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Main image: **USAF B-2A Spirit 82-1070 in flight.** Bruce Smith. Inset (top): **British Airways has retired its last Boeing 737s.** AirTeamImages.com/Simone Ciaralli. Inset (bottom left): **Missionary Flights International DC-3C-65TP N500MF.** Paul Filmer. Inset (bottom middle): **Two USAF F-22A Raptors.** USAF/Tech Sgt Jason Robertson. Inset (bottom right): **Cargolux 747-4R7F LX-VCV is prepared for its next flight at Luxembourg Airport.** Key-James Ronayne

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# BA Welcomes the 787-9



British Airways has taken delivery of its first Boeing 787-9 Dreamliner, G-ZBKA (c/n 38616).

The aircraft arrived at Heathrow early on September 30, following an 8hr 45min flight from Seattle, Washington State. It is the

**British Airways' first Boeing 787-9 Dreamliner G-ZBKA, moments before touching down at London Heathrow Airport on its delivery flight.** British Airways

first of 22 787-9s the airline has on order, with the next due to arrive in mid-October and a further two expected by the end of the year. The 787-9 will initially be used on

the Delhi route, starting on October 25. Abu Dhabi and Muscat will follow in November with Kuala Lumpur in December and Austin, Texas, in February.

## Kuwait Opts for Eurofighter

Kuwait has signed a memorandum of understanding covering the acquisition of 28 Eurofighter Typhoons.

The agreement was signed in Rome on September 11 and includes 22 single-seat and six two-seat aircraft which are being purchased through a government-to-government deal with Italy.

Italian Eurofighter partner Alenia Aermacchi had been leading the efforts to sell the Typhoon to Kuwait and when the final order is signed, which is expected by the end of the year, the aircraft will be

manufactured on the Italian production line in Turin.

The deal is Eurofighter's first export success since the Sultanate of Oman ordered 12 aircraft in December 2012.

Kuwait's Typhoons will be to Tranche 3 standard and feature the new airborne electronically scanned array (AESA) radar. Deliveries are expected to begin in 2019.

Including the Kuwait deal, the Eurofighter Typhoon has commitments for 599 aircraft.

## Waddington Airshow Scrapped

Increased security concerns and operational risks have been cited as the reasons behind the permanent cancellation of the Waddington International Airshow.

Reaper drones are operated from the Lincolnshire base by XIII Sqn and in January four people were arrested after cutting through the fence in protest at their use. This year's show had been cancelled due to runway repairs.

The air force has highlighted RAF Scampton, also in Lincolnshire and home of the Red Arrows, as a possible venue for an air show. However, it says further work is needed to address significant legal, commercial and infrastructure issues which means it will not be possible to hold an air show there until 2017 at the earliest.

An RAF spokesman said: "The RAF appreciates that the cancellation of the air show at RAF Waddington will be a disappointment to many. However, it is hoped that the intent to establish an alternative air show at RAF Scampton is evidence of the RAF's commitment to maintain its traditional and modern links to 'Bomber County'."

The air force says it will continue to hold an annual air show at RAF Cosford and provide significant support to the Royal International Air Tattoo.

## First Finnair A350 Airborne



Finnair's maiden Airbus A350-941 XWB has been conducting flight trials from the manufacturer's Toulouse facility prior to delivery. The aircraft, registered OH-LWA (c/n 018), is the first of 19 examples the airline has on order. Finnair's inaugural long-haul route with the type will be between Helsinki and Shanghai. Airbus/F Lancelot

# Maiden Flight for KC-46A

Boeing and the USAF completed the first flight of a KC-46A tanker aircraft on September 25. The aircraft departed from Paine Field, Everett, Washington State, landing four hours later at Boeing Field in Seattle.

During the sortie, the test pilots performed operational checks on engines, flight controls and environmental systems, taking the aircraft to a maximum altitude of 35,000ft.

The achievement comes after ongoing trials with the programme's initial test aircraft, a 767-2C.

Col Christopher Coombs, USAF KC-46 System Program Manager said: "This first tanker flight is a key milestone for the programme and we'll now begin free air stability tests and flight controls of the boom and wing aerial refuelling pods (WARPs) before conducting aerial refuelling tests where the KC-46 will make contact with other military



aircraft down the road."

Tim Peters, Boeing KC-46 Tanker Vice President and Program Manager, said:

"Today's flight reinforces that we are moving in the right direction and are on track to begin planned Milestone C testing later this year."

An inspection and calibration of instrumentation will take place prior to the next series of flights. Before the end of the year, the KC-46A will begin conducting aerial refuelling trials with a number of USAF aircraft.

Boeing is building four test aircraft, two of which are currently configured as 767-2Cs and

**Boeing's maiden KC-46A tanker lifts off for the first time from Paine Field, Everett, Washington State.** Boeing

two KC-46A tankers. The KC-46As will fly as fully equipped tankers through the FAA and military certification process, while the 767-2Cs will conduct airborne tests prior to being upgraded to KC-46As. The programme's initial test aircraft (EMD-1), a 767-2C, has completed more than 150 flight test hours to date since making its maiden sortie in December 2014. Boeing is expected to build 179 KC-46A aircraft for the USAF.

## Russia Begins Airstrikes in Syria

Military equipment, communication centres, motor vehicles, and munitions and fuel depots were among the first targets of Russian airstrikes in Syria.

The move came on September 30, the day after the upper house of Russia's parliament empowered President Vladimir Putin to use the military outside of the country's territory. Major General Igor Konashenkov was quoted by the Russian state media organisation TASS as saying: "In accordance with a decision by the Supreme Commander-in-Chief Vladimir Putin, Russian Aerospace Forces planes on Wednesday started an operation to deal pinpoint strikes against ground targets of the IS terrorist group in the territory of the Syrian Arab Republic."

Chief of the Presidential Staff Sergey Ivanov said that airstrikes had been launched at the request of Syrian President Bashar

al-Assad. Pentagon officials said US Defense Secretary Ash Carter had instructed his staff to open lines of communication with their Russian counterparts "on de-confliction" of air operations in Syria.

A joint statement by a number of governments was released on October 2. "We, the Governments of France, Germany, Qatar, Saudi Arabia, Turkey, United Kingdom and United States of America state the following in view of the recent military actions of the Russian Federation in Syria: We express our deep concern with regard to the Russian military build-up in Syria and especially the attacks by the Russian Air Force on Hama, Homs and Idlib since yesterday which led to civilian casualties and did not target Da'esh [IS]. These military actions constitute a further escalation and will only fuel more extremism and radicalisation.

We call on the Russian Federation to immediately cease its attacks on the Syrian opposition and civilians and to focus its efforts on fighting IS."

Russia had been building up its military presence in Syria deploying several combat aircraft and helicopters to Bassel al-Assad Air Base in Latakia. Four Sukhoi Su-30SMs *Flanker-C* fighters were the first to arrive on September 25 and subsequent satellite imagery shows they have been joined by 12 Su-25 *Frogfoot* ground attack aircraft and a similar number of Su-24 *Fencers*. The 14 helicopters present are a mix of Mi-17 *Hip* and Mi-24 *Hind* helicopters.

A French television news crew also filmed a Russian Air Force Antonov An-124 *Condor* transport aircraft at the base and there have been reports of Su-34 *Fullbacks* deploying too.

## First Italian Assembled F-35 Flies

The maiden flight of the initial Italian assembled Lockheed Martin F-35A Lightning II took place on September 7.

The aircraft, MM7332 (AL-1, USAF/12-5062), is the first to be assembled at the Cameri Final Assembly and Check Out (FACO) facility making it the first ever F-35 flight outside of the United States. Lockheed Martin F-35 test pilot Bill 'Gigs' Gigliotti flew the 1hr 22min sortie. The Cameri FACO is owned by the Italian Government and operated by Finmeccanica-Alenia Aermacchi



in association with Lockheed Martin.

The aircraft is expected to be officially handed over to the Aeronautica Militare Italiana (Italian Air Force) by the end of the year. It already carries the code '32-01' and unit badge of 32° Stormo at Amendola AB, Foggia – the unit's 103° Gruppo will be

**Italian Air Force F-35A Lightning II MM7332 takes to the sky for the first time at Cameri on September 7.** Lockheed Martin

the first to equip with the type. Both Italy's F-35A and 'B' variants are being assembled at Cameri as well as the Royal Netherlands Air Force's F-35As.

# First C295W for Saudi Arabian MOI



The first C295W for the Saudi Arabian MOI General Security Aviation Command has been undergoing pre-delivery testing at the factory at Seville San Pablo Airport, Spain. Roberto Yáñez

Airbus Defence and Space is test-flying the first of four C295Ws for the Saudi Arabian Ministry of Interior (MOI) General Security Aviation Command. The winglet-equipped

aircraft, which will be registered MOI-C1 (c/n 143), is currently undergoing pre-delivery testing at the factory in Seville, Spain.

In addition to the winglets, the model

also incorporates improved Pratt & Whitney PW127 engines, which Airbus Defence and Space says give better overall performance, particularly in hot and high conditions.

## New-Generation L-39NG Development Aircraft Flies

Czech manufacturer Aero Vodochody Aerospace has conducted the maiden flight of its new-generation L-39NG jet trainer technology demonstrator.

