional cargo and baggage on long range routes."

According to Airbus, the A321XLR will be capable of operating routes such as London-Delhi, Miami-London, New York-Rome, Miami-Santiago, Hawaii-Houston, Tokyo-Sydney, Reykjavik-Dubai and Auckland-Hawaii.

East Coast – a niche the 757 has filled historically. Both the Irish carrier and JetBlue have ordered A321XLRs to join their LRs.

The A321LR/XLR might have quenched some operator's thirst for more fuel-



With Airbus launching a much-needed 'middle of the market' aeroplane with the A321LR and later XLR, Boeing has lost potential customers before it had even launched a product – including US carrier United Airlines, which has ordered 50 of the latter Airbus

efficient mid-market jets, but where does its orders success leave Boeing and its NMA? Is it worth the manufacturer offering a new product of its own for mid-market needs?

Richard Aboulafia, vice-president analysis at the Teal Group Corp consultancy, told *Aviation News* that there is scope for more new mid-market aircraft, both to replace 757s still flying passenger services and other smaller widebody aircraft (for example older 767s and A330-200s) some airlines use for midsize missions.

He said: "This market segment is just starting out. The potential for route fragmentation on international flights, particularly across the Atlantic and intra-Asia, will be playing out for years to come."

A 2018 'middle of the market' analysis by the ICF consultancy contended the A321 does not hit the 757's payload/range sweet

spot "without compromise". While ICF's analysis of course preceded the A321XLR's launch, Airbus' own data suggests there isn't quite an exact match-up between the new Airbus jets and the 757.

Airbus says the XLR will carry 180-220 passengers in a two-class configuration (or 244 in a single-class with the 'Cabin-Flex' option designed to maximise seat numbers) over 4,700nm and ten underfloor unit load devices (ULDs) for revenue cargo.

Boeing's *Airplane Characteristics for Airport Planning* document reveals the 757-200 can carry 186 to 239 passengers over 3,900nm, while the -300 series can accommodate 243 to 279 passengers over 3,400nm. It also notes the 757 can also carry up to 15 ULDs for cargo.

In other words, while the A321XLR's range will exceed the 757's, the European jet's

A321XLR* Xtending the A321neo success: Unbeatable fuel efficiency now flying Xtra Long Range

UP TO
4,700 nm / 8,700 km

+15% range +15% range

A321neo A321LR A321XLR

180 - 220 Typical Seating
2-class

AIRSPACE cabin

A321neo unbeatable economics
-30% fuel burn per seat*

What is an A321XLR?

MTOW **101t**

Rear Centre Tank & optional Additional Centre Tank

AIRBUS

More European pushback... with delays in its NMA, could Boeing further lose its mid-market crown to Airbus and the A321XLR? Airbus



Structural assembly on the centre and rear fuselage sections for the first A321 XLR commenced in May 2021 Airbus-S Verger

cabin will carry around the same number of passengers in two classes (and 35 fewer when compared to a single-class -300) and, crucially for operators, slightly less revenue-generating underfloor cargo.

Aboulafia said that, in his view, "the A321neo is merely in the right place at the right time. Boeing could easily design a vastly superior clean sheet aircraft for the job and generate hundreds of orders out of the box." He added: "Basically, they need an all-new single aisle in the 757-300 size class, with wings and engines that allow it to do what the A321 can't."

Where is the NMA?

When analysts and investors last directly asked Boeing CEO Calhoun about the NMA in January 2020 during the Q4 2019 earnings results, he said the company would continue to listen to its customers and study the market.

Questions about new mid-market aircraft have dried up since then – unsurprisingly, given the MAX grounding and recertification effort and, of course, the ongoing COVID-19 pandemic.

However, a February 2021 *Aviation Week* report noted that Boeing had restarted NMA studies and was working on a two-class, twin-aisle concept with 250 to 275 seats which is, it said, "believed to be called the NMA-5X".

Strickland told *Aviation News*: "I think Boeing, although they're not saying it overtly, are acknowledging that they do need to do something. Even though they may have lost some years, it's worth them getting into."

Aboulafia feels Boeing could launch an NMA "anytime" because the company has, he said, "a remarkable ability to raise debt or equity even in very hard times". He added: "There is a lot of cash out there

looking for an investment opportunity, and as investment opportunities go, this one is quite secure."

Another aircraft-development issue could come into play regarding the future or otherwise of a new mid-market Boeing – and that is how to replace the 737.

During the Q4 2019 earnings results presentation in early 2020, Calhoun said Boeing's new aircraft development team had been asked to "step back and reassess our commercial product development strategy to determine what family of airplanes will be needed in the future".

Aboulafia told *Aviation News*: "It's possible that the [mid-market] airframe developed by Boeing could be scaled down to eventually replace some or all the 737 market, but that's something to worry about in the future."

He emphasised: "Right now, they simply need something in this class." **AN**

Scandinavian Airlines, the flag carrier of Denmark, Norway, and Sweden, is using A321LRs for services from Oslo, Stockholm, and Copenhagen to several cities in the United States – including New York, Chicago and Miami Airbus








AVIATION

THE PAST, PRESENT AND FUTURE OF FLIGHT

With iridescent vapour pouring off its wings, TUI Boeing 757-200 G-OOBP powers out of Birmingham bound for Egypt's Hurghada International in the early winter light of January 27, 2020

v1 Images – George Aldrich

Problematic



Over budget and besieged with problems, Boeing's KC-46 Pegasus continues to come under scrutiny. **Tom Kaminski** provides a timely update

On February 24, 2011, the United States Air Force (USAF) announced it had selected the Boeing Company's NewGen Tanker as the winner of its troubled KC-X project and awarded the firm a US\$3.5bn Engineering and Manufacturing Development (EMD) contract. This included the manufacture of four developmental and 14 production airframes. Although offerings from Boeing and EADS North America both met the service's 372 threshold requirements, the former's acquisition price was around 10% less than EADS's proposed Airbus A330 bid, while its life-cycle costs were also significantly lower.

Third time lucky

The USAF initially attempted to replace 133 of its oldest KC-135E tankers in 2002, when it moved forward with plans to lease 100 767-200ER-based tankers – dubbed the KC-767A – from Boeing.

Under the terms of the Commercial Derivative Air Refueling Aircraft programme, the tankers would have been delivered over a period of six years, beginning in Fiscal Year (FY) 2006. Although the Fiscal 2002 Department of Defense Appropriations Act approved the lease, it was later revised to include the lease of 20 tankers and the purchase of 80. However, as a result of improper negotiations between Boeing and an USAF procurement official, the KC-767A contract was cancelled in January 2006.

It was in March 2001 that Boeing offered the USAF an unsolicited proposal for 36 767 tankers, as a stopgap measure to bolster its tanker capacity. Boeing initially developed the variant for Italy, which signed a contract for four examples in December 2002. A contract to deliver four KC-767J to Japan was signed in April 2003.

In January 2007, the USAF made a second attempt to acquire new tankers, when it

released a request for proposals (RFP) for its next-generation aerial refuelling tanker aircraft – dubbed the KC-X.

The competition pitted Boeing against a joint proposal from Northrop Grumman and partner European Aeronautic Defence and Space (EADS). On February 29, 2008, the service awarded Northrop/EADS a contract to develop its proposal – based on the Airbus A330 – under the designation KC-45A.

However, citing a flawed competition, Boeing challenged the USAF's technical and cost evaluations, conduct of discussions and source selection decision by protesting the award. In June 2008, the Government Accountability Office sustained Boeing's protest, prompting the US Department of Defense to cancel the KC-X competition.

The service's third attempt to acquire a new tanker began with the release of a draft RFP on August 6, 2008. However, this was cancelled just a month later, on September

Pegasus



On strength with the New Hampshire Air National Guard's 157th Air Refuelling Wing out of Pease Air National Guard Base, KC-46A 16-46018 shows off the type's evident 767 lineage Jim Haseltine

10. A full year passed before a new draft KC-X RFP was released on September 25, 2009. Although Northrop Grumman elected not to react to the RFP, EADS offered its A330-200 Multi Role Tanker Transport in response to the final RFP, which was released on February 24, 2010. Ultimately, it lost out to Boeing's proposal.

Winged horse

Boeing's multi-role design used the airframe from its then-new 767-2C commercial freighter, which itself was based on the manufacturer's successful 767-200ER airliner. The new tanker was assigned the mission design series designation KC-46A and, on February 13, 2014, the Air Force Chief of Staff, Gen Mark A Welsh III, announced it was to be called Pegasus.

The KC-46A's first flight was scheduled for late 2014, with delivery of the initial 18 airframes following within six and a half years of the contract award. The USAF planned to purchase 179 examples of the new aerial refuelling platform.

Powered by two 62,000lb st Pratt & Whitney PW4062 turbofans, the KC-46A is operated by a crew of three comprising a pilot, co-pilot, and boom operator. The aircraft provides permanent seating for up to 12 additional aircrew.

The basic 767-2C airframe includes a strengthened main-deck cargo floor, cargo door and freighter features, auxiliary fuselage fuel tanks for increased capacity, and provisions for the plumbing and wiring required for the aerial refuelling mission systems. The hybrid design features strengthened 767-300ER wings, 767-400ER horizontal stabilisers and a 787-based cockpit display system, shared with the commercial 767-400. Whereas KC-46 airframes are assembled on the standard 767 line at Boeing's Everett facility in Washington, the mission systems are installed in the Everett Modification Center, which is also located on Paine Field.

With a maximum capacity of 212,299lb, the Pegasus is equipped with an air-to-air refuelling receptacle that permits fuel to be on-loaded at a rate of 1,200gpm. The airframe is 6½ft longer than the standard 767-200ER series, and boasts a maximum take-off weight (MTOW) of 415,000lb. The large cargo door and 7,800ft³ cargo bay enables the KC-46A to carry up to 18 463L standardised Master Pallets and 58 passengers. Additionally, it can transport up to 114 passengers during contingency operations or 58 medical patients comprising 24 litters (stretchers) and 34 ambulatory patients.

The KC-46's multi-point refuelling systems comprise a digital fly-by-wire air refuelling boom system (ARBS) that can discharge fuel at a rate of 1,200gpm, as well as a permanent FR-600-84MDR centerline drogue system (CDS) and removable RP-910E-75 wing air refuelling pods (WARP). Produced by UK-based Cobham Mission Systems, both the CDS and WARP can deliver fuel at 400gpm.

Although the boom is based on that of the in-service McDonnell Douglas KC-10A Extender, the refuelling system is controlled from the crew compartment via the aerial refuelling operator station (AROS), with a series of cameras mounted on the fuselage that provide a 185° field of view. Additionally, a camera installed on the boom captures three-dimensional video.

The cockpit's integrated display system features large-format Collins Aerospace 15.1in liquid crystal displays that use technology from the commercial 787 Dreamliner. Also located in the crew compartment, the dual station AROS houses three main displays for each operator. The top set of three displays are used for situational awareness to the rear of the jet and primarily supports drogue refuelling operations and the observation/pre-contact position during boom operations. ▶



The main 2D/3D display is used for boom refuelling operations. The fly-by-wire system is operated via control sticks mounted on either side of the boom operator's console. Meanwhile, a third heads-down display provides critical data related to the aircraft's configuration and fuelling operations.

Defensive aids include the Raytheon AN/ALR-69A radar warning receiver (RWR) and Northrop Grumman AN/AAQ-24(V) large aircraft infrared countermeasures (LAIRCM) system. A tactical situational awareness system fuses information from datalinks and onboard sensors to provide an integrated picture of the operational environment. Additionally, it can present threat information based on Link 16 communications from other aircraft. The KC-46 is also equipped with cockpit armour and an onboard inert-gas-generating system. This displaces fuel-tank vapours with inert nitrogen gas, reducing the risk of explosion.

With Boeing and the USAF completing the preliminary design review on April 27, 2012, the design was frozen when the critical design review concluded some 16 months later.

Above: **Boeing KC-46A N884BA in the Benefield Anechoic Facility, Edwards AFB, during avionics testing. The facility provides a controlled electromagnetic environment, shielded against radio frequency interference**
USAF-Christopher Okula

Above, right: **The first KC-46 EMD aircraft (N461FT) during its maiden flight on December 28, 2014** Boeing-Paul Gordon

Below: **Configured with the type's air refuelling systems, the second KC-46A EMD aircraft (N462KC) took to the air for the first time on September 25, 2015** USAF-Jet Fabara

Into production

Following receipt of Milestone C approval on August 18, 2016, the USAF awarded Boeing a US\$2.8bn contract for the first two low-rate initial production (LRIP) lots for seven and 12 KC-46As. A second LRIP contract for 15 airframes, worth US\$2.1bn, was awarded on January 27, 2017. Production was originally to have transitioned to full rate (FRP) with the third lot, but this was extended to include lots three and four in August 2016, while lot five was added in November 2017.

Although an FRP decision was most recently expected in September 2020,

the USAF announced in June 2020 that it had delayed it again until 2024. That move came after Robert Behler, the Pentagon's director of operational test and evaluation at the time, determined the programme's initial operational test and evaluation (IOT&E) phase would be extended until critical deficiencies (discovered during testing) have been resolved, and the USAF Operational Test and Evaluation Center has completed evaluation of the type's final production configuration.

As a result, Boeing continues to build aircraft under LRIP contracts. With orders for 94 aircraft across seven LRIP lots, the most recent was awarded in January 2021. It is expected the last of 175 production aircraft will be procured in FY2025.

The first flight of an initial production jet (15-46005) took place from Paine Field on December 5, 2017. This was three years after the first of four KC-46 development aircraft conducted its maiden flight there on December 28, 2014. The Boeing 767-2C, which carried the civil registration N461FT, was initially in its provisional freighter configuration to support the Federal Aviation Administration (FAA) certification. The EMD aircraft's three-and-a-half-hour





flight concluded at Seattle's Boeing Field/ King County International Airport, where initial flight testing was based.

Configured with the air refuelling systems, the second EMD aircraft conducted its initial flight on September 25, 2015. With its refuelling boom extended for the first time in November that year, the aircraft completed its initial air-to-air refuelling when 1,600lb of fuel was off-loaded to an F-16C on January 24, 2016. The tanker's under-wing WARP was used for the first time to refuel a US Navy F/A-18C Hornet on February 10 that year. The aircraft also received fuel for the first time from a KC-10A that same month.

Flight testing was initially supported by two 767-2C 'provisioned freighters' that were certified without refuelling systems and associated military avionics. The second pair of EMD aircraft were fully configured KC-46A tankers. Developmental testing was conducted in three phases by Boeing, the 418th Flight Test Squadron and the Global Reach Combined Test Force in Washington and from Edwards Air Force Base (AFB), California.

The FAA awarded Boeing an amended type certificate for the 767-2C in December

Above, right: **Pegasus 17-46036 between sorties at Alexandria International Airport, Louisiana, during Green Flag Little Rock 20-09, on August 20, 2020** USAF-Airman 1st Class Mariam K Springs

2017, which enabled it to use the airframe as the baseline non-military aircraft for the KC-46A. It subsequently certified the design of the KC-46A and issued a supplemental type certificate in September 2018. A Military Flight Release for the KC-46A followed in November 2018.

Problem after problem

Despite Boeing and the USAF continuing work to address several critical Category-I deficiencies discovered during flight testing – including fuel leaks, issues with the type's auxiliary power unit and concerns with the boom – the KC-46 officially entered initial IOT&E on October 22, 2019.

The previous month, the USAF prohibited the Pegasus from carrying cargo or passengers, following the discovery of a problem with the type's cargo pallet lock system, identified during pre-IOT&E testing. The restrictions were lifted in December 2019 after redesigned locks were installed.

In April 2020, the USAF and Boeing agreed a plan to correct issues with the aircraft's remote vision system (RVS). As a result, Boeing is currently designing the new RVS 2.0 system, which will feature full-colour Collins Aerospace 4K ultra-high-definition cameras, with proper viewing geometry, laser ranger (LIDAR) to measure the distance to the aircraft being refuelled, and augmented reality that will provide 3D visualisation and distance measuring. A redesigned AROS will include larger, higher-definition, 40in displays in place of the current 24in screens. The redesign will also be provisioned for semi-autonomous or autonomous operations, which will support the refuelling of unmanned systems.

Separately, Boeing has developed a near-term fix for the RVS issues. The enhanced RVS (ERVS), dubbed the RVS 1.5, will provide software upgrades that improve the quality of the boom operator's video feed. With flight testing having commenced in June 2020, by that December the USAF announced it would move forward with implementing the interim improvements offered by the ERVS – work to execute the changes ▶

Boeing KC-46A Pegasus N842BA – the initial of seven jets built as part of the first LRIP awarded to the manufacturer – makes the type's first contact with C-5M Super Galaxy out of Travis Air Force Base on April 29, 2019
USAF-Christian Turner



should be complete in late 2021. Boeing will also make design changes to the boom telescope actuator that will enable it to finally refuel the A-10C Thunderbolt II.

Although testing with live patients first occurred in October 2020, airmen from the 22nd Air Refuelling Wing (ARW) and Air Force Reserve Command (AFRC) 931st ARW tested the KC-46A capabilities during its first operational aeromedical evacuation on July 10, 2020. The mission – which was evaluated by the Air Force Operational Test and Evaluation Center – originated from Joint Base Andrews, Maryland, and involved transferring five patients and two attendants to Naval Station Norfolk, Virginia; Patrick AFB, Florida, and Travis AFB, California.