The aircraft, 2626 (c/n 332626), flew for the first time from Vodochody on September 14 in the hands of test pilots Miroslav Schützner and Vladimír Kvarda. The development airframe has been converted from a former Ukrainian Air Force L-39C.

The new variant features the new FJ44-4M engine from Williams International and avionics built around Genesys Aerosystems' multi-functional displays

and head-up displays (HUDs) by SPEEL Praha. The aircraft will be used to validate the new engine installation and avionics for the L-39NG project. Other significant improvements include composite wing tips in place of the original fuel tanks.

Brig Gen Libor Štefánik, commander of the Czech Air Force (CzAF), together with representatives of the Czech Ministry of Defence, were present to witness the maiden flight.

At the Paris Air Show on June 16, Aero Vodochody announced it had signed up its first customers. The first is Czech state-

owned LOM PRAHA, which is responsible for training CzAF pilots and many international customers at its Flight Training Centre.

The company currently operates seven L-39s, which will be upgraded to the new L-39NG standard, while its contract also includes an option to purchase new L-39NGs as a potential replacement for, or in addition to, its existing fleet. Aero has also received letters of intent (LOIs) from the Breitling Jet Team and the Black Diamond Jet Team, which are both interested in equipping their aircraft with the new Williams engines.



## A-10s Arrive for TSP

Twelve A-10 Thunderbolt IIs and approximately 350 airmen from the 74th Expeditionary Fighter Squadron arrived at Ämari Air Base, Estonia on September 21, as part of a theatre security package deployment in support of Operation Atlantic Resolve. The aircraft are assigned to the 74th Fighter Squadron at Moody AFB, Georgia. USAF/Andrea Jenkins

## MOD Awards ASRAAM Upgrade Contract

Missile manufacturer MBDA has been awarded a £300 million contract by the British Ministry of Defence to upgrade its Advanced Short Range Air-to-Air Missile (ASRAAM).

The new variant will incorporate updated sub-systems into the current ASRAAM design and make it possible to upgrade the weapons systems as necessary.

ASRAAM is currently in-service on Typhoon FGR4 and Tornado GR4 aircraft and will be integrated on to the Lightning II platform in time for first aircraft delivery.

## Merlin HM2 Achieves FOC

Full Operating Capability (FOC) of the Royal Navy's Merlin HM2 anti-submarine warfare helicopter has been declared on time and under budget. The milestone was announced on September 15, with 24 out of the 30 helicopters to be upgraded now delivered to the Royal Navy. Improvements to the helicopter include a radar upgrade and the installation of advanced glass cockpits.

More than 25 miles (40km) of new wiring has been fitted to the helicopters, which also feature an enhanced mission system that includes touch-screen flat panel displays, tactical computers and digital maps and an improved sonar system. The £807 million upgrade programme is being carried out by Lockheed Martin UK, based in Havant and AgustaWestland in Yeovil.

## US Navy Buckeyes Retired

Air Test and Evaluation Squadron 20 (VX-20) has retired the final three T-2 Buckeyes operated by the US Navy. The carrier-capable jet trainers served the navy for 56 years but were replaced in the training role in 2008 by the T-45 Goshawk. However, VX-20 retained three T-2Cs which it operated from NAS Patuxent River, Maryland, as chase aircraft and for weapons testing.

These three aircraft (158320 '320', 158581 '581' and 159713 '713') were finally retired after an official last flight on September 25. Their role with VX-20 will be taken on by two former USAF IAI C-38A Courier business jets, which were retired earlier this year by the 201st Airlift Squadron/113th Wing of the District of Columbia Air National Guard that were resident at JB Andrews NAF Washington, Maryland, see October 2015 issue, p13.

## Tornado Specials Come Together



All four of the RAF's Tornado GR4 centenary jets flew together on September 9, where they were joined by the Tornado 40th anniversary aircraft. Crown copyright 2015

Number IX(B), 12(B), XV(R) and 31 Squadrons have all celebrated their centenary over the past 12 months, while the Tornado turned 40 last year. Gp Capt Rich Davies, Station Commander of RAF Marham, flew the 40th anniversary jet and led the sortie from the Norfolk base. He said: "It is amazing to think that there are four squadrons, flying the same type of aircraft, that will commemorate their

centenaries within 12 months of each other. Each individual squadron has its own strong and varied history, but collectively they come together as one Tornado Force, which is still delivering on operations today across the globe as they did a century ago. The aircraft may have changed greatly over the years, but the ethos and teamwork that draws the squadrons together is the same today as it was for squadron members 100 years ago."

## New Iranian A340



Meraj Air has received Airbus A340-300 EP-AJA which it is operating on behalf of the government of the Islamic Republic of Iran. The aircraft arrived in Iran on September 12 when it flew into Mehrabad International Airport in Tehran. M Photography

## Indonesian Deals

Indonesia has selected the Sukhoi Su-35 *Flanker-E* to meet its air combat requirement. The aircraft will be used to replace a squadron of F-5E Tiger IIs. "We want to buy a squadron [of Sukhoi Su-35s], but the purchase will be adjusted, based on the financial capability of the government," defence minister Ryamizard Ryacudu was quoted as saying by Indonesian state-run news agency *Antara*.

Manufacturer PT Dirgantara Indonesia says it will deliver two more CN235 maritime patrol aircraft to the Indonesian Navy before the end of the year. The navy already has three examples in service.

# First Argentine Coast Guard H225 Delivered

Airbus Helicopters has handed over a brand new H225 to the Argentine Coast Guard.

The helicopter will be based in the city of Mar del Plata and used for search and rescue missions. Its arrival signals the beginning of the renewal process for the Coast Guard's fleet of SA330 Pumas.

Prefecto Nacional Naval Luis Alberto Heiler said: "This helicopter's extensive range will enable us to fly to zones far from the coast. In addition, it is equipped for day and night rescue operations and extreme weather conditions."



The H225 has an automatic flight control system (AFCS), which the manufacturer says enables SAR missions to be carried out with greater precision, safety and effectiveness. It is fitted with searchlights, a winch and a rescue basket and can be rapidly reconfigured to fulfil other missions such as coastal surveillance, port security or aid missions for coastal communities.

**New Argentine Coast Guard H225 PA-14 (c/n 2958) during a pre-delivery test flight in France.** Airbus Helicopters/Anthony Pecchi

## Australia and France Extend Anti-IS Ops into Syria

France and Australia have both carried out their first air strikes in Syria. A statement from the Élysée Palace on September 27 confirmed that France had begun strikes in Syria with targets selected on the basis of intelligence gathered during air operations in the two weeks prior.

While no details were given of the targets, the statement said: "Our country confirms

its resolute commitment to the fight against the Daesh [IS] terrorist threat. We will strike whenever our national security is at stake."

Meanwhile, approval has been granted by the Australian Government to extend Royal Australian Air Force (RAAF) air strikes against IS into Syria.

The decision was announced on September 9 and five days later the first

airstrike was carried out in eastern Syria, destroying an armoured personnel carrier.

Australia's Air Task Group, has been carrying out missions against IS in Iraq under Operation Okra. It has six F/A-18A Hornets, a KC-30A multi-role tanker transport and an E-7A Wedgetail airborne early warning and control aircraft operating from Al Minhad Air Base in the United Arab Emirates.



**Antonov An-70 02 Blue stopped at Leipzig on September 26 while routing from Istres-Le Tubé Air Base, France to Gostomel Airport, Ukraine. The aircraft is in full Ukrainian Air Force markings.** Kevin Gutt

## USAF Converting B-52Hs

Air Force Global Strike Command (AFGSC) is converting 30 of its Boeing B-52H Stratofortress fleet from a nuclear to a conventional-only capable status under the New Strategic Arms Reduction Treaty (New START).

The first to be converted was 61-1021 of Air Force Reserve Command's 307th Bomb Wing, which underwent the process this summer at Barksdale AFB, Louisiana.

The air force is also converting 12 aircraft currently stored at the 309th Aerospace Maintenance and Regeneration Group (AMARG) at Davis-Monthan AFB in Arizona. All of the Stratofortress conversions are scheduled to be completed by early 2017.

New START requires the US and Russia to have no more than 1,550 deployed warheads; 800 deployed and non-deployed intercontinental ballistic missile (ICBM) launchers, submarine-launched ballistic missile (SLBM) launchers and nuclear capable heavy bombers; and 700 deployed ICBMs, SLBMs and nuclear-capable heavy bombers.

### MILITARY AIRCRAFT ORDERS

Air Arm	Company	Number and Type	Contract Date	Delivery Date and Notes
Air Force of the Slovak Republic	Sikorsky	4 x UH-60M Black Hawk	September 3	Work to be completed by May 31, 2017
Hong Kong Government Flying Service	Airbus Helicopters	7 x H175	September 8	Deliveries completed by 2018
Indian Air Force	Boeing	22 x AH-64E Apache Guardian	September 28	All delivered within 48 months
Indian Air Force	Boeing	15 x CH47F Chinook	September 28	All delivered within 48 months
Israel National Police	Airbus Helicopters	4 x H125 AStars	September 3	Order made by Elbit Systems
Israel National Police	Airbus Helicopters	2 x H145	September 3	Order made by Elbit Systems
Mexican Navy	Sikorsky	2 x UH-60M Black Hawk	September 15	Estimated completion date is June 30, 2016
Royal Netherlands Air Force	Boeing	14 x CH-47F	September 7	Deliveries to start in 2019
Royal Thai Air Force	Korea Aerospace Industries	4 x T-50TH Golden Eagle	September 17	Deliveries scheduled within 30 months
Turkish Land Forces	Boeing	Unspecified x CH-47F Chinook	September 14	Estimated completion date is December 31, 2020
Unnamed African air arm	Alenia Aermacchi	2 x C-27J Spartan	September 23	Delivered from 2017.
US Army	Sikorsky	1 x UH-60M Black Hawk	September 17	Estimated completion date is December 30, 2015

# Typhoon Tribute



Two Aeronautica Militare Italiana (Italian Air Force) Eurofighter F-2000A Typhoons from 10° Gruppo, 36° Stormo have been painted as a tribute to World War One ace Francesco Baracca.

The Gioia del Colle-based jets feature a special tail design with a tricoloured rudder and a black prancing horse depicted on a white cloud. This was the symbol that adorned Baracca's aircraft.

**The two Typhoons performing a flypast on September 6 at the Freccie Tricolori 55th Anniversary airshow at Rivilto AB.** Marco Rossi

Unusually, both aircraft, MM7308 and MM7297, wear the same 36-10 code. The pair performed a fly-by during the display of a replica SPAD XIII biplane, sporting the colours and scheme of the original aircraft flown by Baracca, at the Freccie Tricolori 55th Anniversary airshow at Rivilto AB. **Marco Rossi**

## IN BRIEF

Airbus Defence and Space has delivered the fourth AIRBUS A400M ATLAS to the RAF. The aircraft, ZM405 (c/n 0024), was flown to RAF Brize Norton, Oxfordshire, on September 10 from the final assembly line at Seville San Pablo Airport, Spain.

Australia has taken delivery of its eighth and final BOEING C-17A GLOBEMASTER III. The aircraft, A41-212 (c/n 50271/F270, USAF/14-0001, ex N270ZD), was handed over at the factory in Long Beach, California, on September 4, departing later that day on its delivery flight to Royal Australian Air Force Base Amberley, Queensland, where it will join 36 Sqn.

NO.6 FLYING TRAINING SCHOOL stood up at RAF Cranwell, Lincolnshire, on September 7. Gp Capt Andrew Dickens is 6 FTS' new commandant.

Media reports in Seoul suggest South Korea is progressing with plans to procure S-3B VIKING anti-submarine aircraft. South Korea wants to refurbish up to 12 of the former US Navy aircraft and the Defence Acquisition Program Administration will now review the proposal.

## Final ACC MC-12W Flight

Airmen from the 427th Reconnaissance Squadron and 306th Intelligence Squadron performed Air Combat Command's last MC-12W Liberty sortie on September 16.

The flight took place from Beale AFB, California and was flown by 09-0644. Air force personnel deployed with the type will return home shortly, leaving the US Army in full control of MC-12W operations.

The aircraft has flown more than 400,000 combat hours and participated in more than 79,000 combat sorties since flying its first combat mission on June 10, 2009. Beale had been home to the MC-12W since June 6, 2011. Col Darren B Halford, 9th Operations Group Commander at Beale, commented: "Although the mission is leaving Beale and Air Combat Command, the aircraft are going to very good homes. Our joint and total force partners will ensure the MC-12 continues to help find, fix and finish the enemies of freedom."

## India Finalises Helicopter Order

Contracts covering the purchase of 22 Boeing AH-64E Apache Guardians and 15 CH-47F Chinooks for the Indian Air Force have been completed. The paperwork was signed on September 28 by officials from the Indian Defence Ministry and manufacturer Boeing.

Under the terms of the contract, Boeing will commence deliveries of both types within 36 months, with all the helicopters to be delivered within 48 months. A clause in the contract includes options for follow-on orders for 11 more Apaches and seven Chinooks.

Approval for the deal came on September 21 after the Defence Acquisition Council had ratified offset proposals for their acquisition on August 29 last year.

Boeing's AH-64E was selected as India's preferred option for its attack helicopter requirement on August 21, 2012, beating off competition from the Mi-28N Night Hunter. India then chose the CH-47F to meet its heavy-lift helicopter requirement on December 5, 2012, after opting against an upgraded version of the Mi-26.

## New Look for Freccie Tricolori Anniversary

The Aeronautica Militare Italiana (Italian Air Force) aerobatic display team Freccie Tricolori has applied a revised livery to its MB339 A/PAN MLU aircraft to celebrate its 55th anniversary. The colours of the Italian flag now take up the whole tail with the '55 Anniversario' logo just below.

On the left side of the fuselage, close to the cockpit, are the silhouettes of the three different aircraft types the team has used as well as the names of all the pilots who have been members of the team. Freccie Tricolori commander Ten Col Jan Slangen has also had '55' added to the tail of his jet in place of the usual '0'. An airshow was held at Rivilto AB in Italy on September 5-6 to celebrate the team's anniversary. **Marco Rossi**



**Freccie Tricolori aircraft have received a revised livery to mark the team's 55th anniversary.** Marco Rossi

# RAPTORS IN EUROPE



Spangdahlem Air Base in Germany hosted the first ever USAF F-22A Raptor training deployment to Europe this summer. *Aviation News* **Assistant Editor James Ronayne** provides a round-up of their visit.



**F**our Lockheed Martin F-22A Raptors deployed to Europe in August on the type's inaugural training visit to the region. It was the latest demonstration of the US's continued commitment to NATO.

Assigned to the 95th Fighter Squadron (FS) at Tyndall AFB in Florida, the aircraft conducted familiarisation training in Europe and worked with USAFE and NATO allies.

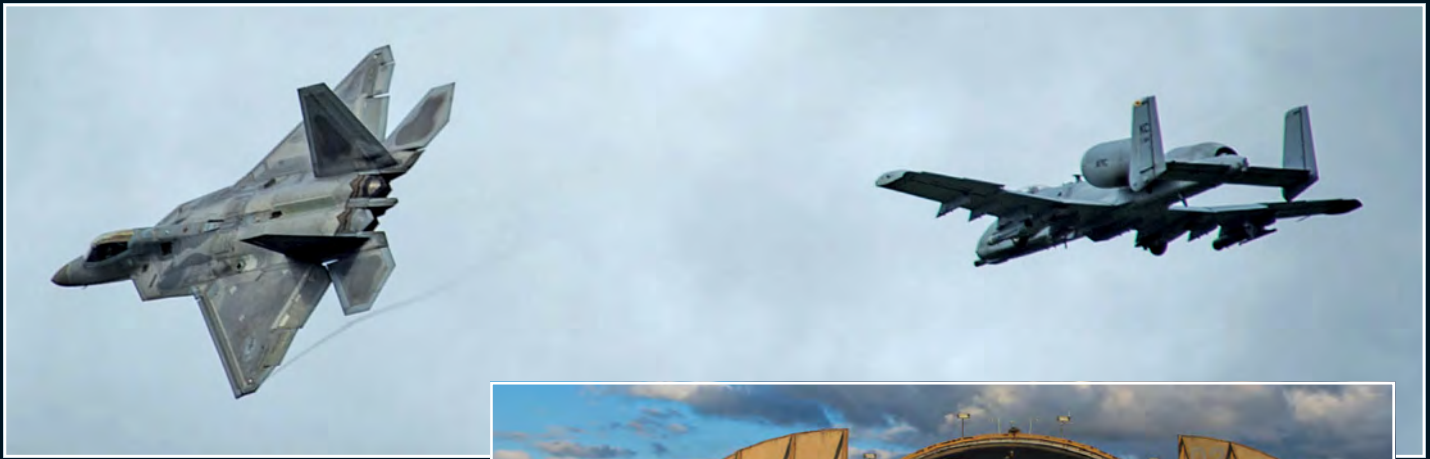
The aircraft arrived at Spangdahlem AB in Germany on August 28, supported by a Boeing C-17A Globemaster III from the 437th AW at Joint Base Charleston, South Carolina, and about 60 airmen. Although not officially labelled as such, a USAFE spokesman confirmed to *Aviation News* the deployment followed the same Rapid

Main photo: **Four Lockheed Martin F-22A Raptors relocated to Spangdahlem AB in August on the type's first training deployment to Europe.** Mick Balter

Above left: **Although not officially labelled as such, the F-22's deployment to Spangdahlem followed the Rapid Raptor concept developed in the Pacific theatre, where four aircraft and their associated equipment and personnel are deployed with a C-17 Globemaster III in support.** USAF/Airman 1st Class Luke Kitterman

Left: **An F-22A pilot from the 95th FS settles into the cockpit prior to taking off from Ämari Air Base in Estonia during a brief forward deployment.** USAF/Tech Sgt Ryan Crane





Above: **An F-22 Raptor and an A-10 Thunderbolt II fly overhead before landing at Ämari Air Base in Estonia.** USAF/Tech Sgt Ryan Crane

Right: **Raptor 05-4098 is prepared for a sortie at Spangdahlem AB.** USAF/Airman 1st Class Luke Kitterman



Below right: **Two Raptors form up over the Baltic Sea behind a KC-135R Stratotanker from the 100th ARW at RAF Mildenhall. Part of the training involved working alongside USAFE assets.** USAF/Tech Sgt Jason Robertson



Raptor concept tested in the Pacific theatre, where four F-22As and their associated equipment deploy quickly, supported by a sole C-17.