Boeing and the USAF continue to work with the FAA toward obtaining certification for the WARPs, and anticipate it will be granted in the near future. Delays to certification have resulted from FAA requirements for a huge amount of testing, and Boeing's initial decision to acquire both military and civil certification for the tanker and its systems. Although similar WARPs have been in use for many years on other military aircraft, they have never received FAA certification. With the Pegasus developed under a fixed-price contract, Boeing has already absorbed more than US\$5bn in cost overruns due to these development and certification delays.

Slow progress

The KC-46A aircrew training system (ATS) was developed by FlightSafety International under a contract awarded on May 1, 2013. It included aircrew training devices, full-motion weapon system trainers, boom operator trainers, fuselage trainers, and part-task trainers at each main operating base (MOB) and formal training unit (FTU). The ATS programme was declared 'ready for training' on July 31, 2019. The first pilot

transition course/boom operator transition began on August 5, 2019.

On April 23, 2014, Oklahoma's Altus AFB was announced as the location for the KC-46A 'schoolhouse' (FTU) while McConnell AFB, Kansas, was named as the first active-duty-led MOB. Both had been previously declared as the preferred alternative bed-down locations in May 2013. As part of the transition, McConnell will eventually receive 36 examples. In August 2014, Pease Air National Guard Base in New Hampshire was named as the first Air National Guard Pegasus MOB.

In January 2017, the USAF selected New Jersey's Joint Base McGuire-Dix-Lakehurst, and California's Travis AFB as the next active-duty-led KC-46A bases. The Pegasus will replace the KC-10As operated by the 305th and 60th Air Mobility Wings

"Boeing has already absorbed more than US\$5bn in cost overruns due to these development and certification delays"

(AMW), with 24 examples assigned to each. With the 305th AMW's 2nd Air Refuelling Squadron (ARS) conducting its final KC-10A sortie on June 30, 2021, the unit was preparing for the arrival of its first KC-46A in November.

The 916th ARW at Seymour Johnson AFB, North Carolina, was chosen as the first AFRC unit to receive the KC-46A in September 2017. On January 10, 2019, the USAF accepted its first KC-46A. Delivered to the 344th ARS at McConnell on January 25, the 56th ARS at Altus received its first example the following month, on

February 8. Deliveries to Altus concluded on October 6, 2021, when the 97th AMW received its eighth Pegasus.

But between February and April 2019, the USAF twice suspended deliveries, following the discovery of foreign object debris while inspecting the aircraft. Production airframes were conditionally accepted – despite three critical deficiencies relating to the RVS and the boom itself. To make matters even worse, initial deliveries took place around 17 months later than originally planned.

Boeing was contractually scheduled to deliver the first 18 fully certified KC-46A tankers and nine shipsets of WARPs to the USAF to meet the required assets available (RAA) milestone by August 2017. However, by December 2016, it slipped to October 2018, then again to April 2021, when it was pushed back once more to March 2022. That said, Boeing delivered 28 KC-46As to the USAF in 2019, and 14 during 2020. Up to October 15, 2021, the contractor had delivered just seven aircraft this year.

The first of 12 jets assigned to the 133rd ARS arrived at Pease on August 8, 2019. With its final Pegasus delivered on February 5, 2021, the jets will be shared with the Active Associate 64th ARS, which is a component of the McConnell-based 22nd ARW/OG.

Seymour Johnson welcomed its first KC-46A with the arrival of 15-46011 to the 77th ARS on June 12, 2020. The arrival of 18-46055 on April 30, 2021, marked the halfway point of the 916th ARW's conversion from the indomitable KC-135R Stratotanker. By June 16, 2021, when 19-46058 was delivered to Seymour Johnson, the unit had received seven jets.

Fielding developments

On May 13, 2021, the USAF revealed that it was considering two bases for the next active-duty KC-46A component, and

Below: **Assigned to the 344th Air Refuelling Squadron, the USAF's first KC-46A, 15-46009, touches down at McConnell AFB on January 25, 2019**
USAF-Airman 1st Class Alan Ricker



six AFRC locations for the next Pegasus reserve unit. The active component (AC) candidate units comprise the 92nd ARW at Fairchild, Washington, and the 6th ARW at MacDill, Florida.

The USAF is also considering the 940th ARW at Beale, California, the 434th ARW at Grissom Air Reserve Base (ARB), Indiana; the 459th ARW at Joint Base Andrews; 452nd AMW at March ARB, California; 914th ARW at Niagara Falls Air Reserve Station, New York; and the 507th ARW at Tinker AFB, Oklahoma, as candidates. Whereas the AC location will host 24 KC-46As, the AFRC unit will receive 12. A final decision is expected by the end of 2021, once site surveys and environmental analysis have been completed.

In February 2021, the USAF cleared the KC-46 to begin limited, non-combat operations while testing continued. These reduced operations permit the tankers to support the US Transportation Command (USTRANSCOM) by refuelling B-52, F-15, F-16, and F/A-18s during long-distance 'Coronet' deployments. Additionally, the tankers can carry passengers/cargo and conduct aeromedical evacuation flights.

Prior to this, the Pegasus had been cleared to conduct USAF and joint service training missions.

The decision to begin limited operations also enabled the service to free up much-needed KC-135s and KC-10s to support combatant command operational taskings. However, the USAF will not use the KC-46A for full combatant command deployments until the refuelling boom and RVS deficiencies are remedied. Until issues have been resolved, the Pegasus is unable to refuel the A-10C, F-22A, F-35A and B-2A.

On July 9, 2021, the Air Mobility Command (AMC) approved the CDS for limited operational use. Under the first Interim Capability Release (ICR), the KC-46A is permitted to refuel US Navy probe-equipped aircraft. A second ICR, approved on August 5, authorised the limited operational use of the ARB to refuel the C-17A, KC-46A and B-52H. On October 13, approval of a third ICR cleared the tanker to refuel all F-15 and F-16 variants while supporting USTRANSCOM missions.

Since January 2019, the KC-46A has completed more than 6,000 missions, as well as more than 26,000 boom and 1,500 drogue refuelling contacts, and transferred more than 35 million pounds of fuel.

In February 2021, the USAF issued a limited operational clearance allowing the boom to be used for refuelling fighter, bomber and transport aircraft during training, exercises, overseas deployments, and familiarisation missions.

Export orders

Japan became the first international customer for the Pegasus when it ordered the first of four tankers in December ►



Captain Wesley Cobb – a C-17 pilot with the 4th Airlift Squadron – holds position on a McConnell-based KC-46 during a training sortie on February 20, 2021 USAF-Senior Airman Mikayla Heineck



A view inside a KC-46A Pegasus during an aeromedical evacuation training exercise in May 2019. A Total Force aeromedical evacuation team comprising personnel from Air Mobility Command, the Air National Guard, and the Air Force Testing and Evaluation Center are working to develop the tactics, techniques, and procedures for medical support on the KC-46 USAF-2nd Lt Daniel de La Fé



Although KC-46A's boom is based on that of the KC-10A Extender, Boeing replaced the traditional boom operator station with a series of cameras, used by the crew to remotely view and conduct refuelling operations Boeing

Right: **USAF Reserve pilot Lt Col Terence McGee (left) discusses aspects of the new tanker platform with vice chairman of the Joint Chiefs of Staff, Gen Paul J Selva, while delivering the third KC-46 to McConnell on January 31, 2019** Department of Defence-US Army Sgt James K McCann

2017 – having chosen the KC-46A as the winner of its own KC-X competition in October 2015. With the sale approved by the US Department of State in September 2016, a second aircraft was ordered in December 2018, with another pair following in October 2020. The Japanese jets will be equipped with defensive systems, including the AN/ALR-69A RWR and AN/AAQ-24(V) LAIRCMIniot.

The first Pegasus earmarked for the Japan Air Self Defence Force (JASDF) flew over Everett, Washington, on February 8, 2021. Personnel from the JASDF's 405th ARS, which was activated in December 2020, began training at Altus Air Force Base, Oklahoma, in mid 2021.

Meanwhile, on March 8, 2020, the US Department of State approved the possible sale of eight KC-46As to Israel. The Israeli government signed a Letter of Offer and Acceptance for two tankers in February 2021. The Israeli Air and Space Arm expects to receive its first two examples in 2024, with initial operating capability planned for the following year.



What's next?

In April 2019, Boeing received a US\$5.7bn contract to develop future KC-46A upgrades under the ten-year Pegasus Combat Capability programme, which aims to improve the type's communications and survivability, and possibly add autonomy capabilities.

In October 2020, Gen Jacqueline D Van Ovost, commander AMC, confirmed

the USAF's plans to move forward with a full and open competition associated with the acquisition of a 'bridge tanker' to follow the KC-46A. Formerly known as 'KC-Y', the project is considered a 'steppingstone' to a more-advanced, futuristic tanker. As well as recapitalising additional KC-135s, the aircraft will bridge the capabilities gap between the Pegasus and the next advanced air refuelling

Brothers in arms: Lockheed F-35A Lightning IIs from the Vermont Air National Guard's 158th Fighter Wing conduct air-to-air refuelling training with a Pegasus (16-46018) from the neighbouring New Hampshire Air National Guard's 157th Air Refuelling Wing in April 2021 Jim Haseltine





tanker recapitalisation phase. According to the Air Force Life Cycle Management Center, the new tanker will be a “non-developmental” programme, and will be based on an existing proven aircraft, such as the KC-46A and the Airbus A330.

The USAF is expected to begin funding the next phase of its tanker recapitalisation in FY2022, with its goal to immediately follow KC-46A deliveries with the new

A KC-46A boom operator monitors his screens in the aerial refuelling operator station while waiting for his next ‘contact’ during a training sortie in 2019 Department of Defence-US Army Sgt James K McCann

tanker starting around 2027. Formally launching the KC-Y tanker competition on June 16, 2021, the USAF released a request for information seeking potential contractors. The service expects to release

the final RFP in late 2022. Deliveries under the KC-Y phase will begin in 2029 and the USAF expects to receive 140-160 new tankers at a rate of 12-15 annually.

But, for now, the Boeing KC-46 continues its journey (albeit slowly) towards becoming a capable tanker platform. That said, with the KC-135’s and KC-10’s shoes to fill, time will tell if it really is a contender. **AN**



A 344th Air Refuelling Squadron Pegasus takes on fuel from a 924th ARS example during at night-vision goggle proving sortie on April 23, 2020 USAF/Senior Airman Alexi Bosarge



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Why does the RAF's latest Poseidon have a grey nose cone?



The Royal Air Force's (RAF) sixth Boeing P-8A Poseidon MRA1 – ZP806 *Guernsey's Reply* – was delivered to its new home base of RAF Lossiemouth in Moray, Scotland, on September 21 this year. However, upon landing, it became obvious there was something different about this aircraft, compared to the previous five delivered – its nose cone was the same grey as the fuselage, while those sported by the rest of the UK's Poseidon fleet are black.

What made this all-grey scheme all the more curious was that, on May 8, the RAF tweeted to announce the naming of ZP806 and posted photos of the aircraft "undergoing its final checks at the Boeing factory in Seattle before joining the growing fleet", during which the standard black nose cone can be seen in place.

Intrigued, *Key.Aero* enquired with the UK Ministry of Defence (MOD) as to why ZP806 had been given a grey nose cone

Above: Bedecked with its grey nose cone, P-8A ZP806 arrived at Lossiemouth on September 21, following its transatlantic delivery from Boeing's Renton, Washington, facility

Niall Paterson

and whether the previous examples already delivered would be retrofitted with one, and if the final three aircraft still to be delivered would be similarly adorned?

In response, a spokesman from the MOD would only say: "The change to a grey nose cone is due to an aircraft modification

"Upon landing, it became obvious there was something different about this aircraft, compared to the previous five delivered"

connected to radar performance. Modification to the entire fleet will be considered in due course."

Although the last three examples due be delivered – ZP807, ZP808 and ZP809 – have all been sighted with black nose cones at Boeing facilities around Seattle, '807, which carries the name *William Barker VC*, was delivered to Lossiemouth on October 19 wearing a grey one. It will be interesting to see if both '808 and '809 also receive grey nose cones prior to delivery.

The RAF ordered its nine Poseidon maritime patrol aircraft (allotted the serials ZP801 through to ZP808) in 2016, as part of a \$3.87bn contract – the first example arrived in the UK on February 4, 2020.

Operated by 120 and 201 Squadrons out of Lossiemouth, the type achieved its initial operating capability on April 1, 2020 and is expected to reach its final operating capability in 2024. [AN](#)



Above, left: Boeing P-8A Poseidon MRA1 ZP806 with its maritime patrol stablemates, shortly after its arrival at RAF Lossiemouth
MOD Crown Copyright-SAC Sian Stephens



Above, right: Boeing Poseidons ZP803, '801 and '804 share a snow-covered flight line with a pair of US Navy P-8s temporarily deployed to Lossiemouth in February 2021. Several US Navy examples of the type also sport grey nose cones
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Concorde reflections: G-AXDN forms part of the Duxford Aviation Society's British Airliner Collection at Cambridgeshire's Imperial War Museum Duxford KEY-Jamie Ewan



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I notice since the change of editor more coverage being given to the issue of sustainability in aviation. Key Publishing should be proud of this and I hope this coverage will continue.

A look at the major aircraft production companies and air forces will show readers that sustainability features highly both in terms of manufacturing and reducing their carbon footprint. The Royal Air Force for example is committed to slashing its carbon emissions with the use of so called 'drop-ins' – sustainable fuel sources including fats and oils, wood waste, alcohol, sugar, biomass and algae. Aircraft including F-35s and Typhoons currently use conventional fuel but could use up to 50% sustainable sources in the future, after the MOD's new aviation fuel standards came into effect in November 2020. It is estimated that by substituting 30% of conventional fuel with an alternative source in a jet travelling 1,000 nautical miles could reduce CO₂ emissions by 18%.

Keep at it!

Owen Shepherd, Lincoln

I read with interest Katie John's excellent article in *Aviation News* (October issue, pages 28-31) charting the history of Concorde and I really enjoyed it.

However, I just wanted to point out that the 'poetry' for which you credit Adrian Meredith was actually written by me! It first appeared in some of our Goodwood Travel brochures and then later in Brooklands Museum brochures, slightly modified to recognise the fact that Concorde was no longer flying.

Adrian quoted it in his book *Concorde – A Photographic Tribute*. I had discussed it with him beforehand and had no problem with it as he kindly allowed us to use a number of his images.

It's not a big deal but I wanted to set the record straight. Keep on keeping the Concorde dream alive!

Jan Knott,

Former managing director at Goodwood Travel Ltd and Concorde operations manager at Brooklands Museum



Believed to have been taken during the SBAC show at Farnborough in 1962, this view of XF923 shows off the Bristol 188 incredibly radical appearance KEY Collection

A *Aviation News* just keeps on getting better and better. The August issue is a superb mix of civilian and military aircraft, both modern and historical. I particularly enjoyed Tony Buttler's feature on the Bristol 188, *Material Difference*, in the August 2021 issue.

I was lucky enough to be taken to the 1962 SABAC show at Farnborough by my father, a serving fast jet pilot at the time. I

well remember the Bristol 188 display – at the time I had never heard anything so loud! Despite the 188's display having to be cut short, it was a pivotal moment in my love of all thing's aviation.

There is no doubt that the magazine is going from strength to strength with excellent content lavishly illustrated.

Keep up the great work!

Niall MacDonald, West Yorkshire



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The latest products for the discerning aviation enthusiast...

Limited edition Guy Martin '617' Head Gasket bobble hat

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In the latest release of his popular Head Gasket bobble hat series, multiple record-breaking motorcycle racer and heavy-vehicle mechanic turned television presenter Guy Martin salutes Avro's mighty Lancaster, the Royal Air Force's indomitable 617 Squadron and the pair's fabled strike against the German dams in 1943.

Led by the one and only Guy Gibson, the 'Dams Raid' – officially known as Operation Chastise – took place on the night of May 16-17 with 617's trained crews dropping purpose-built 'bouncing bombs' (developed by Barnes Wallis) from adapted Lancasters.

Army green, with a black bobble and Guy Martin's trademark skull and spanners

logo, the bobble hat depicts the 1943 mission with a silhouetted Lancaster and a bouncing bomb skimming across the blue water below. Made from 100% Acrylic and produced in the UK, the hat can be worn with the front rolled down, or rolled up. With £1 from every hat sold going towards the East Kirkby-based Lincolnshire Aviation Heritage Centre's efforts to return Avro Lancaster NX611 'Just Jane' to the skies, this headwear not only looks the part but also helps preserve the next chapter of the legendary aircraft. In the words of Guy Martin himself: proper job!

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Sky Stories: From Flying Cars to Flying Fortresses

Book: 177-page softback

Author: Dave Unwin

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At the end of the first chapter, the author – respected pilot, journalist, and all-round nice bloke Dave Unwin – answers the question 'why fly?' with three simple words: "Because I can." Having flown since 1985, Dave has gone on to amass over 5,000 hours on more than 300 types from across the annals of flight. In this compendium of notes, flight tests, columns and thoughts, Dave takes you into the cockpit of just some of those aircraft. Exposing their details and intricacies, Dave also reveals what it means to fly them.

Aircraft include the indomitable Spitfire, the quirky Taylor Aerocar, the gorgeous Ryan ST, the quite incredible Bucker

Jungmeister, the German-built Schleicher ASK-14 motor glider and the single-seat Schleicher Ka 6 sailplane. From an evocative trip in a B-17 Flying Fortress, remembering the boys that

flew them through war-torn skies, to a late afternoon jaunt in a Miles Falcon over the famed Cardington sheds in Bedfordshire,

and the loss of one of his favourite aircraft, Dave gives just a hint of the emotions that engulf both aviation and flying.