On August 31, two F-22As visited Łask AB in Poland for the day and on September 5, two Raptors visited Ämari AB in Estonia, supported by a 100th Air Refueling Wing KC-135R Stratotanker. The forward deployments were made to prove European bases and NATO installations can host the fifth generation fighter. ▶

Right: **Łask AB in Poland was one of the locations the Raptors forward deployed to in Europe. The purpose of the visit was to prove the base is capable of hosting the fifth generation fighter.** USAF/Staff Sgt Joe W McFadden



Below: **Lockheed Martin F-22A Raptor 05-4086 accelerates down the runway at Tyndall AFB in Florida en route to Europe for the type's first training deployment to the region.** USAF/Airman 1st Class Sergio A Gamboa





Above: **The four F-22As taxi after arriving at Spangdahlem on August 28.** USAF/Staff Sgt Chad Warren

Right: **After an unscheduled overnight stop at RAF Mildenhall, the four Raptors continued their journey back to Tyndall AFB on September 12.** Peter R Foster



Gen Frank Gorenc, USAFE and Air Forces Africa commander, said: "It's important we test our infrastructure, aircraft capabilities, and the talented airmen and allies who will host fifth generation aircraft in Europe. This deployment advances our airpower evolution and demonstrates our resolve and commitment to European safety and security."

In Estonia the Raptors flew with A-10 Thunderbolt IIs currently in the region. The F-22As also worked alongside USAFE F-15s and F-16s and RAF Typhoon FGR4s, conducting dissimilar air combat training. No weapons were used by the Raptors during the deployment.

USAF Maj Gen Christopher Bence, 3rd Air Force and 17th Expeditionary Air Force Vice Commander, said: "This is the first deployment of the F-22 as we continue to build our partnership and train and work

together to improve us as allies and as a nation on how we will ultimately fight if we had to.

"We continually rotate US forces from the United States into Europe, and this is a part of the training rotation. We look forward to continue to prove that fifth-generation aircraft can operate in Europe as we set the

foundation for the future of the F-35 coming to Europe in just the next few years."

The Raptors left Spangdahlem on September 11 but issues with their tanker support forced them to overnight at RAF Mildenhall in Suffolk. The fighters and the three KC-135s supporting them departed for the US the following morning. **AN**

Right: **Because of issues with their tanker support, the four Raptors flew in to RAF Mildenhall on their way back to the US. Two of the jets can be seen breaking into the circuit behind this example.** Calum Ross



Below: **Two of the four Raptors outside hardened aircraft shelters at Spangdahlem AB.** USAF/Staff Sgt Christopher Ruano



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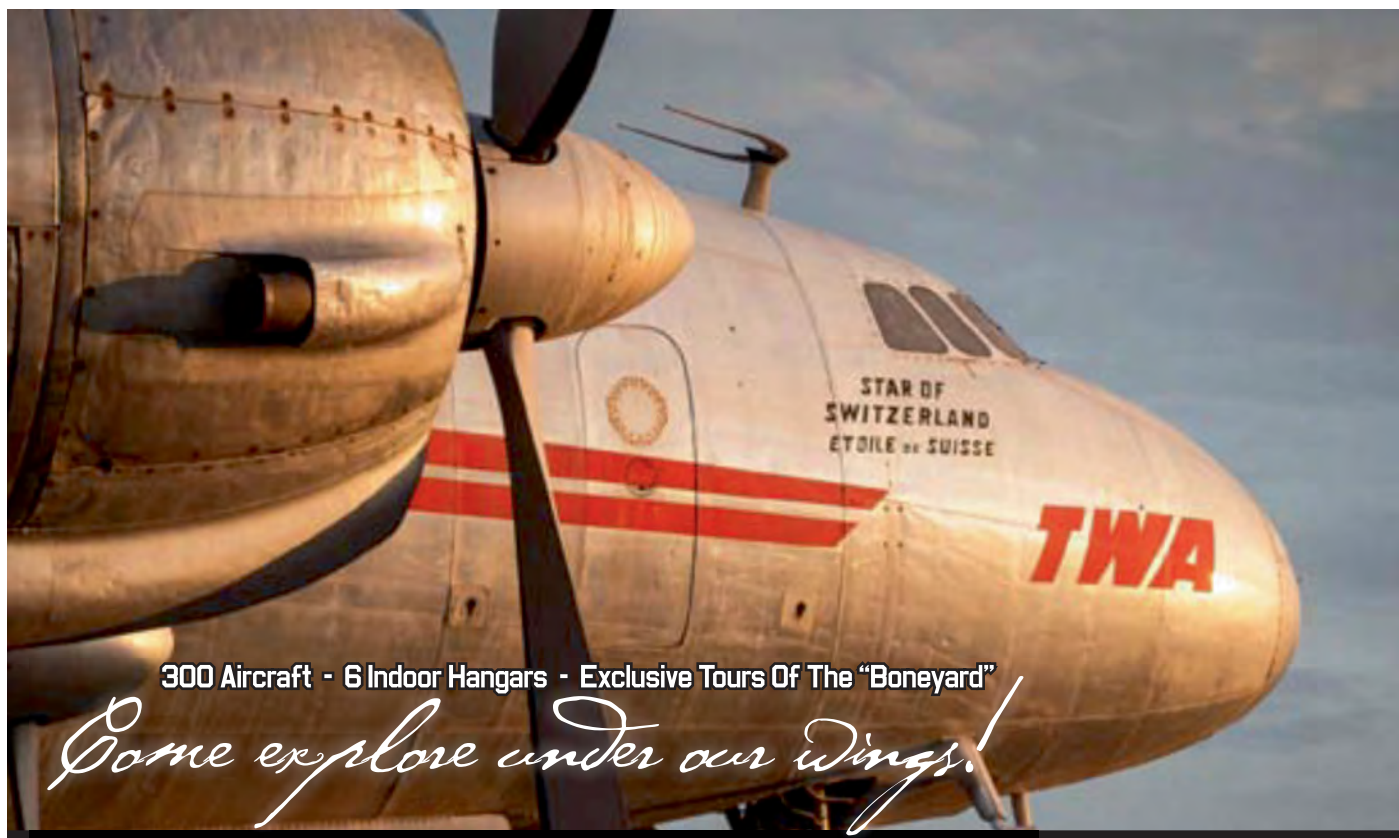
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# First ATR 72-600 for Flybe-SAS Tie-up



Regional carrier Flybe has taken delivery of its first ATR 72-600 turboprop. The aircraft, G-FBXA (c/n 1260), has been acquired from Singapore-based leasing firm Avation and will operate for Flybe's new partner Scandinavian Airlines (SAS) from the carrier's Stockholm Arlanda base.

Five 70-seat ATR 72-600s are due to be

**Flybe ATR 72-600 G-FBXA was delivered to the carrier's Exeter base in the colours of SAS. The aircraft will be used on domestic and regional services from Stockholm Arlanda Airport.**

Craig Stevens

operated for SAS on domestic and regional services as part of a six-year "white label" partnership agreed between the two airlines.

Saad Hammad, Flybe's CEO, said: "We are pleased to be using the ATR 72-600 in

our white label programme for SAS, which launches in October of this year. We have worked closely with both Avation and ATR to make this happen and look forward to a successful partnership with SAS."

## WestJet Outlines London Operations

Canadian carrier WestJet will serve London Gatwick Airport from six Canadian cities starting next spring. Non-stop flights to Vancouver, Edmonton, Calgary, Winnipeg and Toronto will be operated by the airline's fleet of Boeing 767-300ERs while services to St John's will use its Boeing 737-700s.

Bob Cummings, WestJet Executive Vice-President, Commercial said: "Non-stop service between London and Canadian cities is a natural next step in the evolution of WestJet and, specifically, our transatlantic service. With the addition of our 767 aircraft, we will now bring our low fares and fun, friendly, people-driven

service to England and help connect family and friends on both sides of the Atlantic."

WestJet's 767s are configured for 262 passengers, including 24 in its Plus cabin. The carrier's new in-flight entertainment and wireless connectivity system, including 110-volt and/or USB power at every seat.

## EASA Certification for 242-tonne MTOW A330

Airbus has received EASA (European Aviation Safety Agency) certification for the new 242-tonne Maximum Take-Off Weight (MTOW) version of its A330-200. Certification from the Federal Aviation Authority in the US is expected to follow.

The range of the new variant increases up to 350nm/648km compared with the original A330-200, giving a range of 7,250nm/13,427km. Airbus said a combination of aerodynamic refinements and engine enhancements will give operators a reduction in their fuel consumption of up to 2%.

The manufacturer gained certification of the 242t A330-300 in April 2015.

## Vietnam Starts Dreamliner Services to Heathrow



Heathrow welcomed its latest Boeing 787 operator on September 2 when Vietnam Airlines switched its services from the 777-200 to the -9 variant of the Dreamliner. All five of Vietnam's weekly rotations are now operated by the 787. The company's first Dreamliner, VN-A861 (c/n 35151) was photographed departing from Heathrow on September 6.

Matt Stevens

## Maiden 777 for Privilege



Spanish charter operator Privilege Style has taken delivery of its first Boeing 777. Formerly with Asiana Airlines, EC-MIA (c/n 28685, ex HL7500) is the first 777 to be registered in Spain. The aircraft arrived at its new base at Palma de Mallorca early on the morning of September 18. It is configured to carry 299 passengers, 28 of which are in business class. Javier Rodriguez

## Goldstar Airlines to Serve Gatwick

Ghanaian start-up Goldstar Airlines intends to debut at London Gatwick in December. The carrier will serve the UK from Accra twice a week, with flights arriving on Tuesday and Saturday. Goldstar also plans to launch services to Baltimore Washington International Thurgood Marshall Airport in the US in December with flights to the Chinese city of Guangzhou to follow. The airline expects to lease a Boeing 767-300ER from Portuguese aircraft, crew, maintenance and insurance (ACMI) specialist euroAtlantic Airways.

## Textron Proposes Single-Engined Turboprop

Officials at Textron Aviation have confirmed they are developing a new single-engined turboprop personal/business aircraft, which is expected to make its debut at EAA AirVenture Oshkosh 2016. The new aircraft will have a top speed of 280kts (519km/h)

and a range of 1,500nm (2,780km), which indicates it will compete with the successful eight-passenger PC-12 built by Pilatus rather than the smaller Daher TBM900 or Piper M600. In the past, Cessna is known to have tested a Citation Mustang modified with a single

turboprop and, in 2012, Beechcraft showed a concept drawing of an aircraft using the fuselage of the Premier I. However, Textron said the new aircraft is a completely clean sheet design and have not revealed whether it will be branded as a Cessna or a Beechcraft. **Rod Simpson**

## Alternative Viewing Area at Manchester

Aviation enthusiasts visiting Manchester Airport will now be able to view the action from Shadowmoss Road Car Park North. The car park is situated close to the end of Runway 23R providing photo opportunities of aircraft in the air. Parking charges are £2 for each hour and can be paid either by cash or card at the car park.

Wayne Poole, Manchester Airport Passenger Services Director, said: "We know that our business provides much interest and fascination for many thousands of people and we are delighted to offer these new facilities for aviation enthusiasts without causing nuisance for local residents or congestion on the roads."

## Final Assembly of 737 MAX Underway



Boeing has started the final assembly of the first 737 MAX 8 at its facility in Renton, Washington State. Work started on schedule after the first fuselage section arrived on August 21 from Spirit AeroSystems in Wichita, Kansas. Flight systems and insulation blankets were then installed before the wings were attached. Boeing will build the first 737 MAXs exclusively on a new production line in the Renton factory. Once mechanics have proven the production process, 737 MAX construction will be extended to the other two final assembly lines at Renton. Boeing

## Britain's Last Bolkow Air Ambulance to Retire

Scotland's Charity Air Ambulance (SCAA) will retire its Bolkow 105 later this year marking the end of air ambulance operations with the type in the UK.

The charity is due to receive a EC135 in November, operated and maintained

by Bond Air Services, bringing to an end nearly three decades of BO 105 operations in Scotland.

Bolkow 105s first flew emergency missions in Scotland in April 1989 when the Scottish Air Ambulance service teamed

up with Bond Helicopters and British Telecom to launch air ambulance trials from Dundee.

Based at Perth Airport, SCAA's BO 105 G-CDBS has responded to well over 700 emergency call-outs for the charity.

# Refresh for Delta's 'Pink Plane'



Delta Air Lines has repainted its Boeing 767-400ER that promotes the Breast Cancer Research Foundation (BCRF).

Since 2010 N845MH (c/n 29719) has worn a pink-themed livery but with the aircraft due for a repaint Delta's marketing department teamed up with the airline's Technical Operations division to design a new livery.

**Delta Airlines has repainted Boeing 767-400ER N845MH (c/n 29719) into a new livery promoting the Breast Cancer Research Foundation. The aircraft made its first visit to London Heathrow after being repainted on September 26.** Javier Rodriguez

The aircraft now features Delta's standard tail design with a pink ribbon wrapped around the fuselage and BCRF titles below the cockpit. A special paint was used containing a pigment that reflects around 90% of visible light compared with the

30% of normal paint. The aircraft was put back into service on September 22 when it visited Amsterdam and made its first visit to London Heathrow four days later. Delta and its employees have raised \$9.2 million for BCRF since 2005.

## Cathay Receives its 70th 777

Boeing has delivered Cathay Pacific's 70th 777. Registered B-HNR (c/n 60724), the aircraft is also the 53rd and last 777-300ER of the carrier's confirmed orders. The Hong Kong based airline is Asia's largest operator of the 777 and is one of the launch customers for the new 777X with 21 777-9s on order. Cathay received its first 777-300ER in September 2007.

Ivan Chu, Chief Executive, Cathay

Pacific, said: "The 777s have played an important role in Cathay Pacific's fleet modernisation and network expansion strategy. We operate the largest 777 fleet in Asia, and these aircraft offer the range, reliability and flexibility to build multiple daily frequencies on trunk routes, both within the Asia-Pacific region and, with the 777-300ERs, on long-haul and ultra-long-haul routes.

"Our 777 fleet has helped in our efforts to reinforce Hong Kong's position as one of the world's most important international aviation hubs."

Cathay launched its four-times-weekly service between Hong Kong and Düsseldorf on September 1. The carrier has also announced plans to serve Madrid, with the four-times-weekly service starting on June 2.

## New 737 for Texel Air



Former Air New Zealand Boeing 737-33A(SF) N175CR (c/n 27459, ex ZK-NJP) was rolled out of Airbourne Colours' paint shop on September 22 in the livery of Texel Air. The aircraft was delivered as A9C-APC on October 1. Mark Empson

## Gulfstream G280 Software Upgrade

Gulfstream has made an avionics software upgrade available for its G280 business jet, which it says boosts the aircraft's performance.

Delivered in conjunction with Rockwell Collins, the new PlaneView280TM software helps reduce approach speeds by 9kts. The landing distance is also reduced by 270ft (82m) to 2,380ft (725m). According to Gulfstream the software enhances the flight management system performance too, with improvements to basic time and fuel predictions, optimum and maximum altitude and best rate-of-climb speed.

The upgrade also paves the way for operators to activate a number of optional features such as synthetic vision.

# airberlin Promotes Düsseldorf



German carrier airberlin has applied special titles to Airbus A321 D-ABCO (c/n 6501) promoting its Düsseldorf hub. The aircraft now wears 'airdüsseldorf' titles on the fuselage. The aircraft visited Palma de Mallorca on September 19. Javier Rodríguez

## Airbus Opens US Facility

Airbus has opened its first US manufacturing facility in Mobile, Alabama. The \$600 million plant will build A319s, A320s and A321s with the first US-built Airbus commercial aircraft, an A321, scheduled for delivery next spring.

Airbus anticipates the factory will produce between 40 and 50 single-aisle aircraft per year by 2018. The company also assembles commercial aircraft in Hamburg (Germany), Tianjin (China) and Toulouse (France).

## Cessnas 'Reimagined'

Under an initiative started by AOPA (the Aircraft Owners and Pilots Association) old Cessnas are being rebuilt as new and are being sold to flying clubs and private owners at less than half the cost of a new aircraft. In Wichita, Yingling Aviation takes a used Cessna 172 Skyhawk and refurbishes the whole airframe, as the Ascend 172, fitting a zero-time engine, a completely new interior and applying fresh paint with the option of

adding an up-to-date glass cockpit. For the basic training market the Cessna 150 and 152, which have been out of production since 1985, are given the same treatment by Aviat Aircraft of Afton, Wyoming, which also manufactures the Husky and the Pitts biplane. The 150 and 152Reimagined are priced at \$89,000 and \$99,000 respectively while the Ascend 172 has a base price of \$175,000.

**Rod Simpson**

## AIRLINE ORDERS

Airline	Aircraft	Number	Order Placed	Notes
City Airways	Comac C919	10	September 16	Acquired via ICBC Leasing
City Airways	Comac ARJ21	10	September 16	Acquired via ICBC Leasing
RN-Aircraft	Viking Twin Otter Series 400	10	August 27	Delivery between November 2015 and early 2017
RwandAir	Airbus A330-200	1	September 9	Firms up commitment announced earlier this year. Due for delivery in the second half of 2016
RwandAir	Airbus A330-300	1	September 9	Firms up commitment announced earlier this year. Due for delivery in the second half of 2016
SkyWest Airlines	Embraer 175	18	September 14	First delivery expected in 2016
Wizz Air	Airbus A321neo	110	September 14	Firms up commitment announced at Paris Air Show

## Malaysia Agrees A350 Deal

Malaysia Airlines has signed a long-term lease agreement with Air Lease Corporation (ALC) for four Airbus A350-900s. The deal also includes a lease option for two additional A350-900s and two A330-900neos. The aircraft will be delivered between the fourth quarter of 2017 and the second quarter of 2018.

## ATR 72-600 for Binter

Canary Islands based airline BinterCanarias has taken delivery of its first ATR 72-600. Registered EC-MIF (c/n 1278), it is the first of 12 ordered by the carrier through two different contracts signed in 2014 and earlier this year. The new aircraft are configured with 70 seats and will be used on inter-island and international services. BinterCanarias' current fleet consists of 16 ATR 72-500s, having been an ATR operator since 1989.

## New A330 Variant for SAS



Scandinavian Airlines is the first European operator of the new Airbus A330-300 242-tonne maximum take-off weight (MTOW) variant after taking delivery of LN-RKR (c/n 1660) on September 16.