With his perfect blend of technical jargon and relaxed down-to-earth style, Dave's enthusiasm about all things aviation is outrageously contagious – and that comes from someone who spends as much time as physically possible in the air! This is one of

the most beautifully written books I've read.

Published by Pigs Might Fly Publishing: ISBN: 9781513689203, available from Amazon



Darren Harbar Photography aviation 2022 calendar

2022 wall calendar

Price: £10 (postage and packaging not included)

Renowned lensman Darren Harbar has produced this colourful wall calendar, using images of 12 iconic aircraft from his extensive air-to-air portfolio. With airframes such the Shuttleworth Collection's elegant Miles Hawk Speed Six, Historic Helicopter's show-stopping Westland Wessex HU.5 and the sole two-seat Hispano Buchón emblazoned on the glossy paper, this spiral-bound product will delight aviation fans from January through to December.

Other type's illustrated include the Historic Aircraft Collection's stunning Hawker Hurricane adorned in the evocative

colours of Czech ace Josef František, noted warbird and display pilot Stu Goldspink's stunning Stamp SV.4A and the delightful Old Warden, Bedfordshire-based Sopwith Dove. Opening up to A2 size, each month includes plenty of space for engagements, as well as information about the relevant aircraft. Given the photographer and the subject matter, this



is a must have for those with a passion for vintage aviation. What's not to like?

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North Korean Aviation: An Eyewitness Account

By Gerry Manning

In 2016, North Korea hosted its first-ever airshow and invited a number of foreign visitors to attend. Unlike most airshows, this was not an international event – all participants were from North Korea. None of the military aircraft are ever

seen outside North Korea's borders, and even the civilian airline only operates limited international services. Therefore, the opportunity to see and photograph such machines in action was a once-in-a-lifetime event. This volume tells the unique story. 80pp; portrait; over 130 illustrations; ~~£14.99~~



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INSIDE NORTH KOREA: with author Gerry Manning

How did you come to secure such a fascinating opportunity to visit North Korea? They do have tourism in North Korea although most people are not aware of this. The reason for the visit was they were having their first air show ever and invited aviation tour companies to come. I could not resist the temptation.

Did you have a favourite? On the military side the MiG-21 and in the civil arena the Ilyushin IL-18. Did you experience obstacles in trying to photograph the aircraft? No, it was just the opposite. In fact, after the lunch break, the sun had moved around from the morning location that would have had us shooting directly into it so we asked to stay on the other side (where we had had lunch) and this was promptly granted.

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Air Forces of Latin America: Argentina

By Santiago Rivas

Argentina's military forces fly many classic types not often seen in military operation today, as well as some less-common indigenous aircraft. Illustrated with more than 140 photographs, this book shines a spotlight on the Argentine Air Force, Naval Aviation and Army Aviation, as well as the paramilitary forces of the Coast Guard, Gendarmerie and Presidential Flight. Author Santiago Rivas gives a fascinating insight into their histories, comprehensive details of their current organisation, their missions and the aircraft they operate, and full 'orders of battle' for each air arm.

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Lynx: The Final Years in French Service

Modern Military Aircraft Series: Volume 1

By Henri-Pierre Grolleau

When introduced in 1978, the Westland Lynx constituted a massive improvement over the helicopters then in service with the French Navy for anti-submarine duties and quickly became a highly popular rotorcraft. From an asset specialising in antisubmarine warfare, it was soon turned into a multirole platform that proved incredibly versatile, performing an extremely wide range of roles. However, after more than 40 years in service, the Lynx was an ageing design, and in August 2020, it was withdrawn from Aéronautique Navale service.



96 pages; portrait; over 200 illustrations; ~~£14.99~~ **£11.24**

US Air Forces in Europe: The 1980s

By Kevin Wright

The US Air Forces in Europe (USAFE) rapidly expanded its presence in the 1980s, the most dangerous decade of the Cold War. Most controversially, a new generation of intermediate-range nuclear weapons was deployed by both sides. The part played by Strategic Air Command's iconic SR-71s, U-2s, and giant B-52 bombers is outlined, as are the roles of Tactical Air Command and Military Airlift Command's transport and tanker fleet.

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This 1/100th-scale hand-carved model of "Alpha Charlie" in its take-off and taxiing configuration — undercarriage down, "droop-nose" angled down 5° with visor retracted — has a span of 24.77cm and a length of 62.23cm, and is painted in British Airways' distinctive "Landor" livery.

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Air Base Movements

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



RAF BRIZE NORTON

3/9 253 CN235-100MPA 101 Sqn, Irish Air Corps n/s. 9/9 03 C-17A SAC Wing. 10/9 UR-74010 An-74T, Antonov Airlines dep 12/9. 27/9 15+03 A319-133(ACJ) FBS, German AF dep 30th. 28/9 10-0052 CV-22B 7th SOS, 352nd SOW, USAF.

RAF CONINGSBY

7/9 B-536 C-130J-30 Esk 721, Royal Danish AF. 12/9 ZM139/005 F-35B 207 Sqn, dep 15th. 13/9 ZB131 Hawk 167 JHTS o/s. 27/9 ZM332 Texan T1 72 Sqn, RAF. 29/9 E82/8-LW & E90/8-TH Alpha Jet Es ETO1.8, French AF.

RAF FAIRFORD

13/9 10-0052 & 10-0053 CV-22Bs 7th SOS, 352nd SOW, USAF both dep 17th; 09-6207 & 12-5759 MC-130Js 67th SOS, 352nd SOW, USAF both dep 17th. 13/9 64-14849 RC-135U 55th WG, USAF; 62-14126 RC-135W 55th WG, USAF dep 17th; 14/9 80-1080 U-2S 9th RW arrived on TDY. 16/9 80-1092 U-2S 9th RW arrived on TDY. 18/9 97-0041 C-17A 437th/315th AW, USAF. 26/9

86-0015 C-5M 68th AS, AFRC; 07-7171 C-17A 305th/514th AMW, USAF.

RAF LAKENHEATH

7/9 07-8608/RS C-130J-30 37th AS, 86th AW, USAF. 8/9 84-0085 C-21A 76th AS, 86th AW, USAF also 28th. 9/9 84-0083 C-21A 76th AS,

86th AW, USAF. 20/9 16-5883 C-130J-30 37th AS, 86th AW, USAF. 29/9 84-0087 C-21A 76th AS, 86th AW, USAF.

RAF LEEMING

1/9 10-0052 CV-22B 7th SOS, 352nd SOW, USAF; ZM325, ZM327 & ZM331 Texan T1s 72 Sqn,



USAF C-146A Wolfhound 12-3060 taxiing at RAF Mildenhall on September 26 following a night stop. On strength with the 27th Special Operations Wing's 524th Special Operations Squadron based at Cannon Air Force Base in New Mexico, the aircraft departed for the return trip home using the callsign 'Reach 1040' Peter Foster

Antonov Airlines' An-74T Coaler UR-74010 arrives at Brize Norton on September 10. Nicknamed 'The Cheburashka' after an animated character with big ears, this is the sole example operated by the Ukrainian cargo carrier Richard Ecclestone





Flying as 'Reach 1034', USAF Lockheed Martin MC-130J Commando II 18-5910 flies final for Mildenhall on September 16. On strength with the 1st Special Operations Wing's 9th Special Operations Squadron out of Florida's Hurlburt Field, the aircraft was returning from an undisclosed location in the Middle East Peter Foster

RAF. **15/9** ZJ220 & ZJ221 Apache AH1s 3/4 Regts, AAC. **20/9** ZJ197 Apache AH1 3/4 Regts, AAC; T-785 Falcon 900EX LTDB, Swiss AF also 21st. **22/9** 76-0171 C-12C USE Oslo.

RAF LOSSIEMOUTH

1/9 168755 P-8A VP-4, USN o/s. **12/9** N190TC MQ-9B SkyGuardian arrived on TDY. **14/9** 197/64-HE CN235-300M ET3.62, French AF. **16/9** 152/64-IP CN235-200M ET1.62, French AF. **17/9** 60+04 P-3C MFG3, German Navy dep 19th. **21/9** ZZ399, ZZ403 & ZZ521 Wildcat AH1s 847 NAS, RN. **22/9** 76-0171 C-12C USE Oslo n/s; S-441 & S-442 AS532U2s 300 Sqn, Royal Netherlands AF, both dep 24th. **29/9** T-786 PC-24 LTDB, Swiss AF.

RAF MILDENHALL

13/9 84-0085 C-21A 76th AS, 86th AW, USAF; ZZ419 Shadow R1 14 Sqn, RAF o/s. **16/9** ZZ176 C-17A 99 Sqn, RAF o/s 03-3176/RS C-130J-30 37th AS, 86th AW, USAF; 08-6206, 16-5862 & 18-5910 MC-130Js 9th SOS, 1st SOW, USAF all



In what has been billed the UK's military movement of the year, Royal Saudi Air Force Boeing RE-3A TASS (Tactical Airborne Surveillance System) 1901 climbs out of Waddington, Lincolnshire, bound for the US on September 31. See last month's *Military News* for more Kevin Bell

n/s. **18/9** 16-5883/RS C-130J-30 37th AS, 86th AW, USAF; 88-1301 AC-130W 6th SOS, 1st SOW, USAF dep 20th. **24/9** 84-0096 C-21A 76th AS, 86th AW, USAF o/s. **25/9** 12-3060 C-146A 524th SOS, 27th SOW, USAF n/s; 162872 E-6B VQ-4, USN. **26/9** 02-4452 C-32B 150th SOS, NJ ANG also 30th.

RAF NORTHOLT

4/9 258 Learjet 45 102 Sqn, Irish Air Corps also 14th, 22nd & 28th. **7/9** G-ETPH H125 ETPS. **9/9** MM62210 VC-900 31 St, Italian AF; T-785 Falcon 900EX LTDB, Swiss AF. **12/9** ZZ533 Wildcat HMA2 815 NAS, RN. **14/9** MM62245 VC-900 31 St, Italian AF. **20/9** 144619 CC-144D 412 Sqn, RCAF dep 22nd; 280 & 281 PC-12NGs 104 Sqn, Irish Air Corps. **21/9** 76-0171 C-12C USE Oslo n/s, also 23rd n/s. **23/9** 33/XA TBM 700 French AF. **30/9** L1-01 Falcon 2000EX Slovenian AF; 84-0087 C-21A 76th AS, 86th AW, USAF.

RAF SHAWBURY

2/9 ZJ220 Apache AH1 3/4 Regts, AAC also 16th. **8/9** ZH835 Merlin HM2 814 NAS, RN. **16/9** ZJ189 Apache AH1 3/4 Regts, AAC. **21/9** ZZ502 Avenger T1 750 NAS, RN; ZZ390 (also 22nd) & ZZ407 Wildcat AH1s 1 Regt, AAC. **22/9** ZZ501 Avenger T1 750 NAS, RN also 23rd. **23/9** ZM309 & ZM320 Prefect T1s 3 FTS, RAF.

RAF WADDINGTON

6/9 072/YA Xingu EAT319, French AF. **7/9** 69 Xingu 28F, French Navy also 9th. **9/9** ZP801 Poseidon MRA1 54/120 Sqn, RAF dep 11th. **13/9** 85 Xingu 28F, French Navy also 20th & 23rd. **15/9** 082/YG Xingu EAT319, French AF. **20/9** 11-5758 C-130J-30 41st AS, 19th AW, USAF n/s. **23/9** 09-9211 C-17A 62nd/446th AW, USAF. **29/9** ZP803 Poseidon MRA1 54/120 Sqn, RAF. **30/9** 1901 RE-3A 19 Sqn, Royal Saudi AF n/s, dep to USA for rework.



Luftwaffe Airbus A319-133(ACJ) FBS 15+03, callsign 'OSY11F', taxis at Brize Norton on September 29 following its Open Skies mission up and down the United Kingdom Tom Gautier

Swiss Air Force Pilatus PC-24 T-786 arrives at Lossiemouth from Benbecula on September 29 Niall Paterson



Airport Movements

A round-up of notable aircraft visiting UK airports



ABERDEEN INTNL

2/9 G-LMSA ATR 42-600 on delivery to Loganair.
7/9 M-JCBB Gulfstream G650. 9/9 A9C-BAH Gulfstream G650 Bahrain Royal Flight. 10/9 N650LC Challenger 605. 11/9 F-GJFE Beech 200; OE-GBH Phenom 300. 13/9 F-HTTL Challenger 605; TF-BBL 737-490(SF) Bluebird Nordic; N889DE Gulfstream V. 15/9 N83CW Gulfstream G650ER; N135CA Tecnam P2012 on delivery to Cape Air. 16/9 D-AFAB Challenger 604; D-CBBS Phenom 300. 17/9 LX-JFS PC-12. 19/9 OK-WAY Challenger 604. 20/9 OO-FAE Falcon 7X. 23/9 2-SHOT Hawker 750; OH-JFB PC-12. 24/9 D-IKCG CitationJet 525A CJ2+. 27/9 LX-LXX Gulfstream G650. 29/9 N91FX Global Express. 30/9 2-BILL Eclipse EA550.

BIRMINGHAM

1/9 EC-LZO 767-35D(ER) Privilege Style also 15th & 29th; EI-IMH A319-112 Alitalia f/v; D-CQAJ Learjet 35A; F-HSHB Citation 510 Mustang; OK-SLS Citation 560 V; PH-SFF PC-12 also 3rd. 2/9 I-BIMA A319-112 Alitalia f/v; 9H-CAP Avanti also 6th. 3/9 D-ACLX 737-45D(SF) CargoLogicAir f/v; HA-LVM A321-271NX Wizz Air; OE-GBD Astra SPX. 4/9 G-DHKN 757-223(PCF) DHL Air f/v to STS; OE-IHK A332 Wamos Air f/v to STS; dep 16th. 5/9 9H-FCM Lineage 1000 Air X Charter f/v; OO-CEJ CitationJet 525 CJ1. 6/9 CS-TKT 767-36N(ER) EuroAtlantic Airways also 19th; HA-LZA A321-271NX Wizz Air f/v; HB-AZC E190E2 Helvetic Airways. 8/9 D-BEER Legacy 500; D-IPPY Avanti. 9/9 CS-TKS 767-36N(ER) EuroAtlantic Airways; D-CAGA Phenom 300; OO-ACO Citation 510 Mustang. 10/9 HB-AZE E190E2 Helvetic Airways; OY-RUU A321-231 Danish Air Transport f/v also 12th. 11/9 TC-LCR B737MAX-8 Turkish Airlines f/v. 12/9 CS-DGW & CS-DVH CitationJet 525B CJ3s; OE-FMT Phenom 300. 13/9 PH-TFA 737-8K5 TUI Airlines Netherlands f/v; ES-PVP Learjet 60 also 15th; OE-

GLR Citation 680A Latitude+. 14/9 UR-CQD An-26B Vulkan Air; D-AWIN Legacy 650; D-BONN Falcon 2000EX also 16th. 15/9 D-CROG Phenom 300; ES-PVP Learjet 60; F-GLNF Beech 1900D Twin Jet; OE-GMM Citation 680 Sovereign. 16/9 N947BC BBJ1 Boeing Co f/v, to STS Aviation for Wedgetail conversion; 281 PC-12NG 104 Sqn, Irish Air Corps; F-HGET PC-12; LX-PCB PC-24; T7-VBS Global Express. 17/9 D-CHMS PC-24. 18/9 TC-LCC 737MAX-8 Turkish Airlines f/v; VP-BCJ 737-46Q(SF) Aviatrans Cargo Airlines f/v and 19th. 19/9 D-ATOP Legacy 650. 20/9 D-CNU Learjet 60; F-HPUR Hawker 800XP also 21st; N673HA Gulfstream G650 also 21st. 21/9 YR-MXC 737MAX-8 Blue Air also 28th; N29FR Global Express; OK-PBK CitationJet 525B CJ3. 22/9 D-FBOX PC-12; EI-GEA CRJ900LR CityJet; OO-AMR CitationJet 525A CJ2+. 23/9 N193LA Global 6000. 24/9 HA-LVZ A321-271NX Wizz Air f/v; HB-AZC E190E2 Helvetic Airways. 25/9 TC-LYB 737MAX-9 Turkish Airlines; YR-MXD 737MAX-8 Blue Air f/v; F-HLRS Phenom 300 also 26th; SP-CIT CitationJet 525 CJ1 also 29th. 26/9 D-AVIB Legacy 600; D-CHAT CitationJet 525B CJ3; N405CB Gulfstream G550. 27/9 9H-VIE Global 7500 VistaJet; OK-KIN CitationJet 525B CJ3 also 29th. 28/9 T7-ULS A330-343 San Marino Executive Aviation f/v; D-ARMY Legacy 650; HB-JSF CL650; OY-VLT PC-12. 30/9 9H-AFX Legacy 500; D-IETA Cessna 414A; OE-GDR CitationJet 525C CJ4.

BRISTOL

2/7 D-ARIE Falcon 7X dep 4th; LX-PCF PC-24. 5/7 D-CGER CitationJet 525B CJ3; F-HAJD CitationJet 525 CJ1. 10/7 LX-GJM Challenger 350. 12/7 D-IAAR Phenom 100 n/s; N51VE Gulfstream V dep 14th, also 15th-17th. 13/7 D-IAAD Phenom 100; M-CKAY Learjet 40. 15/7 S5-BBG Citation 550 II. 17/7 SE-DJI Falcon 7X. 20/7 T7-MCB Global XRS. 25/7 N920TT Beech

C.90B dep 30th. 26/7 F-GPNJ Falcon 900EX. 28/7 OY-EVO Citation 550 Bravo. 31/7 D-CAWB Citation 680 Sovereign n/s.

EAST MIDLANDS

1/9 VP-CGH 737-86N for painting for Transavia; N707CK 747-4B5(BCF) Kalitta Air also 29th. 2/9 D-AALT 777-F Aerologic first revenue flight; N740CK 747-4H6(BCF) Kalitta Air. 4/9 EC-NCK A330-243 Wamos Air. 5/9 SE-RIL Citation 560XLS also 20th. 6/9 4K-SW888 747-4R7F Silkway West; N743CK 747-446(BCF) Kalitta Air. 7/9 N744CK 747-446(BCF) Kalitta Air also 22nd & 25th. 8/9 SE-RVZ Citation 525M2; D-CHLR Phenom 300; N741CK 747-4H6(BCF) Kalitta Air also 14th. 9/9 N742CK 747-446(BCF) Kalitta Air also 10th, 16th & 17th. 10/9 OK-PPP Nextant 400XTi. 11/9 LZ-CXA 737-85F(SF) Compass Air Cargo f/v; N710CK 747-4B5F Kalitta Air also 21st. 12/9 N577UP 747-44A(F) UPS f/v; LX-EVM Falcon 2000LX; VP-BIN 747-83QF AirBridgeCargo. 13/9 9H-TGR Citation 525B CJ3; D-CAWX Citation 680 Sovereign+. 14/9 N608UP 747-8F UPS f/v also 17th, 19th, 20th, 23rd & 28th; N88FE Global 7500; LV-BSS Challenger 300; N579UP 747-45E(BCF) UPS f/v. 15/9 N979JW Falcon 7X; N580UP 747-428F UPS f/v also 18th; N712CK 747-4B5F Kalitta Air also 23rd & 24th; LX-TRO Legacy 650; VQ-BFE 747-83QF AirBridgeCargo; N625UP 747-8F UPS f/v. 16/9 N618UP 747-8F UPS f/v; PH-MYX Citation 650 VII; VQ-BOK Global 7500. 18/9 VQ-BFU 747-83Q(F) AirBridgeCargo; EC-KRN Gulfstream G200. 19/9 OK-NTU Nextant 400XT. 20/9 D-CARO Citation 680 Sovereign+; EC-MOM 787-8 Air Europa; RA-76511 IL-76TD-90VD Volga-Dnepr Airlines. 21/9 N610UP 747-8F UPS f/v also 25th & 27th; N583UP 747-4R7(F) UPS f/v. 22/9 N570UP 747-44A(F) UPS f/v. 23/9 N629UP 747-8F UPS f/v; N797CX Citation 750 X; OY-JJS Hawker 4000; N114HC Falcon 50EX. 24/9 N612UP 747-8F UPS



A highly unusual visitor to London Heathrow, United States Air Force Boeing C32B 02-5001, flies final for Runway 27L on September 23. Operated by the 486th Flight Test Squadron out of Eglin AFB, Florida, the aircraft arrived from Tel Aviv in Israel and departed for the US the following day Paul Phillips

f/v; N115QS Global 5000. **27/9** F-HTSB Citation 525B CJ3. **28/9** SE-RKB A321-251N Novair for painting. **29/9** 747-4R7(F) UPS f/v also 30th; N615UP 747-8F UPS f/v; EI-DAD 737-8AS (BCF) ASL Ireland/Prime Air. **30/9** OY-YDI ATR 72-600 Nordic Aviation Capital for painting for Loganair; VT-RUP Global 5000; 2405 A330-202MRTT 24 Sqn, Royal Saudi AF dep **1/10**; N614UP 747-8F UPS f/v.

GATWICK

2/9 LN-ENU 737-8JP Norwegian Air Shuttle f/v; YL-ABC A220-300 Air Baltic f/v. **4/9** 9H-VJZ Global 6000 VistaJet f/v. **7/9** CS-TST 767-34P(ER) EuroAtlantic Airways f/v; D-CTWO Learjet 35A f/v. **8/9** EC-NGX Citation 510 Mustang f/v. **9/9** G-IACZ ATR 72-600 Eastern Airways f/v; 985 767-3Y0ER Grupo 10, Chilean AF f/v; D-CAGA Phenom 300 f/v. **12/9** OM-JEX 737-8AS Air Explore ops for Iraqi Airways f/v. **13/9** D-AAHB Global Express f/v; G-CKUB Citation 560XLS+ f/v. **15/9** N679BP Global XRS f/v. **16/9** LN-ENO 737-8JP Norwegian Air Shuttle f/v; C-GOIK A321-271NX Air Transat f/v; N161B Gulfstream G600 f/v. **17/9** N630AB Challenger 350 f/v. **20/9** C-GOIW A321-271NX Air Transat f/v. **21/9** D-ABUP 767-3Q8ER Condor f/v; HA-LVQ A321-271NX Wizz Air f/v; N711LS Global 6000 f/v; T7-LLS Bell 429. **26/9** 606 Falcon 7X MH 59. Sz.D. REB. Hungarian AF f/v. **27/9** C-GOIS A321-271NX Air Transat f/v; EJ-ROXY Challenger 605 f/v; P4-BFY Gulfstream G550 f/v. **30/9** N4022J A321-271NX JetBlue Airways first service from JFK f/v; N620JH Gulfstream G550 f/v.

GLASGOW PRESTWICK

1/9 UR-UZM An-26B Constanta Airlines delivery flight; HB-FQU PC-12 PCH c/n 2123 on delivery. **2/9** 02-1105 C-17A 62nd/446th AW, USAF; 169036 C-40A VR-61, USN n/s; 87-0030 C-5M 60th/349th AMW, USAF n/s; 07-7189

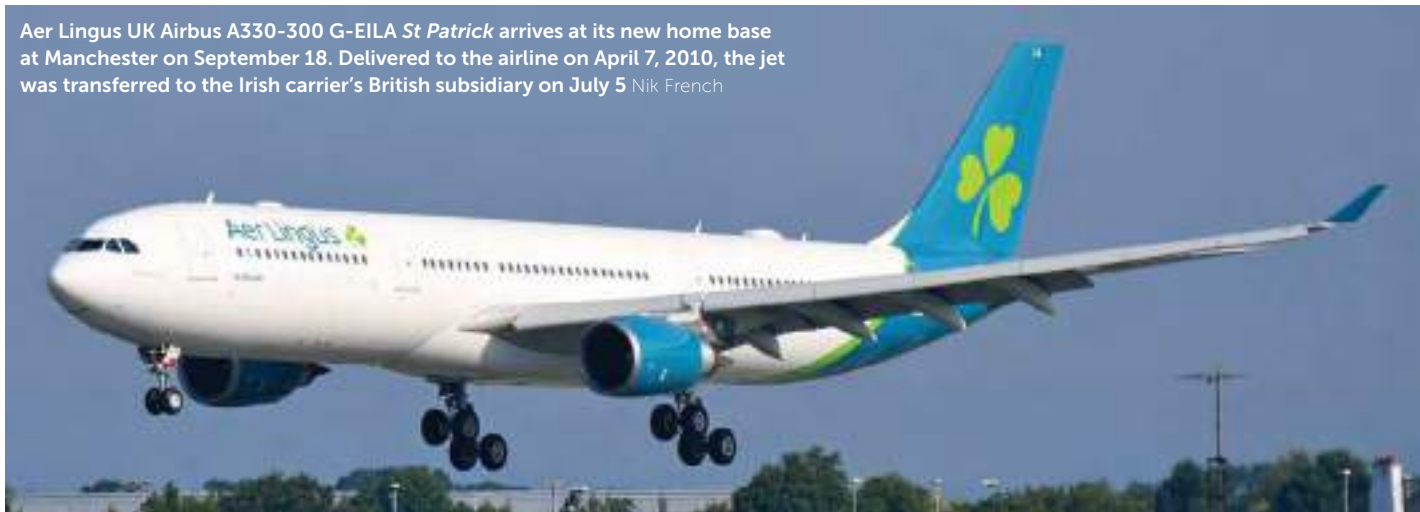
C-17A 437th/315th AW, USAF; 06-6161 C-17A 60th/349th AMW, USAF n/s; 06-6162 C-17A 60th/349th AMW, USAF n/s; OO-GLM Citation 680 Sovereign; SP-KPL Saab 340A Sprint Air; 99-0169 C-17A 437th/315th AW, USAF; 168980 C-40A VR-48, USN dep 10th. **3/9** 04-4132 C-17A 305th/514th AMW, USAF; 06-6166 C-17A 436th/512nd AW, USAF n/s; 86-0016 & 87-0030 C-5Ms 60th/349th AMW, USAF; 05-5145 C-17A 729th AS, AFRC n/s; 97-0045 C-17A 137th AS, NY ANG dep 5th. **4/9** 89-1190 C-17A 167th AS, WV ANG n/s. **5/9** 01-0186 C-17A 436th/512nd AW, USAF; **6/9** 96-6042 CN235-100 427th SOS, USAF; 97-0042 C-17A 155th AS, Tn ANG; EC-LYL Citation 560XLS+. **8/9** 00-0171 C-17A 517th AS, 3rd Wg, USAF; N8200R Dash 8-202 Dynamic Avlease ops for US SOC; 1211 C-130H UAE AF n/s; LX-FPF CitationJet 525A CJ3 also 11th; LX-FCB PC-24 dep 11th F-GMTJ Citation 510 Mustang. **9/9** LX-NCL 747-4EVF(ER) Cargolux; 09-9210 C-17A 62nd/446th AW, USAF n/s; 144619 CC-144D 412 Sqn, RCAF n/s also 17th. **10/9** EJ-ROXY Challenger 605; 06-6159 C-17A

60th/349th AMW, USAF n/s; EC-NCJ Citation 560XLS+; UR-CKL An-12BK Cavok Air n/s. **11/9** 08-8194 C-17A 62nd/446th AW, USAF also 20th; 06-6157 C-17A 60th/349th AMW, USAF; 5N-FGS Gulfstream V Nigerian AF; D-AHOX Legacy 650; 1229 C-17A UAE AF n/s. **12/9** 00-0180 C-17A 758th AS, AFRC n/s; C-FNCU Dash 8-Q311 Voyageur Airways, UN titles, c/n 517. **13/9** LX-RSQ Learjet 45; D-IETB Premier 1. **14/9** 10-0215 C-17A 437th/315th AW, USAF; HB-FQY PC-12 c/n 2127 on delivery; 164996/RU C-130T VR-55, USN. **15/9** HB-FQW PC-12 c/n 2125 on delivery; 165835 C-40A VR-57, USN. **16/9** N150QS Global 6000; ZJ189 & ZJ197 Apache AH1s 4 Regt, AAC fuel stops; D-IETB Premier 1; 08-8194 C-17A 62nd/446th AW, USAF. **17/9** 99-0058 C-17A 62nd/446th AW, USAF dep 20th; OH-CHF Citation 550 II dep 19th. **18/9** N5AW Cirrus SF50; N215BT Cessna 208A; 90-0535 C-17A 89th AS, AFRC; 01-0193 C-17A 437th/315th AW, USAF n/s also 20th. **19/9** 06-6159 C-17A 60th/349th AMW, USAF; OY-AWH PC-12; A6-RJY BBJ1 Royal Jet n/s;



On September 16, with the last rays of the setting sun catching its tail, Boeing Capital Corporation Boeing 737-73W(WL) BBJ N947BC taxis at Birmingham following its transatlantic delivery to resident STS Aviation Services. The aircraft is due to undergo conversion to an E-7A Wedgetail airborne early warning platform for the Royal Air Force John Mason

Aer Lingus UK Airbus A330-300 G-EILA *St Patrick* arrives at its new home base at Manchester on September 18. Delivered to the airline on April 7, 2010, the jet was transferred to the Irish carrier's British subsidiary on July 5 *Nik French*



87-0045 C-5M 436th/512nd AW, USAF n/s. **20/9** N797CX Citation 750 X; 01-0193 C-17A USAF; 97-0048 C-17A 89th AS, AFRC; N73730 737-3Q8/F c/n 26312 CSDS Aircraft Sales, on delivery to Yerevan. **21/9** 10-0218 C-17A 62nd/446th AW USAF n/s; N239KA Beech 200 c/n BB1701 n/s. **22/9** 05-5148 C-17A 535th AS, 15 Wg, USAF also 23rd; 02-1098 C-17A 305th/514th AMW, USAF n/s; 03-3119 C-17A 183rd AS, Ms ANG n/s also 25th n/s; UR-CNN An-12B Cavok n/s. **23/9** 07-7185 C-17A 437th/315th AW, USAF also 21st; 02-1101 C-17A 758th AS, AFRC; N940CW TBM 940; 08-8197 C-17A 62nd/446th AW, USAF. **24/9** 07-7189 C-17A USAF; 07-7185 C-17A USAF; D-CAAN Do.328-110 328 Support Services from Keflavik, escorting 19-2041, 19-2042, 19-2043 & 19-2044 Super Tucanos on delivery to Nigerian AF, all dep 26th; **25/9** HB-ALR ATR 72-212A Zimex Aviation. N488CR Challenger 650 Lasai Aviation ops for US Army; VT-IAH A319-115(ACJ). **26/9** 07-7171 C-17A 305th/514th AMW, USAF n/s; C-FYTY Beech 350 n/s. **27/9** 144620 CC-144D 312 Sqn, RCAF; HB-FRB PC-12 c/n 1230 on delivery; CS-EFF Citation 560XLS+; 01-0187 C-17A 62nd/446th AW, USAF n/s; UR-CJN An-12B Cavok dep 29th. **28/9** HB-FRD PC-12 c/n 2132 on delivery. **29/9** N797CX Citation 750 X; 15+03 A319-133(ACJ) FBS, German AF Open Skies; EI-DAN B738 ex Ryanair, ferried to Lasham. **30/9** EI-DAM B738 ex Ryanair, ferried to Lasham; 06-6158 C-17A 60th/349th AMW, USAF n/s.

GUERNSEY

1/8 N505H Bell 505. **2/8** HB-VHV BAe.125-800B dep 4th as M-ADDS. **5/8** 2-BILL Eclipse EA550 first flight as such, ex N118HX. **7/8** N990NA Eclipse EA500 f/v, delivered to Chapel Jets. **10/8** N95VB Beech C90GTi also 25th. **11/8** N250MD PA-31-310 f/v also 17th. **12/8** N7EY PA-30-160 dep 14th. **14/8** M-ALCB PC-24 f/v. **16/8** D-ISIS Citation M2 f/v. **18/8** N750MD Global 7500 f/v. **20/8** N1032X Mooney M20TN; F-HFMU Pipistrel Virus SW121. **23/8** M-LOOK Challenger 604 dep as M-CDAN. **25/8** EJ-REVA Hawker 800XP f/v. **27/8** D-CEMS CitationJet 525B CJ3. **30/8** D-ISIR CitationJet 525 CJ1+. **31/8** M-ABCC Global 6000 f/v, dep as M-ERCI.

HEATHROW

1/9 N190JA Global XRS f/v; SX-GNA A320-251N Sky Express Greece f/v; TC-NBZ A320-251N Pegasus Airlines f/v. **2/9** TC-NCD A320-251N

Pegasus Airlines f/v. **3/9** TC-NBA A320-251N Pegasus Airlines f/v. **4/9** F-HBNB A320-214 Air France f/v; TC-NBT A320-251N Pegasus Airlines f/v. **6/9** CS-TUH A330-941N TAP Portugal f/v; CS-TUP A330-941N TAP Portugal f/v. **7/9** A7-ACS A330-202 Qatar Airways f/v; D-CLIF Phenom 300 f/v. **8/9** C-GKUG A330-343E Air Canada f/v. **9/9** D-IGEL Beech 200GT f/v; TC-NCO A320-251N Pegasus Airlines f/v. **10/9** F-HSFJ Citation 680A Latitude f/v; G-TTNN A320-251N British Airways on delivery. **11/9** B-322Y A350-941 Air China f/v; YR-MXC 737MAX-8 Blue Air f/v. **12/9** B-LQF A350-941 Cathay Pacific Airways f/v; N226SJ Global Express f/v; TC-NCP A320-251N Pegasus Airlines f/v. **13/9** SU-GFP A320-251N Egyptair f/v. **14/9** B-322Z A350-941 Air China f/v; D-AIEK A321-271NX Lufthansa f/v; TC-NBN A320-251N Pegasus Airlines f/v; VP-BPQ A320-251N Aeroflot f/v. **15/9** B-LRE A350-941 Cathay Pacific Airways f/v. **17/9** B-LRO A350-941 Cathay Pacific Airways f/v. **18/9** A7-ACT A330-202 Qatar Airways f/v; P4-KGE A321-271NXSL Air Astana f/v. **19/9** B-LRU A350-941 Cathay Pacific Airways f/v; N945GS Gulfstream IVSP f/v; YR-MXD 737MAX-8 Blue Air f/v. **21/9** VN-A889 A350-941 Vietnam Airlines f/v. **22/9** 9H-AIS Legacy 600 f/v; EI-KGD A321-271NX Air Astana f/v. **23/9** 02-5001 C-32B 150th SOS, NJ ANG f/v. **24/9** 4K-SW008 747-4R7F Silk Way West Airlines f/v. **26/9** B-LQC A350-941 Cathay Pacific Airways f/v; JY-JVB A330-203 Jordan Aviation f/v; VN-A894 A350-941 Vietnam Airlines f/v. **27/9** B-LRR A350-941 Cathay Pacific Airways f/v. **29/9** P4-KGF A321-271NX Air Astana f/v. **30/9** B-LRF A350-941 Cathay Pacific Airways f/v; OY-JJJ Hawker 4000 f/v.