The aircraft, which is powered by Rolls-Royce Trent 700 engines, was handed over

Scandinavian Airlines Airbus A330-300 LN-RKR departs Toulouse on its delivery flight on September 16. Airbus/F Lancelot

during a ceremony at the manufacturer's Toulouse facility. Scandinavian Airlines has another three A330-300s on order as well as 30 A320neos and eight A350-900s.

## Lightwing AC4 CS-LSA at Zell



One of the highlights of Air Expo Zell in Austria in September was the Swiss-built Lightwing AC4 CS-LSA prototype HB-WEA. The aircraft has completed its test-flight programme and is now fully European Aviation Safety Agency approved in the LSA category.

Designed by Hans Gygax (who also designed the Comco C42 Ikarus) and built at Stans in Switzerland, the first production AC4 for a customer is scheduled to be rolled out

**Lightwing AC4 CS-LSA prototype HB-WEA was on display at Air Expo Zell in Austria on September 12 and 13.** Geoff Jones

by the end of the year. The aircraft features a metal tube frame and carbon fibre and fabric shell and has a 100hp Rotax 912iS Sport fuel injection engine. It can be used for flight training and is being considered for stretcher evacuation use (with the right seat removed) as well as a glider tug. **Geoff Jones**

## IN BRIEF

**AUSTRIAN AIRLINES** started its new daily service between Vienna and Manchester on September 11. The flights are being operated by Fokker 70/100s.

An **AIRCRAFT ENTHUSIASTS' FAIR AND MODEL SHOW** is being held at the Museum Of Army Flying at Middle Wallop, Hampshire, on November 22. It takes place between 10am and 4pm and admission to both the event and the museum is £7.50. For further details contact Mark Roberts 01264 334779 or email mark@roberts15863.fsnet.co.uk

**WIZZ AIR** will start a twice-weekly service from Warsaw to Aberdeen on May 13.

**BLUE AIR** has announced it will serve Glasgow from Bucharest twice a week (Thursdays and Saturdays) starting from December 17.

**IBERIA EXPRESS** will link Madrid and Birmingham four times a week, starting from March 27. The flights will be operated by an Airbus A320.

Weight restrictions have been lifted at **CANNES MANDELIEU AIRPORT** in France enabling jet aircraft up to 35 tonnes to use the facility.

## BBA Aviation Agrees Landmark Deal

Global aviation support specialist BBA Aviation has agreed to acquire Landmark Aviation from The Carlyle Group for \$2.065 billion.

Landmark operates 68 fixed base operations (FBOs) across the US, Canada, France and the UK including at White Plains and Teterboro in the US, Paris Le Bourget and London Luton.

It also has 110 aircraft under its management, which are available for charter. BBA Aviation, which operates the Signature Flight Support FBO brand, said the deal opens up opportunities for significant cost-saving and quality-enhancing efficiencies.

Maria Sastre, President and Chief Operating Officer of Signature, said: "This is a strategic fit for the Signature network. It will significantly expand our reach within North America as well as globally. It will also enhance Signature's customer value proposition and materially increase the relevance of our network for our customers."

The deal is subject to regulatory and shareholder approval. It is expected to be completed by early 2016.

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## CanJet Ceases Operations

Canadian low-cost operator CanJet Airlines ceased flying operations on September 1. A division of the Halifax-based IMP Group, the airline had a single Boeing 737-800 remaining in its fleet, wet leased to Air Transat.

For several years CanJet carried out leisure tour charters on behalf of Transat Tours, a division of Air Transat, which has been building its own fleet of 737-800s since early 2014.

CanJet was originally formed in 1999, and was merged with Canada 3000 in May 2001. After Canada 3000 went bankrupt, the CanJet brand was relaunched in 2002. In its heyday CanJet operated a fleet of its own Boeing 737s, supplemented by

others leased for the peak winter season from European operators including Arkefly, Jetairfly, Transavia, TUIfly, and usually painted in hybrid colour schemes.

In its early years it flew 737-200 Classics, then 737-500s, and more recently the 737-800. CanJet has operated 42 different Boeing 737s, with a maximum of ten in one season.

On September 2, the carrier's last aircraft, 737-8AS C-FYQO (c/n 29934), had Air Transat decals applied over its CanJet markings. CanJet's last flight was from Puerto Plata's Gregorio Lupón International Airport in the Dominican Republic, to Toronto Lester B Pearson International Airport on August 31. **Andrew H Cline**

## New Look for CityJet



Irish regional airline CityJet unveiled its new corporate livery on September 4 at an event at the carrier's Dublin Airport hangar. The first aircraft to wear the new scheme is Avro RJ85 EI-RJT (c/n E2366), which visited London City Airport on September 28. **Brian G Nichols**

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12-31 Mar	<b>NEW ZEALAND WITH HONG KONG STOPOVERS:</b> 20 day tour of both islands: airports, airfields, museums and collections; plus the spectacular warbird airshow at Wanaka. Plenty of opportunities for optional flights and sightseeing (whales, Arthur's Pass, Glacier Landing/Take Off on Mount Cook, etc).
1-12 Apr	<b>USA:</b> NAS Key West & Sun 'Fun Airshows & Aviation Sites Of Florida incl Piper Aircraft Factory, Fantasy of Flight & Valiant Air Command Museums.
1-10 May	<b>RUSSIA:</b> Moscow: Great Patriotic War Victory Day Parade, Red Square & Aviation Museums
8-19 May	<b>USA, MEXICO, CUBA &amp; ST MAARTENS:</b> Calling all airliner fans: Miami, Mexico City, Havana & St Maarten. Flying AAL & CUB (opt CUB An-148 fit), Ramp tours requested at MEX and HAV & Aeromexico & Cubana maintenance. Opt fit to St Bart from St Maarten
31 May-7 Jun	<b>KAZAKHSTAN:</b> KADEX 2016 Aerospace Exhibition & Airshow, 25th Anniversary of Kazakhstan Independence. Ramp tour Almaty Airport TBC
Mid May	<b>NATO TIGER MEET, ZARAGOZA AIRBASE:</b> Zaragoza hotel, 5-day tour. In addition to Spotters Days we also include full day at end of runway.
Late May	<b>BELARUS:</b> long weekend trip to fly in Soviet aircraft, eg. IL-18, IL-76, An-12 & Tu-134
Late May/Early Jun	<b>FINLAND:</b> Airshow, Aviation Museums & Bear Spotting. Await confirmation of airshow.
27 May-5 Jun	<b>GERMANY:</b> ILA Aero Exhibition & Airshow, Berlin; Minsk, Belarus; & Warsaw & Deblin, Poland. Optional long weekend just to Berlin.
5-17 Jun	<b>USA ALASKA:</b> Propellers, Airliners & Floatplanes. Flying Icelandair via Iceland; repeat of our hugely popular and successful tour of 2014. Interest in this tour is already high.
7-11 June (tba)	<b>TURKEY:</b> Anatolian Eagle, Konya. Hotel confirmed.
23-31 Jul/6 Aug	<b>USA:</b> Oshkosh; 6 full days at the show. Opt Ext to USAF Museum, Dayton & Nat Air & Space, Udvar Hazy Museums in Washington D.C.. Hotel near the White House.
28 Jul-1 Aug	<b>HUNGARY:</b> Hungarian Air Force Int'l Airshow. Back, this very popular airshow. 4 days visiting several museums in addition to "Arrivals Day" and 2 full days at the airshow.
Dates TBA	<b>REPUBLIC OF CHINA:</b> Air Force Base Visits TBC
11-17 Sep	<b>BULGARIA:</b> Air Force Bases: all the airbases of the Bulgarian Air Force (TBC), and military aviation museums and collections.
Sep TBA	<b>CANADA:</b> Air Force Bases; tours of major airbases of all the major airbases; to coincide with an airshow.
17-28 Nov	<b>FALKLAND ISLANDS:</b> airfields & battle sites inc Argentinian Air Force aircraft; local wildlife.
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# Battle of Britain Flypast



Three Spitfires and a Hurricane fly in formation above Goodwood during Battle of Britain Day celebrations on September 15. Glenn Sands

A spectacular flypast from Goodwood was the highlight of commemorations for the 75th anniversary of the Battle of Britain on September 15. Around 40 aircraft, mostly Supermarine Spitfires

and Hawker Hurricanes, took off from the West Sussex airfield (formerly RAF Westhampnett) and flew in smaller groups across towns in southern England and the sites of bases used during the

battle. The event was arranged by the Boulton Flight Academy at Goodwood and was attended by Prince Harry. A service of remembrance was also held at St Paul's Cathedral.

## Engines Received for Hudson Restoration

Joe McBryan of Buffalo Airways has donated two Wright GR1820 radial engines to the restoration of Lockheed Hudson VI FK466 at Trenton, Ontario.

The aircraft's fuselage, found in a scrapyard and on long-term loan to the National Air Force Museum of Canada from the Atlantic Canada Aviation Museum in Halifax, already has a new nose, wings and tailplane. All of these components were

taken from donor aircraft Lockheed Lodestar CF-CEC.

Originally allocated to the RAF, before being taken on by No.1 Composite Squadron RCAF at Torbay, Newfoundland, FK466's turret was removed and it was equipped with a lifeboat for use in air-sea rescue. In 1945 the aircraft was used to save the crew of a downed US Consolidated B-24 Liberator.