JERSEY AIRPORT

4/8 SP-CIT CitationJet 525 CJ1 also 14th. **5/8** 2-LATE Challenger 601-3A. **6/8** N119SX AW119 also 11th; OK-JRT Citation 680 Sovereign. **7/8** N30VG Cessna T.210N; OE-GCL CitationJet 525C CJ4. **8/8** D-AIRZ Legacy 650. **9/8** D-IKBO CitationJet 525A CJ2+. **12/8** F-HGSM DR.401/160A. **13/8** D-ASAP Legacy 650; N542TP Falcon 2000LX; PH-DTS DA42. **14/8** D-CBBS Phenom 300. **16/8** D-AHOI Legacy 650; HB-VVU PC-24. **17/8** N542GP Falcon 7X also 29th. **18/8** OK-PPP Nextant 400XT. **19/8** 9H-JCE HondaJet also 22nd; 9H-WIT PC-12; N576MH S-76C also 22nd. **20/8** D-IAKN CitationJet 525A CJ2+; F-HFMU Pipistrel Virus SW121. **21/8**

OO-SKS Citation 560XLS; N910RW TBM 910. **22/8** OK-NTU Nextant 400XT. **23/8** N613LF Gulfstream G550; N720LF Gulfstream G650ER; N818LF Gulfstream G550. **24/8** OO-SLM Citation 560XLS. **25/8** F-HNDI DR.400/140V; N542AP Gulfstream G500. **26/8** 9H-TGR CitationJet 525B CJ3; D-AAHO Legacy 650; OY-MSI Global Express. **27/8** OO-NEY Legacy 450. **29/8** F-HBMR Citation 550 II; N685AB Falcon 7X. **31/8** SE-RKL Gulfstream G550.

LEEDS BRADFORD

1/7 OY-JJK Hawker 4000 Sun-Air f/v; F-HELA ERJ145LR Valljet. **3/7** 9H-AMY Challenger 850. **6/7** 9H-ILB Challenger 850 VistaJet. **8/7** 9H-FRM Falcon 100 f/v. **9/7** 9H-JPC Legacy 600 Air X Charter. **10/7** 9H-WCF Hawker 850XP f/v; OE-FUX CitationJet 525A CJ2. **12/7** D-AHOX Legacy 650; D-ARMY Legacy 650E. **13/7** 2-FFLY Cirrus SR22T; OO-ACC CitationJet 525A CJ2+; 9H-ILA Challenger 850 VistaJet. **15/9** N260AM CitationJet 525 CJ1 f/v. **19/7** D-CBBS Phenom 300. **20/7** T7-SST Phenom 300 f/v; D-ATOP Legacy 600; D-CEIS Citation 680 Sovereign. **23/7** D-CQAB Learjet 45XR; F-HATV Citation 680A Latitude. **24/7** EC-KRN Gulfstream G200. **29/7** EC-MLV Citation 680 Sovereign; OE-GWS Citation 560XLS+. **30/7** OK-SLS Citation 560 V Silesia Air f/v. **31/7** LX-GJM Challenger 350.

LIVERPOOL JOHN LENNON

1/7 TF-BBO 737-46B(SF) Bluebird Nordic, OY-VNS Vulcanair P68C BioFlight also 30th n/s. **2/7** OK-NTD Nextant 400XT n/s. **3/7** CN-TKC Hawker 800XP. **5/7** YL-RAG Saab 340A(F) RAF-Avia. **8/7** EC-MLV Citation 680 Sovereign. **9/7** F-HCEQ HondaJet. **10/7** D-CAWX Citation 680 Sovereign+; SE-RNR Challenger 350; ZZ419 Shadow R1+ 14 Sqn, RAF o/s. **14/7** D-CBAY Citation 680 Sovereign. **15/7** ZZ416 Shadow R1 14 Sqn, RAF o/s. **16/7** F-HJAV CitationJet 525 CJ1; 9H-LAJ A320-232 Ryanair f/v; D-BUBI Challenger 350. **17/7** SP-CEZ Learjet 60 n/s. **19/7** PH-CUA Saab 340B Jet Netherlands; OK-EAS Beech 400XP also 21st. **20/7** OE-GWV Citation 560XLS also 23rd n/s; N980AE Commander 695; D-FUNC Cessna 208B Itzehoe Air Service; HA-LVX A321-271NX Wizz Air f/v. **21/7** YR-MXA 737Max-8 Blue Air type f/v n/s. **22/7** OK-PPP Beech 400XP n/s. **24/7** 9H-BOO Challenger 850; D-BAHB Falcon 2000LX. **28/7** LY-VUT A320-232



Heston Airlines n/s. **29/7** 9H-CLG Challenger 850 n/s. **30/7** YU-RDA Citation 560XLS+; 9H-DOM Challenger 850; 9H-LOR A320-214 Ryanair f/v; OY-VPS Vulcanair P68 Observer BioFlight n/s; D-CKJE & D-CMXM Phenom 300s both n/s. **31/7** OO-KIN Citation 680 Sovereign.

LONDON BIGGIN HILL

2/7 D-CHMS PC-24; LX-RHC Challenger 605 dep 28th; N716AS Gulfstream V dep 20th; T7-SRC Challenger 650 dep 12th. **3/7** D-FCYW PC-12; OE-GCL CitationJet 525C CJ4. **4/7** 9H-TGR CitationJet 525B CJ3. **5/7** S5-BBC Citation 560XLS+; T7-GER PC-12 dep 14th. **6/7** D-BOLT Praetor 600 n/s; LN-BSE Beech 250; T7-SST Phenom 300. **7/7** N1AR Global Express dep 24th. **8/7** OH-FAY PC-12 n/s. **10/7** F-HCEQ HondaJet. **11/7** N240V Hawker 800XP n/s; 2-COOL Avanti II; ZZ419 Shadow R1+ 14 Sqn, RAF. **14/7** 9H-IAR Challenger 605 dep 16th. **15/7** N155QS Global 6000; OO-MST Citation 510 Mustang. **18/7** OO-RKS Citation 510 Mustang. **19/7** F-GUNN Citation 560XL. **20/7** N360KA Beech 360. **21/7** D-ISIR CitationJet 525 CJ1+. **22/7** SE-RVZ Citation 525M2. **23/7** ZZ410 Wildcat AH1 847 NAS, RN. **24/7** D-AEOM Challenger 604 n/s; SX-KKA Legacy; 9H-JET CitationJet 525A CJ2 n/s. **25/7** L1-01 Falcon 2000EX Slovenian Government n/s. **26/7** ES-NXT Nextant 400XT n/s; OE-GXT CitationJet 525C CJ4 n/s; OH-EAU PC-12. **27/7** D-AVOS Legacy 650 n/s; G-CMEB Challenger 605 first reported as such, ex G-RANE; LN-AOA/EN570 Spitfire IX with Heritage Hangar for rebuild. **28/7** D-CFAR Learjet 60; N450AZ Gulfstream G280 dep 30th; SP-KPL Saab 340A Sprintair. **29/7** D-IGER Beech 200GT; N260CL Citation 680A Latitude; 2-SHOT Hawker 750. **30/7** PH-JRC Legacy 600.

LONDON LUTON

1/9 D-AGRO Global XRS; T7-DMA Challenger 605; SX-KKA Legacy. **2/9** D-BJUG Legacy 500. **3/9** N644RV Falcon 2000. **7/9** HB-JIM Falcon 8X; N776AG Gulfstream G280; OH-FLG PC-12. **8/9** OH-CHF Citation 550 II; F-HTSB CitationJet 525B CJ3. **9/9** N9013J Global Express; ZS-ULT Learjet 45. **10/9** N801QS Citation 700 Longitude; N828SN Gulfstream G650ER; 9H-WIT PC-12; N989JW Falcon 8X; OE-FMT Phenom 100E. **12/9** N979JW Falcon 7X; N2313A Global 6000; 9H-AFX Legacy 500. **13/9** N702LT Gulfstream G400; LX-RHC Challenger 605. **14/9** T7-CAPE

Following nearly six hours of delays due to flight plan issues, Royal Saudi Air Force Airbus A330-202 (MRTT) 2405 taxis for departure from East Midlands on October 1. Adorned in a stunning special scheme to celebrate Saudi Arabia's 89th National Day in 2019, the jet flew as tanker support for RE-3A 1901 (see Airbase Movements, p60) Karl Nixon

Gulfstream G600. **17/9** N13JS Gulfstream G650; F-HEGA Phenom 300; P4-BFM Challenger 605; D-CEMS CitationJet 525B CJ3; OK-WAY Challenger 605. **19/9** PH-CDE 737-8KN Corendon Dutch Airlines; SP-RIO Premier 1A; T7-SFG Global 6000; N405JS Gulfstream IVSP; N803QS Citation 700 Longitude. **20/9** N401VP Global XRS; N953GA Gulfstream G600. **21/9** N879HB Gulfstream G550; OE-GYS CitationJet 525B CJ3+. **22/9** OE-HWJ Citation 750 X. **23/9** N121RS Global 7500; SP-WMT Learjet 75; D-ILAP Phenom 100. **24/9** N729KF Global 7500; SP-AGA PC-24; 9H-XOB Citation 560XLS. **25/9** S5-CES CitationJet 525B CJ3+; OM-FLY Citation 560XLS+. **26/9** 9H-ICY Challenger 601-3A; D-CHRG Citation 680A Latitude. **27/9** HB-VAJ Phenom 300; N260DL Gulfstream G550. **28/9** D-CHMS PC-24. **29/9** SP-OMI Praetor 600; D-ACCF Global XRS; D-CIKS Phenom 300; N1DS Gulfstream G650ER.

LONDON SOUTHEND

2/9 LX-MIC Falcon 2000S f/v. **3/9** 2-LYCO PA-39-160C/R f/v; A7-HMD EC155B1 Air Harrods. **8/9** N21GB Cessna 310R f/v also 11th; PH-CGC Do.228-212 Royal Netherlands Coast Guard. **9/9** ZZ419 Shadow R1+ 14 Sqn, RAF f/v; N788DP BBJ1 dep 19th. **16/9** N322K Gulfstream G550 f/v; N27V Beech 200 International Aviation Support, f/v, on delivery to Kenya, registration 5Y-SFW taped over, dep 22nd. **17/9** OO-PCM PC-12 f/v; G-CJNI & G-CHNS AW139s Bristow Helicopters, both Norwich diversions & f/vs. **18/9** F-HBTB Citation 510M2 f/v. **24/9** OY-VNS Vulcanair P68C BioFlight f/v

MANCHESTER

1/9 A6-EUO A380-842 Emirates, resumption of A380 ops; N83CW Gulfstream G650ER f/v. **2/9** B-LXM A350-1041 Cathay Pacific f/v; OE-LIO Global 5000 f/v. **3/9** EC-MRR Falcon 2000LX f/v. **4/9** 9H-VUC 737MAX-8200 Malta Air f/v; 9H-LMI A320-214 Ryanair; OE-GJB Citation 560XLS+ f/v. **5/9** EC-NGX Citation 510 Mustang f/v; OH-

FLG PC-12 f/v. **6/9** TF-ICO 737MAX-8 Icelandair f/v. **7/9** B-LXO A350-1041 Cathay Pacific f/v; EC-NLV A321-211(SL) Vueling f/v; EC-MVC CRJ1000NG Iberia Regional; D-AAHO Legacy 650 f/v; OH-DEN PC-12 f/v. **8/9** D-CVMS PC-24 f/v. **9/9** OK-BZZ Beech 400XP f/v; N988NW Falcon 7X f/v. **11/9** B-LXN A350-1041 Cathay Pacific f/v; A7-BEQ 777-300ER Qatar Airways f/v; 9H-LOZ A320-232 Ryanair; OE-IGL Global 6000 f/v; SP-DOM Learjet 60 f/v. **12/9** YL-AAR A220-300 Air Baltic f/v. **13/9** HB-JDB A320-271N Swiss International f/v; 9H-ZAZ 737-436 Air Horizont f/v; HB-JVN E190LR Helvetic Airways. **14/9** D-AZFA E190LR German Airways f/v; N88D Global Express f/v; OE-GDM Citation 560 Encore+ f/v. **15/9** F-HJAV CitationJet 525 CJ1 f/v; OH-JFC PC-12 f/v; 280 PC12NG 104 Sqn, Irish Air Corps; ZK554 & ZK556 Chinook HC6s 7 Sqn, RAF both f/vs. **16/9** F-HMUT Beech 350 f/v. **17/9** HB-JCU A220-300 Swiss International f/v; 02-0201 C-40C 201st AS, DC ANG f/v, dep 19th; D-BANN Challenger 300 f/v; N19H Gulfstream V f/v. **18/9** G-EILA A330-302E Aer Lingus UK f/v, arrival for new Manchester Long Haul Base; SP-RZC 737MAX-8200 Ryanair f/v; 9H-LOS A320-214 Ryanair; B-8287 A330-343E Hainan Airlines; UR-CQD An-26B Vulkan Air f/v; N697PF Gulfstream V f/v; SX-AQG Citation 560XL f/v. **19/9** MM62244 VC-900 93 Gr, Italian Air Force. **21/9** OE-GSE Learjet 60 f/v. **22/9** EC-IZR A320-214 Iberia f/v; JY-JVB A330-203 Jordan Aviation ops for Pakistan International. **24/9** TF-ICC 737MAX-9 Icelandair f/v; YU-PAA Legacy 600 f/v; LN-MER PA-46-500TP f/v. **25/9** B-LQD A350-941 Cathay Pacific f/v; 9H-VUE 737MAX-8200 Malta Air f/v; **26/9** YL-ABC A220-300 Air Baltic f/v. **27/9** EC-NIJ A320-271N Vueling f/v. **28/9** EC-MKL 737-85P Air Europa; YU-SXX Citation 550 Bravo f/v; EJ-ROXY Challenger 605 f/v. **30/9** TC-JNN A330-343 Turkish Airlines f/v; I-MCAM Citation 525M2 f/v.

TEESSIDE INTNL

4/8 HB-KRJ TBM 930. **8/8** D-IZRH CitationJet 525A CJ2 n/s. **13/8** 2-LAND Commander 114B. **14/8** EJ-ROXY Challenger 605 also 28th. **18/8** HB-IVJ Gulfstream G650. **21/8** SE-RIL Citation 560XLS. **22/8** D-CAGA Phenom 300. **24/8** N8833 Gulfstream G650 Newcastle fog diversion. **25/8** 2-NGUS DA42NG o/s. **31/8**; D-CKJE Phenom 300 n/s.

Key: f/v first visit; n/s night stop; 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.dtmovements.co.uk, Aerodata Quantum Plus and RHADS.

At the fence

A variety of aircraft and movements caught worldwide by the *Aviation News* community

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Above: Stuart Haigh caught Alaska Airlines marked Boeing 737-9 MAX N60436 departing a dimly wet and grey Glasgow Airport on October 8. The jet, which is the US aviation giant's latest ecoDemonstrator, arrived in the early hours of October 4 to attend a two-day event promoting innovation and sustainability hosted by the Scottish airport and the manufacturer SH



Left: De Havilland Canada DHC-8-314Q Dash 8 OY-CJY passed by Ian Simpson's lens at Exeter International Airport, Devon, on August 30. Bound for Australian carrier Maroomba Airlines as VH-QQP, it is seen taxiing for departure for the first leg of its mammoth delivery flight to the Antipodean nation. However, the aircraft suffered a technical issue and was forced to return to its stand
Ian Simpson

Main photo: William Jardim caught Lockheed Martin F-35I 'Adir' 947 on delivery to the Israeli Air Force on September 24. Seen landing at Naval Air Station Rota, Spain, the low observable fifth-generation jet was one of three (the others being 945 and 949) bound for Nevatim Air Base, Israel. It is reported the aircraft joined 140 'Golden Eagle' Squadron. Of interest, the three aircraft displayed USAF markings during their delivery flight William Jardim

Right: On October 1, James Ronayne shot Phenom 100E M-TOMY arriving at Cranfield, Bedfordshire, from Enniskillen Airport, Northern Ireland. Wearing its former Etihad Aviation Training colours where it was registered A6-EFB, the 2016-built jet was listed with Guernsey-based TGTA on September 9 James Ronayne

Below: Marco Rossi was at Italy's Turin-Caselle Airport on July 19 when the third Leonardo P-72B maritime patrol aircraft for the Gruppo Esplorazione Aeromarittima della Guardia di Finanza (GdF, Air and Sea Patrol Group of Customs Police) returned from a check flight. Initially carrying the serial C.S.X.62321, the aircraft was delivered to the GdF at Pratica di Mare Air Base on September 28, as M.M.62321 Marco Rossi

Grey nose: Joe Walker caught Royal Air Force Boeing P-8A Poseidon ZP807 rolling out at the Boeing Field facility, Seattle on October 4. The maritime patrol aircraft has since been delivered to RAF Lossiemouth, Scotland (see p54 of this issue)

Joe Walker



Below: Richard Porter spotted former Eastern Airways Embraer ERJ-145LR G-CISK at North Lincolnshire's Humberside Airport, Hull, awaiting delivery to Democratic Republic of Congo (DRC) carrier Mwant Jet on August 25. The aircraft, which has been assigned the DRC registration 9S-AMG, was noted leaving the airport on September 3 bound for Sidi Ahmed Airport in Tunisia Richard Porter

Bottom: José Ramón Valero photographed Airbus A330-243MRTT Phénix EC-333 arriving back at the manufacturer's Getafe facility near Madrid, Spain, on October 13 following painting at Châteauroux in France. Bound for the French Air and Space Force as F-UJCL/046, the jet will join the 31e Escadre Aérienne de Ravitaillement et de Transport Stratégiques, Istres-Le Tubé Air Base José Ramón Valero





Above: While shooting the traffic at Split Airport on August 27, Richard Vandervord spied Albanian Air Force Eurocopter AS532AL Cougar FA-633 transiting out over the Adriatic Sea. The aircraft is operated by the Regjimenti i Helikopterëve (Helicopter Regiment) headquartered at Tirana International Airport in central Albania
Richard Vandervord



Left: All the eights! Richard Vandervord captured Croatian Air Force Canadair CL-415 888 climbing away from Split Airport (also known as Resnik Airport) on August 22. The aircraft is one of six on strength with the air arm's 855. protupožarna eskadrila (885 Firefighting Squadron) out of the 93rd Air Force Base in Zadar
Richard Vandervord



Below left: Richard Vandervord caught French freight carrier GEODIS Air Network Airbus A330-343(P2F) G-EODS while undertaking crew training at Stansted Airport on September 7, 2021. Operated by Titan Airways and leased from Japanese lessor JP Lease (JLPS), the 15-year-old jet was delivered to the airline on August 27.
Richard Vandervord

Below: October 12: Editor Jamie Ewan caught Royal Danish Air Force General Dynamics F-16AM (MLU) Fighting Falcon E-598 leaving RAF Coningsby following a brief stop. Operated by Skrydstrup-based 727 Eskadrille, the jet departed for trials work at the nearby Air Weapons Range at RAF Donna Nook
KEY-Jamie Ewan



Register Review

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



RESTORATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-BPES	402CEE	Piper PA-38-112 Tomahawk	38-81A0064	MA Lee, Teesside International, Co. Durham
G-BRDW	400FFA	Piper PA-24-180 Comanche	24-1733	IP Gibson, (Esher, Surrey)
G-BSWO	407C7F	Britten-Norman BN-2B-26 Islander (built by Pilatus Britten-Norman Ltd)	2243	Islander Aircraft Ltd, Cumbernauld, North Lanarkshire
G-BTRC	403494	Light Aero Avid Speedwing (built by AA Craig)	PFA 189-12076	H Bishop, (East Grinstead, West Sussex)
G-CBUB	4009DC	Bell 412EP	36297	FB Leasing Ltd trading as Draken Europe, Bournemouth, Dorset
G-CFXN	406078	CZAW Sportcruiser (built by R Underwood & JD Boyce)	LAA 338-14903	H Bishop, (East Grinstead, West Sussex)
G-DOLS	40116F	Piper PA-28-236 Dakota	2811046	N Shell Drake, Tibenham, Norfolk
G-MWXX	40353C	Cyclone Chaser S447	CH831	NR Beale, Poplars Farm, Deppers Bridge, Warwickshire
G-MWYT	40356C	Mainair Gemini Flash IIA (Modified)	881-0392-7-W676	C Richards, (Roushill, Shropshire)
EI-SIB	4CACB5	Airbus A320-251N	7951	Scandinavian Airlines Ireland Ltd, Stockholm-Arlanda, Sweden
EI-STH	4CA349	Boeing 737-439	25729	ASL Airlines (Ireland) Ltd, Dublin, Co. Fingal (NB)

NEW REGISTRATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-CMBU	407C06	Cameron Z-80	12476	Hop Auctions.Com Ltd, (Howden, East Riding of Yorkshire)
G-CMCE	407CA8	Cameron Z-77	12468	Airship & Balloon Company Ltd, (Henbury, City of Bristol)
G-CMCH	407CAE	Cameron Cloud Baby-110	12412	Cameron Balloons Ltd, (Bristol, City of Bristol)
G-CMCJ	407CBD	Kolb Twinstar Mk.III Xtra	PFA 205-14411	CF Janes, (Portsmouth, Hampshire)
G-CMCN	407CDC	Flylight Bivvybee	DA215	CJ Tomlin, Sywell, Northampton
G-CMCO	407CDD	Rand KR-2	PFA 129-12516	FJ Snell, (Calne, Wiltshire)
G-CMCP	407CE1	Cessna 120	11783	AJ Brophy, (Hampton, Greater London)

Cancelled from the Swedish register on August 26, former Braathens Regional Airlines Avro RJ100 SE-RJI joined the Isle of Man register as M-ABOS on September 13. Owned by Eastgate Investments and currently stored at Norwich International Airport, the jet is expected to join Bolivian carrier Linea Aérea EcoJet S.A Bene Riobó

G-CMDE	407CC6	UltraMagic M-130	130/83	JCM Greatrix, (Winchester, Hampshire)
G-DOOG	407CBC	TL Ultralight TL-2000 Sting S4 (built by TL Ultralight SRO)	20 ST 487	VMBC Ltd, (Stotfold, Hertfordshire)
G-DOUN	407CBA	Agusta A109S Grand	22162	Eagle Moon Ltd, (St Helier, Jersey)
G-DRTJ	407C6D	Boeing 737-86N	35647	Jet2.Com Ltd, Leeds-Bradford, West Yorkshire (NB)
G-DVII	407B86	Leonardo AW139	31957	Executive Jet Charter Ltd, Bristol, North Somerset
G-EMEF	407C0F	Sikorsky S-92A	920194	CHC Scotia Ltd, Aberdeen, City of Aberdeen
G-ESJA	407C9F	Aerospatiale SA318C Alouette Astazou	2068	Gudbergur Gudbergsson, (Mosfellsbae, Iceland)
G-HAPZ	407B3A	Pipistrel Alpha BCAR-S-164	AT1640010	Fly About Aviation Ltd, Church Farm, Shipmeadow, Suffolk
G-HAYZ	407C2A	Airbus AS350B3 Ecureuil	8835	Airbus Helicopters UK Ltd, Oxford, Oxfordshire
G-HFZA	406E7F	Dornier 228-200	8046	Zeroavia Ltd, Cotswold, Gloucestershire
G-HUGB	401961	Bell 47G-5	2639	UGB Aviation Ltd, (Exeter, Devon)
G-HWPK	407CC9	TAF Sling 4	LAA 400-15721	D & AP Alvis, (Bagshot, Surrey)
G-KINZ	407C84	AutoGyro MTOSport (assembled by Rotorsport UK Ltd)	RSUK/MTOS/065	M Law, (Kelty, Fife)
G-KNSL	407275	Eurocopter EC135T2+	848	Babcock Mission Critical Services Onshore Ltd, Gloucestershire (NB)
G-LCAH	4079D3	Embraer 190	19000564	BA Cityflyer Ltd, London City, Greater London
G-LITN	407CDE	Murphy Renegade Spirit UK	PFA 188-13193	GR Litton, (Wolverhampton, West Midlands)
G-LOEZ	407CD0	Rutan Long-EZ (built by C Moffatt, CJ Perkins & GL Thompson)	PFA 074A-11073	CJ Perkins, (Ashbourne, Derbyshire)
G-NGLZ	404BF9	Bell 206B JetRanger III	4466	NA Allen, (Walton-on-Thames, Surrey)
G-OEKO	407CCC	Pipistrel Virus SW 128	VSW1280042	Fly About Aviation Ltd, Church Farm, Shipmeadow, Suffolk



Boeing 737-8 MAX N6063S – seen here during a test flight from Boeing Field, Washington, in August 2020 – was delivered to Irish airline Ryanair as EI-HAT on September 13, 2021 v1 Images-Huy Do

G-OSNJ	4067D7	North American SNJ-5 Texan	88-17282	Smoking Hole LLP, Oxford, Oxfordshire
G-PSLT	407C85	Cameron Z-105	12469	IJ Martin & DJ Groombridge trading as Flying Enterprises, (Wootton-under-Edge, Gloucestershire)
G-RNCA	407CCF	Aeronca 11AC Chief	11AC-S54	CJ Perkins, (Ashbourne, Derbyshire)
G-RODW	407BF6	Aeropro EuroFOX 2K (assembled by Ascent Industries Ltd)	62521	RB Webb, (Lidlington, Bedfordshire)
G-SCFG	407CDA	Cessna 152	152-82748	Cristal Air Ltd, Spilsted farm, Sedlescombe, East Sussex
G-SLPC	407CC7	TAF Sling 4 TSi (built by AJ Seymour)	LAA 400A-15725	Aakos Ltd, (Navenby, Lincolnshire)
G-SNEL	407CE3	Aeriane Swift Light PAS	131	S Snell, Darley Moor, Derbyshire
G-SNSL	407CA9	Agusta AW139	31511	CHC Scotia Ltd, Aberdeen International, Aberdeenshire (NB)
G-TTNN	4079F7	Airbus A320-251N	10344	British Airways PLC, London Heathrow, Middlesex
G-ULLI	407CC8	Best Off Skyranger Nynja LS 912S(1)	BMAA/HB/734	PJ Gulliford, (Newton Tracey, Devon)
G-ULTC	407B9E	Airbus BK117D-2	20089	Starspeed Ltd, (based on MV Ultramarine)
G-UNNN	407C14	Aeropro EuroFOX 3K (assembled by Ascent Industries Ltd)	62321	SPS Dornan, Kirknewton, West Lothian
G-UXLA	407CCB	Learjet 40	45-2018	Saxonair Charter Ltd, Norwich International, Norfolk (NB)
G-VXEN	407C6B	Aeroprakt A32 Vixxen	LAA 411-15762	SJ Wakeling, (Amington, Staffordshire)
G-ZLNN	407CC1	Zlin Z.326 Trener (built by Moravan Narodni Podnik)	880	PA Coleman, Luxters Farm, Hambleton, Buckinghamshire
G-ZOLA	407CBB	Diamond DA 42NG Twin Star	42.N105	AJW Construction Ltd, Elstree, Hertfordshire
EI-GRD	4CABC8	Robin DR100/160 Chevalier	733	M Duffy & O Shkrogal, (Enniscrone, Co. Sligo)
EI-GVE	Not allotted	Airborne Windsports Edge XT-912 L-SST	XT912-354	J McQuoid & J Porter, (Hacketstown, Co. Carlow)
EI-GWL	4CAC40	Airbus A320-232	5027	Macquarie Aerospace Finance 5027 Ltd,
EI-GXV	4CAC67	Airbus A320-232	5155	Macquarie Airfinance Acquisitions (Ireland) Ltd,
EI-HAT	4CA92B	Boeing	65076	Ryanair DAC, Dublin, Co. Fingal (NB)
EI-HGG	4CAC20	Boeing	62316	Ryanair DAC, Dublin, Co. Fingal (NB)
EI-KBD	4CABFD	Airbus A320-232	5870	Saryarka Aviation Ltd, Almaty, Kazakhstan (operated by Air Astana)
EI-KBH	4CAC01	Airbus A320-271N	7124	ALC Aircraft Ltd, Almaty, Kazakhstan (operated by Air Astana)
EI-KDB	4CAC09	Airbus A321-231	5870	Saryarka Aviation Ltd, Almaty, Kazakhstan (operated by Air Astana)

EI-KGD	4CAC13	Airbus A320-271NX	9432	ALC Aircraft Ltd, Almaty, Kazakhstan (operated by Air Astana)
EI-STW	4CAC6D	Boeing 737-4M0	29201	ASL Airlines (Ireland) Ltd, Dublin, Co. Fingal (NB)
EJ-JMMM	4CAC5D	Bombardier Global Express XRS	9387	ACASS Ireland Ltd, Shannon, Co. Clare (NB)
M-ABOS	424BCA	British Aerospace Avro 146-RJ100	E3357	Eastgate Investments (London) Ltd, Stored at Norwich International, Norfolk
M-AJET	424BCE	Bombardier Global 6500	60023	Jetology GmbH, Vienna International, Austria
M-AKER	424BC4	Embraer EMB-135BJ Legacy 650	14501173	Bestavia Holdings Ltd, TBA
M-ALEY	424BC2	Bombardier Challenger 605	5906	Bestavia Holdings Ltd, TBA
M-KAPP	424BD0	Agusta A109C	7630	VR Kappler trading as Flexible Trading, Bergneustadt, Germany
M-SFPL	424BCC	Bombardier Global 6000	9692	Jasoom Development Ltd, Larnaca, Cyprus
M-TOMY	424BCF	Embraer EMB-500 Phenom 100	50000371	TGTA Ltd, TBA
2-COOK	43EE43	Cessna 525 Citation M2	525-1077	William Cook Aviation Ltd, Retford Gamston, Nottinghamshire
2-DTAL	TBA	Canadair Regional Jet 100	7086	Concave Investments Ltd, (stored Vilnius, Lithuania)
2-GATE	TBA	Boeing 737-8AS	33813	TC Aviation Capital Ireland Ltd, (stored Dothan, AL for freighter conversion)
2-MICK	TBA	ATR-72-212A	1099	ACIA Aero Leasing Caspian Sea Ltd, (stored Kuala Lumpur-Sepang, Malaysia)
2-PASF	TBA	Diamond DA42 Twin Star	42.245	Tesla Solutions Ltd, Gloucestershire
2-SHSV	TBA	Airbus A330-343	1648	AP Leasing 1648 DAC, (stored Teruel, Spain)
2-VIHA	TBA	Airbus A320-232	3330	Sunset Leasing Ltd, (stored Jakarta, Indonesia)
2-VSLP	TBA	Airbus A320-233	5089	Viking 5089 Pte Ltd, (stored Singapore-Changi)
2-WKTK	43EE55	Beech 200T King Air	BY-15	Dynamic Avlease Inc, Retford Gamston, Nottinghamshire



Built in 1991, Augusta A109C G-SLAR was cancelled from the UK register on September 17 and transferred to Australia James Smith

CANCELLATIONS

REG'N	TYPE	C/N	REASON
G-AZHK	Robin HR100/200B	113	Cancelled as Permanently WFU (CoFA expired 28.10.19, To Ayr College as Instructional Airframe 09.21)
G-BJPI	Bede BD-5G	1	Cancelled by CAA (No Permit to Fly issued, believed not completed)
G-BKGL	Beech 3TM	CA-164	Cancelled as Destroyed (crashed at Lisolotta, Torra Vescovato, Corsica 14.09.21)
G-BMSC	Evans VP-2	PFA 063-10785	Cancelled by CAA (Permit to Fly expired 29.04.05)

G-BMVL	Piper PA-38-112 Tomahawk	38-79A0033	Cancelled by CAA (crashed at Caernarfon, Gwynedd 11.10.18)
G-BUTK	Murphy Rebel	PFA 232-12091	Cancelled as Permanently WFU (Permit to Fly expired 17.09.18)
G-BZEU	Raj Hamsa X'Air 582(8)	BMAA/HB/140	To Republic of Ireland
G-BZGS	Mainair Blade 912S	1242-0300-7-W1035	Cancelled by CAA (Permit to Fly expired 11.07.18)
G-CDKA	SAAB 2000	2000-006	To USA as N506FR
G-CGAJ	Alpi Pioneer 300	01	To Italy
G-CGVH	Flylight Motorfloater	MF003	Cancelled as Permanently WFU (SSDR microlight so no Permit to Fly required)
G-CHIA	North American SNJ-5 Texan	88-17282	Re-registered as G-OSNJ
G-CHMG	ICA Bravov IS-28B2	353	To Serbia
G-CISK	Embraer EMB-145LR	145570	To Democratic Republic of The Congo
G-CKWA	Boeing 787-9	63315	To Malta
G-CKWF	Boeing 787-9	63316	To Austria as OE-LCO
G-CLRX	Sikorsky S-92A	920047	Cancelled as Permanently WFU (CofA expired 29.05.21, parted out at Aberdeen 11.20)
G-CLXC	Bombardier DHC-8-402	4014	To Canada as C-GXNL
G-CLYT	Pipistrel Alpha BCAR-S 164	AT1640010	Re-registered as G-HAPZ
G-CLZN	Airbus AS350B3 Ecureuil	8835	Re-registered as G-HAYZ
G-CMBI	Aeroprakt A32 Vixxen	LAA 411-15782	Re-registered as G-VXEN
G-CTSB	Diamond DA40NG Star	40.N283	Cancelled by CAA (crashed at Cranfield 12.12.20)
G-DAYR	Bombardier Challenger 605	5764	To Malta as 9H-ALD
G-ECHB	Dassault Falcon 900EX	623	To Austria as OE-IGE
G-ECOF	Bombardier DHC-8-402	4216	To USA as N881WM
G-ENZO	Cameron Z-105	10914	Cancelled by CAA (CofA expired 29.06.18)
G-EZWJ	Airbus A320-214	5638	To USA as N207NV



Saryarka Aviation added Air Astana Airbus A320-232 P4-KBD to the Irish register as EI-KBD on September 10. The company is based in Dublin, Ireland JOSO Photos