Museum Executive Director Chris Colton

also confirmed that restoration of Northrop A-17A Nomad s/n 3521 has been put on hold. Recovered from Lake Muskoka last year, the Nomad is severely damaged, necessitating lengthy and extremely complex work. Much of the existing airframe needs to be replaced. The museum is considering putting it on display in an 'as found' condition, but for the time being it remains in storage. [www.airforcemuseum.ca](http://www.airforcemuseum.ca) **Ken Cothliff**

## Canso Returns to the Skies

Consolidated PBY-5A Canso C-FUAW is flying again after a four-year restoration. The PBY is privately owned by Bob Dyke of Victoria, British Columbia and is based at Victoria International Airport. The aircraft's first post-restoration flight was on August 4, 2015 and three days later it was the star of the static display at the Abbotsford International Airshow. During 1945 this Canso served with the RCAF flying out of Victoria (then known as Patricia Bay Air Station), and C-FUAW has been painted to depict how it looked then. The work was carried out by members of the Catalina Preservation Society at Victoria. The PBY will now travel to air shows, museums and events to show off the only flying Canso in Western Canada. **Derek Heyes**



Bob Dyke's Consolidated PBY-5A Canso C-FUAW has returned to the skies after restoration. Derek Heyes/[www.hazersflightline.com](http://www.hazersflightline.com)

# Cornwall's Aviation Heritage Centre Opens its Doors



Hawker Hunter T.8 WT722 and Vickers Varsity T.1 WJ945 are two of the exhibits at the new Cornwall Aviation Heritage Centre. CAHC

Cornwall Aviation Heritage Centre (CAHC) opened to the public on September 20.

Based at Newquay Cornwall Airport, the organisation was formed after Classic Air Force (CAF) decided to return to its previous home at Coventry, Warwickshire. Ownership of the CAF airframes that could not be relocated to Coventry has now passed to the CAHC, with a number of other projects likely to join them in the near future. These form the basis of the centre, and the personnel running the attraction are determined to make theirs a 'hands-on' operation, meaning visitors can climb aboard many of the aircraft.

The CAHC is housed within the airport's new Aerohub enterprise zone, and most of its exhibits (except the larger ones) are based inside a Cold War-era hardened aircraft shelter (HAS), which dates back to when the site was part of RAF St Mawgan. The military base still exists at Newquay in a reduced capacity.

Vickers VC10 K3 ZA148, which landed for the final time at Newquay on August 28, 2013, is to be refitted with its original Rolls-Royce Conway engines and maintained to a high standard, with the help of specialists from Bruntingthorpe-based GJD Services.

BAC One-Eleven ZH763, which also arrived in 2013, will be kept in 'live' running condition. Like the VC10, tours will be available inside the former QinetiQ jet, the cabin of which will be converted into an educational facility for school groups.

Other attractions include Vickers Varsity T.1 WJ945, formerly at Duxford, and Hawker Siddeley Harrier GR.3 XV753. The latter was built in 1969 as a GR.1 and later modified to GR.3 standard for the RAF. It was most recently used by the Royal Navy as a deck-handling trainer at Predannack, Cornwall.

The centre also has two Hawker Hunters – a former RAF F.4 single-seater and an ex-Navy T.8 trainer. The cockpits of both jets are being refurbished to enable visitors to sit in them. Space for commercial partners and special events is available and a 1950s-themed café is being installed.

The group is currently undertaking long-term Hawker Sea Hawk and English Electric Lightning restorations and is hoping to offer aerobatic Harvard and Chipmunk flights among other flying experiences in the near future. [www.cornwallaviationhc.co.uk](http://www.cornwallaviationhc.co.uk) With thanks to **Geoff Ogden**

# World's Sole Original Sopwith Pup Unveiled

Tyntesfield, a National Trust-owned stately house near Bristol, was the venue for the unveiling of an extremely rare original Sopwith Pup currently under restoration.

Built in 1917 by Coventry's Standard Motor Company, Pup B1807 originally served as a night-fighter with Rochford-based 198 Training Squadron and is likely to have flown with a number of other units before ending the war with 39 Squadron.

Flying as G-EAVX, it crashed during the 1921 Aerial Derby at Hendon, due to pilot Dring Lester Forestier-Walker becoming unwell. Forestier-Walker escaped unhurt, and the aircraft was stored for a few years at Claude Grahame-White's hangar, also at Hendon.

Kelvyn Baker discovered the Pup in a barn near Compton Abbas, Dorset, in 1972. Work began to rebuild it in several different locations, eventually continuing at RNAS Yeovilton.

New wings have been created, but the fuselage and tail are original, and an 80hp Le Rhône rotary engine has been installed and successfully run. The Pup even has its original wicker seat and illuminated night-flying instruments. Baker is currently working alongside Nick Harris, Jason Nuttall, Mark Castle-Smith and Mike Waldron at his home near Banwell, Somerset, to complete the restoration to airworthy condition.

The plan is to return the biplane to its civilian colours and markings, with a first flight anticipated in or around 2020 from either Yeovilton or Middle Wallop, Hampshire. **Adrian M Balch**

# Mosquito Prototype Progress



Restoration work on the de Havilland Aircraft Museum's Mosquito prototype W4050 is nearing completion. Bob Glasby

Significant progress has been made on the restoration of the de Havilland Aircraft Museum's Mosquito prototype W4050.

The four-year initiative, which is supported by a £41,000 grant from the Heritage Lottery Fund, is being carried out by volunteers at the museum at Salisbury

Hall, London Colney, Hertfordshire.

Mosquito W4050 flew for the first time on November 25, 1940 from nearby Hatfield. The project is currently on schedule to be completed in time for the maiden flight's 75th anniversary later this year. [www.dehavillandmuseum.co.uk](http://www.dehavillandmuseum.co.uk)

# Aussie Dak Revamp

Australia's second oldest Douglas DC-3, VH-ABR, is being overhauled in preparation for a return to the air. The work is being carried out by its new owner, Paul Little's Melbourne Aviation Precinct, at the city's Tullamarine Airport. The 1938-built machine served in the RAAF during World War Two.

# New Swedish Harvard Team



A new aerobatic display team has been formed by the Swedish Air Force Historic Flight (SwAFHF) comprising four Noorduyn-built AT-16-ND Harvard IIs.

All four aircraft served with the Swedish Air Force, with which the type was designated Sk 16. The team has consequently been named

**The four Harvards of the Swedish Air Force Historic Flight Team 16.** Lennart Berns

SwAFHF Team 16. Three of the Harvards are painted in Swedish Air Force colours, while the fourth – SE-FUZ – flies in a bare metal finish. All of its pilots are either serving or former air force personnel.

The Sk 16 was used as an advanced trainer at the Central Flying School at Ljungbyhed in southern Sweden, before being replaced in the late 1950s by the de Havilland Vampire. After being withdrawn from the training role, the air force used its Harvard fleet as liaison aircraft until the late 1960s. **Lennart Berns**

## Special Award for Ju 52M/3

Deutsche Lufthansa Berlin Stiftung's Junkers Ju 52M/3 D-CDLH ('D-AQUI') has been designated a 'flying memorial'. The 1936-built aircraft is one of the oldest airliners still flying commercial services.

At a ceremony in August, Olaf Scholz, Hamburg's Lord Mayor, presented a plaque to Deutsche Lufthansa's Dr Jürgen Weber and Deutsche Lufthansa Berlin Stiftung boss Bernhard Conrad, placing the aircraft under the protection of the Office of Historic Monuments of the Hamburg Cultural Authority. For official purposes, the aircraft has been classed as a 'Moveable Monument'.

During the summer, around 9,000



**Junkers Ju 52M/3 D-CDLH ('D-AQUI') at Hamburg in August.** Key-Tony Dixon

passengers are carried on sightseeing flights around Germany and Austria in this machine,

with the flight and cabin crew being selected from Lufthansa employees. **Key-Tony Dixon**

## Polish Hurricane Unearthed 75 years after BoB Crash

As part of the #BoBPoles project commemorating the 75th anniversary of the Battle of Britain, the Polish Embassy co-financed the repainting of a Hawker Hurricane in the paint scheme of the legendary 303 Polish Fighter Sqn. Hurricane Mk.XIIa G-HURI now bears the serial P3700 and code RF-E which was originally flown by, among others, Sgt Kazimierz Wunsche. Sgt Wunsche was forced to abandon the aircraft on September 9, 1940 after it sustained damage during combat over Beachy Head, East Sussex. In a remarkable follow-up, the wreckage of the original Hurricane was

uncovered exactly 75 years after its crash. The historic dig near Saddlescombe Farm in West Sussex was carried out by a team of archaeologists and historians supported by Polish and British veterans of foreign missions in Iraq and Afghanistan.

The operation, led by MOD archaeologist Richard Osgood, ended with the successful extraction of the aircraft's components, including its reduction gear and propeller hub. The recovered material will go on show at the Polish Museum at RAF Northolt, where 303 Sqn was stationed during the Battle of Britain. The dig took place in

the presence of Sgt Wunsche's daughter Grazyna and granddaughter Joanna, and the repainted Hurricane conducted a flypast.

In all, 145 Polish fighter pilots served in the Battle of Britain in 302 and 303 Polish Squadrons as well as with British units. No.303 Sqn was the highest-scoring Allied unit of the Battle. Poles constituted the second largest contingent after the British out of the total number of fighter pilots from Allied countries. By the end of World War Two, almost 20,000 Polish airmen and airwomen were serving in 16 squadrons of the Polish Air Force in Britain. **David J Smith**

# TORNADO

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# FINAL CALL FOR BRITISH AIRWAYS BOEING 737s

With the retirement of the last British Airways Boeing 737 at the end of September, **Charles Kennedy** reviews the type's service with the carrier and associated airlines.