G-FLBC	Bombardier DHC-8-402	4257	To Canada as C-FFZP
G-FLFX	Embraer EMB-550 Praetor 600	55020122	To Malta as 9H-IFX
G-GREM	MD Helicopter MD600N	RN053	To USA as N420GC
G-HAAT	MD Helicopter MD900	900-00081	To Germany
G-IVAR	Yakovlev Yak-50	791504	To Germany
G-LCYF	Embraer 170	17000298	To USA as N762DT
G-LCYG	Embraer 170	17000300	To USA as N763CC
G-LHCI	Bell 47G-5	2639	Re-registered as G-HUGB
G-MAUX	Raj Hamsa X'Air Hawk	LAA 340-15185	Cancelled by CAA (No Permit to Fly issued, believed not completed)
G-MNWL	Aerial Arts 130SX/Arbiter Services Trike	130SX/333	Cancelled as Permanently WFU (SSDR microlight so no Permit to Fly required)
G-MRTY	Cameron N-77	1008	Cancelled by CAA (CofA expired 27.10.20)
G-MVOO	AMF Chevron 2-32C	014	To Lithuania
G-MWOC	Powerchute Kestrel (Modified)	00413	Cancelled as Permanently WFU (SSDR microlight so no Permit to Fly required)
G-NZGL	Cameron O-105	1361	Cancelled by CAA (CofA expired 27.10.10)
G-OMEX	Zenair CH.701UL STOL	PFA 187-13556	To Republic of Ireland
G-OPDG	Robinson R44 Raven II	11815	Cancelled as Destroyed (CofA expired 01.10.21, details unknown)
G-RCFC	Hawker 900XP	HA-0164	To USA as N417CM
G-RVRL	Piper PA-38-112 Tomahawk	38-78A0711	Cancelled as Permanently WFU (CofA expired 19.06.20, details unknown)
G-RYZZ	Robinson R44 Raven II	11418	Cancelled as Permanently WFU (rolled over on take-off at Gloucestershire 15.05.19)
G-SAYE	Dornier 228-200	8046	Re-registered as G-HFZA
G-SHUU	Enstrom 280C	1221	To Slovenia as S5-HKA
G-SLAR	Agusta A109C	7649	To Australia
G-SONE	Cessna 525A CitationJet CJ2	525A-0031	To USA as N469RB
G-SPEY	Agusta Bell 206B JetRanger III	8608	To France
G-STVZ	Bell 206B JetRanger III	4466	Re-registered as G-NGLZ
G-TATS	Aerospatiale AS350BA Ecureuil	1905	To Italy
G-TAWF	Boeing 737-8K5	37244	To USA as N842SY
G-TCUK	Agusta A109S Grand	22021	To USA as N69KG
G-TUIK	Boeing 787-9	44579	To Sweden as SE-RFZ
G-UFOX	Aeroprop EuroFOX 912(1)	BMAA/HB/628	Cancelled as Destroyed (Permit to Fly current to 19.05.22, details unknown)
G-YKSS	Yakovlev Yak-55	901103	To Lithuania
EI-FSS	Boeing 777-2Q8	32701	Cancelled as Removed From Service (Parted out at Teruel, Spain 07.21)
EI-FSZ	Pipistrel Virus 912	132VN912	To Lithuania
EI-GSL	Boeing 737-85R	35082	To Malta as 9H-TJF
EI-GTI	Embraer 190	19000564	To United Kingdom as G-LCAH

PREVIOUS IDENTITIES

REG'N	P.I.	REG'N	P.I.
G-BSWO	ex D-ILFA	EI-GVE	ex 32-7425 (Australian ultralight sequence)
G-CBUB	ex ZJ707	EI-GWL	ex VT-IEP
G-CMCP	ex N77342	EI-GXV	ex VT-IEW
G-CMDE	ex HB-QTY	EI-HAT	ex N6063S
G-DOLS	ex 2-DOLS	EI-HGG	ex N1800B
G-DOOG	ex OK-ZUA 69	EI-KBD	ex P4-KBD
G-DOUN	ex HB-ZQE	EI-KBH	ex P4-KBH
G-DRTJ	ex OO-TUX	EI-KDB	ex P4-KDB
G-DVII	ex I-EASS	EI-KGD	ex P4-KGD
G-EMEF	ex C-GUVZ	EI-SIB	Ex SE-DYD
G-ESJA	ex TF-KBG	EI-STH	ex HA-FAY
G-HAPZ	ex G-CLYT	EI-STW	ex OE-IAU
G-HAYZ	ex G-CLZN	EJ-JMMM	ex N789RR
G-HFZA	ex G-SAYE	M-ABOS	ex SE-RJI
G-HUGB	ex G-LHCI	M-AJET	ex C-GKVF
G-KNSL	ex EI-KEL	M-AKER	ex B-3099
G-LCAH	ex EI-GTI	M-ALEY	ex B-7763
G-LOEZ	ex G-BLRH	M-JCBD	ex M-JCBA
G-NGLZ	ex G-STVZ	M-KAPP	ex 2-HELO
G-OSNJ	ex G-CHIA	M-SFPL	ex N507DW
G-RNCA	ex N3846E	M-TOMY	ex 2-TOMY
G-SCFG	ex N89439	2-COOK	ex N277MZ
G-SNEL	ex 69AAX (French microlight sequence)	2-DTAL	ex OD-TAL
G-SNSL	ex PH-EUJ	2-GATE	ex VQ-BPM
G-TTNN	ex F-WWIE	2-MICK	ex 9M-MYA
G-ULTC	ex I-LIKO	2-PASF	ex 9M-NRZ
G-UXLA	ex 9H-AGV	2-SHSV	ex 9V-SSH
G-VXEN	ex G-CMBI	2-VIHA	ex VT-IHA
G-ZLNN	ex LZ-706	2-VSLP	ex 9V-SLP
G-ZOLA	ex D-GIFT	2-WKTK	ex N45N
EI-GRD	ex G-BAEB		



Indian low-cost carrier IndiGo returned Airbus A320-232 VI-ETW to Dublin-based lessor Macquarie Airfinance Acquisitions (Ireland) on February 5, 2021. The jet was transferred to the Irish register as EI-GXV on September 9 Venkat Mangudi

EI-GTR	Airbus A320-214	3972	To Croatia as 9A-IRM
EI-IMP	Airbus A319-111	4859	To Bulgaria
EI-IMR	Airbus A319-111	4875	To Bulgaria
EI-IMU	Airbus A319-111	5130	To Bulgaria
EI-KEL	Eurocopter EC135T2+	0848	To United Kingdom as G-KNSL
EJ-AWES	Bombardier Challenger 605	5966	To San Marino
M-ATAK	Gulfstream 650	6047	To USA as N650JG
M-ABOA	Embraer 190	19000354	To Australia as VH-XFL
M-ABOB	Embraer 190	19000420	To Australia as VH-XFM
M-ASER	Embraer EMB-505 Phenom 300	50500590	To San Marino as T7-LASER
M-BHBH	Gulfstream 650	6132	To Malta as 9H-BBH
M-KGTS	Embraer EMB-505 Phenom 300	50500206	To Mexico (but actually became N400JA 09.21)
M-MOON	Cessna 750 Citation X	750-0242	To USA as N225GT
M-SASS	Gulfstream 200	233	To San Marino as T7-SAS
2-ATRB	ATR-72-212A	1222	To Norway (but actually became UR-RWE)
2-ATRF	ATR-72-212A	1251	To Norway (but actually became UR-RWF)
2-BTTB	Boeing 737-85R	42805	To Samoa as 5W-TFL
2-CAIY	Airbus A319-111	2214	Cancelled by Guernsey Aircraft Register (parted out Pinal Air Park, Marana, AZ, USA)
2-COOK	Piper PA-46-500TP M500	4697562	Re-registered as 2-TRAC
2-FALA	Embraer 170	17000107	To USA as N176RS
2-GDEJ	Hawker 800XP	258786	To India
2-HELO	Agusta A109C	7630	To Isle of Man as M-KAPP
2-HZPR	Embraer 190	19000424	To South Africa
2-IGSA	Airbus A320-232	4328	To Malta as 9H-HUB
2-KLEY	Embraer 190	19000087	To Australia as VH-IQY
2-KNOW	Cirrus SR22	1367	To Switzerland as HB-KTC
2-LONG	Airbus A320-232	2401	To Moldova as ER-AXA
2-LVLY	Bombardier Challenger 604	5396	To Malta
2-MCLN	Cirrus SR22T	0177	To United Kingdom as G-MCLE
2-NNGF	Boeing 737-8JP	39017	To Mexico as XA-EBN
2-NOOR	Commander Aircraft Commander 114B	14656	To USA as N77717
2-RBLS	ATR-42-500	1005	To Greece as SX-OAZ
2-RBLT	ATR-42-500	1002	To Greece as SX-OAY
2-RTNA	Boeing 737-86N	32692	To Egypt as SU-TMN
2-TOMY	Embraer EMB-500 Phenom 100	50000371	To Isle of Man as M-TOMY
2-VSYG	Boeing 737-85R	34798	To Bermuda as VQ-BDP
2-VSYM	Boeing 737-8BK	29685	To Bermuda as VQ-BDY

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-ASXR	Reserved as N4702W (cancelled by CAA 15.02.10)
G-AXUB	Type officially amended to a BN-2A-26 Islander 28.09.21
G-BAEB	Became EI-GRD 28.09.21
G-BKVC	Became HA-BIP 06.08.21
G-BPJB	Became SP-KGO 04.21
G-BSEE	C/n is PFA 196-11635 (corrects Page 68, November 2021)
G-BSRI	C/n is PFA 191-11467 (corrects Page 68, November 2021)
G-BZSS	Type officially amended to a Pegasus Quantum 15-912 (modified) 20.09.21
G-CFXN	C/n is LAA 338-14903 (corrects Page 68, November 2021)
G-CHPR	Became I-C969 (cancelled as Permanently WFU 19.02.18)
G-CJBL	Type officially amended to a Flylight Foxcub/Twamley Trike 16.09.21
G-CJZU	C/n is 00118-1507 (corrects Page 68, November 2021)
G-CKIP	Became D-EAYS 30.06.21. C/n is 17273832 (corrects Page 68, November 2021)
G-CMAW	C/n is 2012-7637 (corrects Page 67, November 2021)
G-COBN	C/n is 525-0429 (corrects Page 67, November 2021)
G-ECOG	Became C-FFZJ 07.09.21
G-ECOM	Became C-FFZE 07.09.21
G-ERBA	Became PH-EUL 31.08.21
G-ERFX	Became 9H-AIP 06.21
G-ERMN	Builder officially changed to TF Crossman, W Holden & TG Lloyd 20.09.21
G-HETY	Builder officially changed to RA Cole, I McFarlane, J McLean, N Burke & J Taylor 20.09.21
G-IXCC	Became VH-IUK 14.09.21
G-LCYD	C/n is 17000294 (corrects Page 69, November 2021)
G-LILE	C/n is 525-0429 (corrects Page 69, November 2021)
G-LIST	C/n is 14501072 (corrects Page 67, November 2021)
G-LNCR	C/n is PFA 191-11467 (corrects Page 67, November 2021)
G-OSOE	Should read G-OSOR (corrects Page 69, November 2021)
G-PKUP	C/n is 2104-7644 (corrects Page 68, November 2021)
G-PUMS	Became C-GVIQ 29.09.21
G-RAAF	Became N920QR 30.09.21
G-RSXP	C/n is 560-6198 (corrects Page 69, November 2021)
G-SHLE	Became I-AWVE 05.21
G-ZEUI	Became 9A-JET 06.21
G-ZZSG	Became B-70X9 09.21
G-ZZSM	Became B-70Y3 09.21
EI-BMI	Became SP-TAI 27.11.20
EI-GHJ	Became ZS-YAR 08.07.21
EI-GHK	Became ZS-YAS 16.08.21 (corrects Page 69, November 2021)
EI-PHE	C/n is 5024T11B033 (corrects Page 68, November 2021)
EJ-CORE	C/n is 14501072 (corrects Page 69, November 2021)
M-ABNK	C/n is 19000524 (corrects Page 69, November 2021)
2-DOLS	Became G-DOLS 06.09.21
2-FLIP	Became D-CEMO 06.21
2-TOMY	C/n is 50000371 (corrects Page 68, November 2021)
2-TRAC	C/n is 4697562 (corrects Page 68, November 2021)
2-YAGY	Became EP-PAA (Officially cancelled to Armenia 22.01.18)



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'Black Bats', Eagles and Wild Cherries...



The little-known RB-69A was used by the CIA and Republic of China Air Force to mount covert overflights across mainland China. **Dr Kevin Wright** explores the career of the USAF type that never was



From its establishment in 1947, the Central Intelligence Agency (CIA) engaged in an aggressive campaign countering communist influence across the world. In East Asia, working with the Nationalist Chinese government in Taiwan, it dropped agents, supplies, propaganda material and equipment using modified B-17s, B-26s, P4Ys and C-46s. But by the mid-1950s these aircraft needed urgent modernisation.

Covert procurement

Project 'Wild Cherry' was to provide reconfigured Lockheed P2V Neptune maritime patrol and anti-submarine warfare platforms for clandestine CIA operations. Five P2V-7U airframes bound for the US Navy (USN) were diverted from the production line and allocated United States Air Force (USAF) serials 54-4037 to 54-4041; two more were later loaned from the USN and assigned serials 54-4042 and

54-4043. Heavily modified by Lockheed at its famed 'Skunk Works' in Burbank, California, just across from the Neptune production line, they were designated the RB-69A. In the CIA they were casually referred to as the 'P2V'. Mainly used in operations against communist China, the original five (and the crews flying them) would all be lost in action.

But the type was well suited to its new role. Intended for low-level operations,



it boasted long-range and good payload performance. Powered by two 3,400hp Wright Cyclone R-3350-32W engines fitted with exhaust flame suppressors, each drove a four-bladed propeller. Like the P2V, the RB-69 was equipped with two underwing pod mounted Westinghouse J-34-WE-36 turbojets.

Internal modifications were extensive. For agent-dropping tasks, the crew escape hatch under the centre of the rear

Top: Project Goshawk: An incredibly rare view of an unidentified ROCAF-marked RB-69A during the type's service in Taiwan. Note the aircraft is in 'ferry' configuration with under wing and wing tip tanks All images Taiwan Ministry Of National Defense unless stated

Main photo: Seen at Eglin Air Force Base during testing circa 1957, RB-69A 54-4037 was shot down over mainland China on June 11, 1964. Note that the aircraft is carrying standard USAF markings and serials

National Museum of the United States Air Force

fuselage, often referred to as a 'Joe Hole', was enlarged and sufficient space made for four to six agents 'down the back'. The weapons bay could be used for direct load drops or fitted with a specially designed leaflet dispenser that could eject more than 500,000 leaflets during a single flight. Observation bubbles were fitted on the fuselage roof and sides, while the aircraft's usual wing tip tanks were removed. However, it was the onboard electronic ►

SIGINT (signals intelligence) collection, threat warning and navigation equipment that distinguished the RB-69A.

Even before its evaluation process was completed, and despite agent insertion and para-military programmes in eastern Europe winding down, two RB-69As were delivered to Germany's Wiesbaden Air Base (AB) – one in April and the other in May 1957. The CIA attempted to maintain 'plausible deniability' by mainly employing exiled Polish and Czech pilots rather than US aviators. They became the unofficial 'D Flight' of the resident 7405th Support Squadron, which was already flying covert reconnaissance missions through the Berlin Air Corridors and along the Inner German Border with heavily modified USAF transport aircraft. Today, the details of its clandestine CIA operations still remain classified.

That said, the RB-69s are credited with mapping huge parts of the Soviet electrical grid in eastern Europe while flying nocturnal low-level missions equipped with an early infrared device. In 1959 the aircraft were transferred to the Air Proving Ground Command at Eglin Air Force Base, Florida, as part of the CIA's reorganisation of its air assets. This became the main US location for Agency RB-69 aircrew training and new equipment testing.

Taiwanese tenure

Preparations for the RB-69As arrival at Taiwan's Hsinchu AB commenced in 1957. Located southwest of the capital Taipei, the airfield already housed B-17, B-26 and P4Y covert operations aircraft. With the CIA assigning the project the cryptonym STPOLLY, the Nationalist Republic of China Air Force, or ROCAF, dubbed it 'Goshawk'.

The roughly 30 strong American team

at Hsinchu comprised a detachment commander and a mix of CIA, USAF, USN personnel and civilian contractors under the cover of the 'Naval Auxiliary Communications Center' or NACC. Although NACC personnel took part in both training and test flights, they never participated in overflight missions. With the first two RB-69As arriving in December 1957, their USAF markings were replaced with ROCAF ones. In January 1958 the aircraft were assigned to the ROCAF's 34th Squadron – nicknamed the 'Black Bats'. Operating alongside the unit's long-established B-26 and B-17 missions, the 34th soon boasted four RB-69As, three crews totalling 46 officers and airmen, plus 76 groundcrew and 83 civilian employees; a C-46 and C-47 leased from Air Asia were used for support, while a TB-26 was used as an instrument trainer.

Collecting SIGINT from the communist People's Liberation Army Air Force (PLAAF) air defence network soon became the US' priority. A mission crew normally consisted of 11 or 12. Flight deck crews were usually trained in the US, with the standard two pilots typically supplemented with a third. Three navigators ensured the precision required for the type's low-level night operations. While one monitored progress by traditional dead reckoning, another positioned in the Plexiglass nose observed ground features and watched for enemy activity. The third monitored the onboard navigation equipment, which included various forms of RADAN (Radar Doppler Automatic Navigation).

An early terrain-following radar – or TFR – was tested on the RB-69As at Hsinchu but was not sufficiently developed to be successful. Dubbed the APQ-56, it used an early sideways looking ground mapping

radar mounted in two 26ft long, 24in diameter tube antennas fixed horizontally on either side of the fuselage between the wing trailing edge and tailplane. Accurate down to just 300ft, it was often rendered useless with the RB-69As flying even lower during operational missions.

In the aircraft's rear, an electronics operator monitored Chinese VHF/UHF air defence and ground control voice communications with his System III equipment. Recording the transmissions on to AMPEX reel tape recorders, these were later transcribed for analysis. To collect intelligence on enemy radars the RB-69 was fitted with an APR-9 detection system, pulse analysers including the APA-74, and a QRC-15 direction finder. A fixed camera photographed the radarscopes and frequency pulse-analyser displays at regular intervals for later examination. The RB-69's electronics were progressively updated as newer and better systems were developed as technology advanced – including the improved ALQ-28 receiver.

Another operator (who periodically reported their progress back to Taiwan) searched for higher frequency electronic signals and controlled the aircraft's noise jammer to counter enemy radars. Fitted with an APS-54 radar warning receiver (RWR), later self-defence systems included a signal generator that projected a false position. Equipped with broad frequency jammers, chaff was also used initially thrown manually through the fuselage windows when ordered; the latter was replaced by an automated system developed by US and Taiwanese staff at Hsinchu. However, all of this equipment added considerably to the RB-69's constantly growing weight.

Typically there was at least one, although

Fitted with underwing and wing tip fuel tanks, this RB-69A awaits its next sortie from an undisclosed location in Taiwan





Prior to the arrival of the RB-69A, a small number of P4Y2 Privateers (alongside converted B-17s) were operated in the covert ELINT (Electronic intelligence) and air-drop role



The crew of a ROCAF-marked RB-69 are given their final instructions before another clandestine mission over mainland China from Hsinchu in 1961

usually two, loadmasters 'down the back', doubling as observers watching from the upper fuselage and side Plexiglass bubbles.

If these low-level night overflights were not inherently hazardous enough, there were constant concerns that local communist agents at Hsinchu reported the RB-69A's movements. In an attempt

to confuse PLAAF defences, two aircraft often departed at the same time, while some missions were launched from Kunsan in South Korea. To make matters worse, communist fishing fleets operating in the Taiwan Straits regularly reported air and sea movements over and around Taiwan. When over the Chinese mainland, there were coast watchers, inland radars, searchlights, anti-aircraft guns and fighters to contend with.

Eagle 513

As a mission example, on June 19, 1958, an RB-69A – callsign Eagle 513 – departed Hsinchu at 1700hrs. Flying low level across the South China Sea, it made landfall under the cover of darkness north of Shanghai at 2147hrs. Crossing the coast at 1,500ft, the aircraft dropped to between 500ft-800ft and followed a long looping route inland.

With overflights conducted during the dark 'moon phase' to reduce the aircraft's vulnerability to the improving People's Republic of China (PRC) air defences, flying the planned route was challenging – even with three navigators. Features such as rivers, lakes and towns were already difficult to spot, let alone in the dark, while cities were often blacked out by the communist authorities in an attempt to confuse the intruders. While Eagle 513's nose navigator scanned ahead, he spotted the glow from an unidentified aircraft's tailpipe as it crossed about 700m ahead of the RB-69 and disappeared into the night.

Although payloads of more than 2,000lbs were not unusual, Eagle 513 carried just over 1,500lbs of cargo comprising 311,000 leaflets, 20 rice bags, 20 'child' kits and 50 undescribed 'utility' packages. Despite the clandestine nature of the RB-69's missions, small food and clothing packages were often dropped – particularly during times of shortage on the mainland – with appropriate propaganda messages.

As '513' approached its coastal exit point, it dropped to 300ft having been over PRC territory just short of six hours. Turning for Hsinchu, it landed at 0825hrs after a gruelling 15½ hours in the air.

Though RB-69A agent drops over the Chinese mainland were infrequent, agent security was taken very seriously. Forbidden from mixing with the Hsinchu personnel before boarding the drop aircraft, the RB-69s would pause briefly at a remote part of the airfield while taxiing for departure to allow them to climb up through the 'Joe Hole.' Most drops were unsuccessful, with the individuals often captured shortly after landing.

Exotic equipment

During the RB-69's tenure in Taiwan, a three-camera night photographic suite was tested in the aircraft's forward bay. However, the only way targets could be illuminated adequately at the time for nocturnal photography was to operate wing tip-mounted arc lights – which would have immediately attracted the



enemy's attention. An alternative was a synchronised strobe flashlight system developed to illuminate targets, but this was equally dangerous and also affected the crew's night vision. To add to this, the crews had to fly within just +/- 25ft of 500ft to ensure images were adequately focussed. The resulting photographs covered such a small area that their potential value was very limited. As such, further work was discontinued in September 1959.

With the USN evaluating the Fulton surface-to-air recovery system to snatch people up from the ground, trials using an RB-69A were conducted at Florida's Eglin AFB from August 1959; the aircraft in question was 54-4037, the primary test airframe for the type. In 1961, an RB-69A was detached to Kadena in Japan, in preparation for a plan to rescue CIA B-26 pilot, Allen Pope. Shot down over Indonesia on May 18, 1958, he was later sentenced to death. However, the plan was abandoned when Pope's sentence was commuted, with later negotiations securing his release.

Towards the end of operations, RB-69s were fitted with an air sampling pod in an attempt to collect radioactive samples, as the US stepped up its search for indications of China's nuclear weapons programme.

First of five losses

The first RB-69A loss was a tragic accident. On March 25, 1960, 54-4040 departed on a radio silent ferry flight from Hsinchu to Kunsan. From there it was to conduct an overflight across northeast China. As it crossed the South Korean coast, it struck an 800ft hill just below the summit, killing all 14 people on board – including 34 Squadron's CO.

The PLAAF rapidly developed an integrated air defence system using fixed and mobile radar sites, searchlights, anti-aircraft guns and later SA-2 surface-to-air missiles – co-ordinated with fighters – to bring down intruders. Nearly all of the RB-69As penetration missions were detected.

In his book *The Black Bats*, Chris Pocock has extensively written about the Taiwanese-CIA operations – especially the PLAAF efforts to counter them with MiG-15s and -17s. That said, the MiGs were generally unsuccessful because they were too fast and had only a few seconds to line up and fire before overshooting their target. An overflight on October 21, 1960, resulted in the PLAAF scrambling 13 MiG-17PFs – one of which flew into high

“That changed on November 6, 1961, when a carefully laid trap caught RB-69A 54-4039 in the open”

ground attempting to achieve a favourable firing position.

To overcome this, the PLAAF mounted Izumrud airborne interception radars – the same as those equipping its MiGs – into several of its ex-Soviet Tu-2, twin-engine, high speed, light bombers. Armed with twin 23mm cannon, while the Tu-2s were not initially successful, it made the RB-69 crew's already inherently dangerous mission even more so. Chris Pocock also describes how a small number of the PLAAF's Tu-4s – a Soviet copied B-29 gifted to China – were also modified to

counter the low flying RB-69As. Gun positions were fitted with special infrared sights, while the original search radar was moved from the belly to the upper fuselage to act as an airborne intercept set. Provision was also made for carrying extra equipment operators. Again although not successful in downing a RB-69A, the constant harassment made their missions much more difficult.

Caught in a trap

Although no RB-69 had yet been lost to Chinese air defences, some were damaged by the Tu-2s and -4s, enemy fighters and anti-aircraft guns. However, that changed on November 6, 1961, when a carefully laid trap caught RB-69A 54-4039 in the open. Departing Kunsan for a low-level penetration flight over mainland China, the aeroplane crossed the Liaodong Peninsula. Unbeknown to the crew, 30 companies of anti-aircraft units and three radars that had been deployed in a 20 mile-long, five-mile-deep box, sat in wait below. As the intruder approached, the middle radar was activated. Detected by the RB-69's RWR, it altered course away from the threat... unknowingly that just took it towards other units further along the defensive line. Waiting until the last possible moment, the defences were simultaneously activated. Searchlights immediately illuminated the RB-69. Despite taking evasive action, it was quickly brought down by the Chinese anti-aircraft guns, killing all 13 crew.

With a temporary halt in operations after the incident, 54-4038 and its crew were lost just two months later on January 8 following the resumption of missions. Tasked with electronic intelligence-gathering and leaflet-dropping, the aircraft crashed into Korea Bay.

Curtiss C-46 Commando transports – including '8356' – were used to support RB-69A operations from Kunsan Air Base in South Korea



Starting life as a US Navy Lockheed P2V-7 Neptune in 1954, 135564 was converted to an RB-69A and transferred to the CIA in December 1964. The final example of the clandestine type produced, it is seen shortly after its return to the US in 1967 following the RB-69's withdrawal from Taiwan. Note the visible missile rails under the wing US Navy



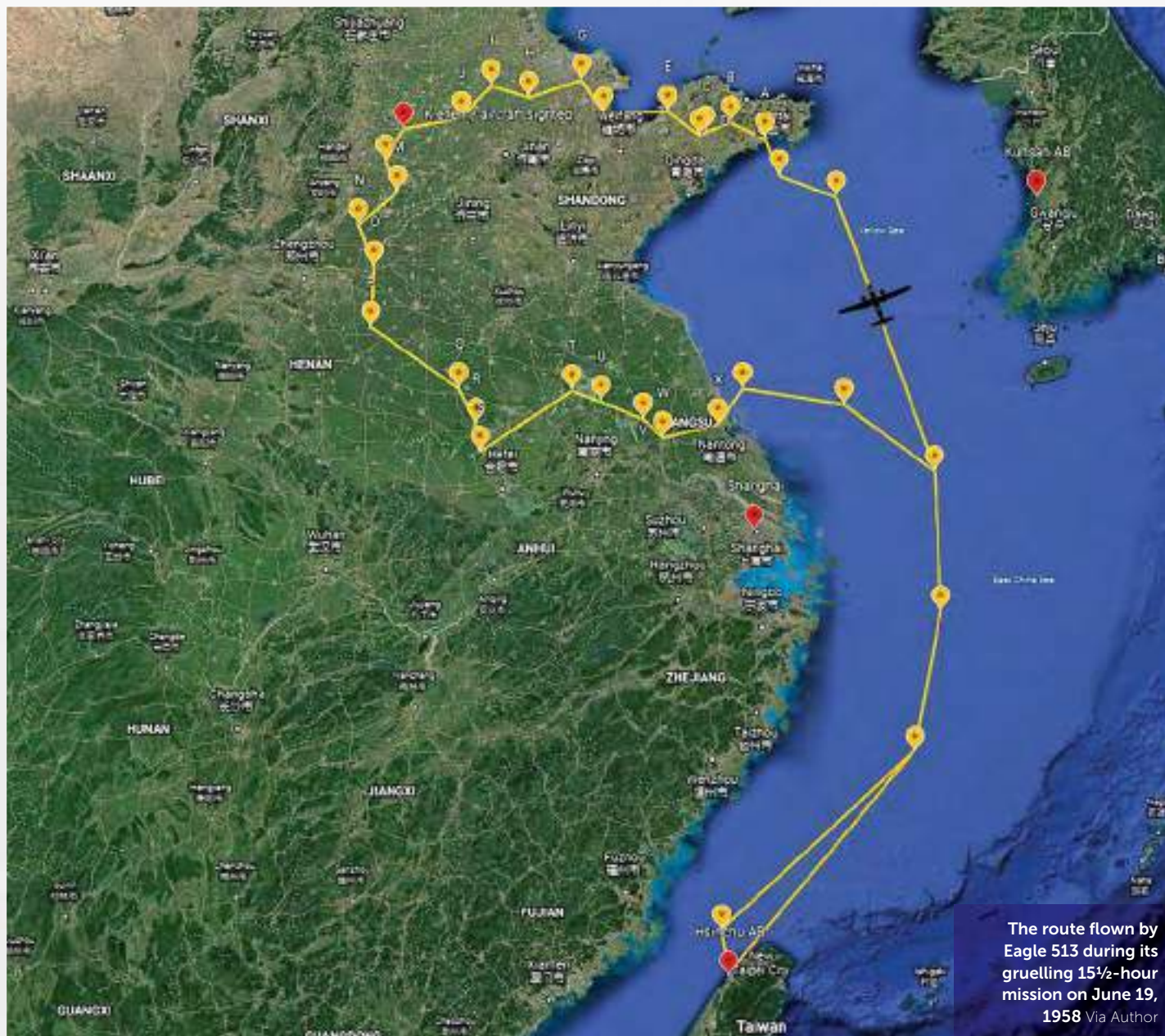
A pair of 'Black Bats' P4Y2 Privateers prepare for a rare daylight mission from Hsinchu circa 1960



On June 19, 1963, ROCAF Capt Zhou's RB-69A (54-4041) was subjected to nine unsuccessful intercept attempts by PLAAF MiG-17PFs and Tu-4s. As 54-4041 passed the MiG base at Xiangtang, another was launched. Flown by the deputy base commander, he attempted both a side-on and stern attack – but failed each time. With PLAAF controllers guiding him in for a third assault, the RB-69's jammer broke the enemy jet's radar contact as the pilot spotted a stray exhaust flame escaping from the protection of its suppressors. Homing in and firing a two-second burst, the RB-69 burst into flames – killing all 14 on board. As a result, penetration missions over mainland China were again paused.

In July 1963 the 'Black Bats' began conducting agent and airdrop missions over Vietnam with C-123 Providers. However, North Vietnamese air defences – with China's help – were soon rapidly expanded. With concerns about the Provider's vulnerability, RB-69As began mounting occasional SIGINT missions across Vietnam to identify possible threats.

After a long cessation, Chinese mainland overflights resumed in March 1964. However, tragedy struck on June 11 when the People's Liberation Navy used a flare dropping technique to bring down a fifth RB-69A – 54-4037. As the aircraft flew towards the Shandong Peninsula, a MiG-15 and an Il-28 were scrambled in



Of the original five, 54-4037 was the most 'famous' of the RB-69s having been the subject of a series of official USAF photographs while undergoing testing at Eglin during 1957





United States Navy Lockheed EP-3B Orion 149678 on strength with Fleet Air Reconnaissance Squadron (VQ-1) 'World Watchers' in 1970. Delivered to the service as a P-3A in October 1962, it was one of three obtained by the CIA under Project STSPIN to replace its RB-69As *US Navy*

the direction of the intruder. The RB-69A evaded the pair by altering course several times, but they eventually reacquired it. Climbing to 10,000ft, the IL-28 released flares that illuminated 54-4037 some 7,000ft below it. Now the MiG-15 could see its prey ahead and fired. With its rounds tearing into the intruder, the MiG almost struck the ground itself as the pilot followed the stricken RB-69 down. From its wreckage, Chinese military personnel recovered three of the four Sidewinder air-to-air missiles that had recently been fitted for self-defence. Intended to shoot down the MiGs as they overshot their prey, it was little too late for the RB-69s.

Winding down

Having lost the original RB-69s, the last remaining example – 54-4042, ex-150283 – was transferred

to the CIA in September 1962; this was later joined by 54-4043 (ex-135564) in December 1964.

With the US' attention switching to peripheral SIGINT flights off the coast of mainland China, around ten such flights a month were scheduled – sometimes with NACC crew participation. Missions could last in excess of 11 hours, with the aircraft operating as close as 20 miles off the mainland. When PLAAF interceptors were launched, the RB-69s simply retired some 60 miles from the hostile territory.

As peripheral flights continued, there were just two more penetration missions – one on December 24, 1965, and the last on June 15, 1966. With the RB-69A completing its final peripheral mission in mid-November 1966, the type left Hsinchu in January 1967. Ferried back to the US, both 54-4042 and 54-4043 were

soon returned to the USN inventory and designated 'SP-2Hs' the following month.

By then, the CIA had started replacing the RB-69As with newly modified Lockheed P-3A Orions under Project STSPIN.

With the first arriving at Hsinchu in May 1966, their days were already numbered as the end of joint operations with the Taiwanese rapidly approached. With both sides' mission objectives becoming too divergent, the Taiwanese priorities were largely directed towards carrying on the low-level overflight insertion and propaganda programme, the US was firmly focused on SIGINT collection. The two P-3s were withdrawn in late 1966, having never undertaken a mainland overflight.

While most of the 'Black Bats' missions remain classified, an internal CIA draft history entitled *Low-Level Technical Reconnaissance over Mainland China (1955–66)* written in 1972 is known to be in existence. However, it is not expected to be declassified by the Central Intelligence Agency until after 2022. **AN**



Next Month



Night CAP (above)

In the first of a two-part feature, respected Cold War fast jet pilot Ian Black takes us into the cockpit of his Mirage 2000 as he prepares for a nocturnal Combat Air Patrol through the skies of war-torn Bosnia

From cockpit to capsule

As UK astronaut Tim Peake prepares for his next space mission, *Aviation News* charts an extraordinary career that is rooted in rotary flight

Greener flying

With the aviation industry coming under huge pressure to 'clean up', we discuss some of the carbon offsetting projects taking place in the UK

Red Tail legacy

Selected by the United States Air Force as the winner of its long-drawn-out T-X programme to replace its ageing Northrop T-38 Talons, the Boeing-Saab T-7 Red Hawk has 'big shoes' to fill. We investigate this advanced jet trainer

Making waves

Taking place between September 27 and October 15, 2021, Exercise Cormoran-21 brought the French Navy and French Army together in a high-intensity large-scale, amphibious exercise. *Aviation News* was there

Size matters (below)

As Airbus' Beluga XL operation gains pace, the European aviation giant continues to improve its incredibly distinctive transport platform. We take a look at this next-generation heavy lift icon

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Built under licence by Curtiss in 1928 this beautiful and extremely rare metal-framed version of De Havilland's famous Gipsy Moth is now being offered for sale. Owned since 1986 by Hamish Moffatt who was an intrepid explorer and Bugatti racing car driver, G-AADR has spent her years since then on an idyllic rural farm strip in Herefordshire, England.

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