**B**y the mid-1970s, early-build Hawker Siddeley Trident 1s were coming up to retirement age and a new airliner was needed. British European Airways (BEA) merged with British Overseas Airways Corporation (BOAC) on March 31, 1974 and the newly-formed British Airways began evaluating types – the effort focusing on the Boeing 737-200 and the Douglas DC-9. The latter was a twin-engined T-tail design that first entered service with Delta Air Lines on December 8, 1965. The -30 variant



**GB Airways was one of several airlines to operate Boeing 737s in British Airways' livery.**  
GB Airways/John Dibbs – The Plane Picture Company

had accommodation for 127 passengers in a five-abreast single-class configuration and was powered by Pratt & Whitney JT8D engines over distances of up to 1,790 miles (2,880km). British Airways leased a series of DC-9-40s (a slightly stretched subtype broadly identical to the -30) from Finnair and ran them on its flight 'BA772/773' to Helsinki and back during 1977 to gain technical expertise of the type.

### BIRTH OF THE 737

Boeing had been busy with the runaway success of the 707 Intercontinental and the 727 trijet, and so entered the short-haul market later. The 737, which shared many design elements with its older siblings, first flew on April 9, 1967. It had a conventional tail and an engine under each wing. The first variant, the 737-100, entered service with Lufthansa on February 10, 1968. Only 30 -100s were built, 23 -130s for Lufthansa, five -112s for Malaysia-Singapore Airlines and a pair of -159s for Avianca Colombia.

Although the new type was well received by airlines and passengers alike for its decent fuel efficiency and roomy six-abreast seating, United Airlines requested increased passenger capacity. As a result, the baseline -100 was stretched by 6ft 2in (1.9m) which facilitated the addition of two rows of seats –

an order for 40 737-200s was the result. The first -200 flew on August 8, 1967, received FAA certification on December 21 of the same year and entered service with United on April 28, 1968.

Further tweaks included increased fuel capacity and enhanced flap fairings for improved range and performance, reverse thrust on the engines (the original, taken directly from the 727, had the unintended result of lifting the aircraft's weight off the wheels, reducing braking efficiency and extending, rather than reducing, the ground roll after landing). These enhancements were standard after number 135 rolled off the line at Boeing Field, Seattle and aircraft incorporating these modifications were branded -200 Advanced. Production moved to Renton, also in Seattle in 1971.

Despite Boeing's continued efforts to improve the aircraft, orders were slow, and in 1970 only 37 were placed. Part of the problem was that US regulations required a third crewman on the flight deck of the 737 as the Boeing aircraft was in a different weight class to the DC-9.

Boeing gave serious consideration to closing the line, or selling it to a Japanese aerospace consortium. It was only with the cancellation of the supersonic Boeing 2707 programme that enough manpower

and capital was freed up to concentrate on rescuing the type. With the three-crew rule finally rescinded for US carriers, sales began to pick up in the middle of the 1970s.

### BRITISH AIRWAYS ORDER

To further research the replacement for the Trident, British Airways leased 737-200s from Dutch carrier Transavia, starting with PH-TVI on November 3, 1977, a 737-222 originally delivered to United in 1969. Three more were leased from the same source a year later — another -222 and a pair of 2K2s that had been delivered direct to Transavia in 1975. After a careful comparison with the Douglas DC-9 and a cursory glance at the Dassault-Breguet Mercure (not helped by the fact that it had a range of only 1,295 miles/2,084km compared to the 737-200's 2,660 miles/4,300km), British Airways decided on the Boeing, and placed an order for 28 737-236s – 19 for the mainline fleet and nine for charter subsidiary British Airtours.

British Airways has a history of leading the way with new technology on existing Boeing platforms, and the introduction of the 737 was no exception. One of the Trident's great innovations was to be able to perform an autoland in zero-zero conditions (zero forward and vertical visibility), known as a Category (Cat) IIIc autoland. ►



The 737 was only certified to autoland in Cat II conditions up until this time, so Boeing upgraded the avionics, most notably the Automatic Flight Control System (AFCS) to enable Cat IIIa autolands. To achieve this, the first British Airways 737-236, G-BGDA, which initially flew on September 12, 1979 as N1285E, was kept at Boeing Field for the next two years for systems development and verification. The first example to arrive at London's Heathrow Airport was G-BGDC on February 7, 1980.

The 737 fleet quickly went into service on short-haul services from Heathrow, displacing Tridents on flights to cities across the British Isles and Europe. Compared with the Trident, the 737 offered a huge saving in fuel burn, which was the kind of step forward British Airways badly needed as it

was a loss-making publicly-owned utility, albeit one earmarked for privatisation by the Conservative Government of the day led by Margaret Thatcher. She appointed Lord John King as chairman and new aircraft purchases included a top-up order for a further 16 737-200s, hastening the retirement of the Trident. Some of the 737s were based at Birmingham and Manchester for the carrier's services from these airports.

The new regime under Lord King decided on a new livery; initially a variant on the existing colour scheme but with a silver upper fuselage replacing the white was applied to G-BKYA. Later a more radical makeover was designed by San Francisco-based consultancy Landor Associates, which reinstated the company's full name on the side of the aircraft (in the early 1980s

Above: In the latter stages of their time with the airline, the 737s were consigned to flights from Gatwick. AirTeamImages.com/Simone Ciaralli

Left: British Airtours Boeing 737-236 G-BGJF at Manchester in September 1980. AirTeamImages.com/Bob O'Brien Collection

some aircraft just wore the titles 'British'), ditched BOAC's old Speedbird logo for a new Speedwing motif on the lower fuselage. It also added a coat of arms and the motto 'To Fly To Serve' to the tail, which still sported the quartered Union Flag, but with the colours now reversed for a more sober effect. The first British Airways aircraft to display the new livery was another 737-200, G-BKYF. The final British Airways -200, G-BKYH, was retired from the fleet on June 6, 2001.

## BRITISH AIRTOURS

The charter subsidiary British Airtours received the first of its nine aircraft, G-BGJE, on March 21, 1980. In the midst of a positive time for the airline – with losses turning to profit and customer service improving – tragedy struck on August 22, 1985. Aircraft G-BGJL, operating British Airtours flight 'KT28M', suffered an engine malfunction during the early stages of its take-off roll at the start of a trip from Manchester to Corfu. The report, issued after a three-year

Below: As part of trials to find a replacement for its fleet of Hawker Siddeley Tridents, British Airways leased four Boeing 737-200s from Transavia, including PH-TVH. AirTeamImages.com/Bob Robinson





Above: **British Airways Boeing 737-236 G-BKYM** wearing additional 'Birmingham' titles. The carrier based 737s at Manchester and Birmingham, and added the titles to signify this. Key Collection

Below: **Caledonian Airways Boeing 737-236 G-BGJI** lines up at Gatwick in October 1988. AirTeamImages.com/Carl Ford



investigation by the Air Accidents Investigation Bureau stated: "The cause of the accident was an uncontained failure of the left engine, initiated by a failure of the No.9 combustor can which had been the subject of a repair. A section of the combustor can, which was ejected forcibly from the engine, struck and fractured an underlying fuel tank access panel. The fire which resulted developed catastrophically, primarily because of adverse orientation of the parked aircraft relative to the wind, even though the wind was light."

Although 82 passengers and crew escaped, 55 did not. The accident was a turning point for aviation safety, leading to a number of improvements – not only regarding the positioning of an aircraft in relation to

the elements during an evacuation but also space around exits, galleys and survivability issues in general.

When British Airways bought British Caledonian, British Airtours was rebranded as Caledonian Airways (which retired its last 737 in November 1988). The airline was subsequently sold to Inspirations PLC in March 1995. Caledonian Airways flew a total of 27 737-200s.

### UPGRADED 737

Boeing had been looking at ways to improve the 737, with preliminary specifications for an upgraded offering released at the 1981 Farnborough airshow. The biggest departure from the -200 was the use of the CFM56

engine, which had a much wider first stage fan. This was accommodated under the low wing of the 737 by placing the engine ahead of the wing instead of beneath it, and moving the gearbox and other accessories to the side of the nacelle instead of the bottom.

The 737-100 and -200 were retrospectively known as the 737 Original and the 737-300, -400 and -500 later became known as the 737 Classic. The prototype 737-300 took to the air for the first time on February 24, 1984, and the -400, with an extra 10ft (3.45m) of fuselage was rolled out on January 26, 1988 at the Renton 737 plant. The -400's maiden flight was on February 19. The final variant of the Classic era was the shortest of the lot, the -500, which was intended as a direct 737-200 replacement, flying for the first time on June 30, 1989.

The first 737 Classic operated in British Airways livery was a quartet of -300s which came from BA's partnership with Danish operator Maersk Air. The aircraft were operated in full Landor livery, with the first example to join BA, G-BOZA, arriving direct from Boeing on September 14, 1988 – the remaining three having already operated in Maersk livery. In addition to the two Dan-Air examples (see later) the airline flew a further eight -300s. The final example was retired in July 1998.

In 1989, British Airways ordered 25 of the 737-400, registered G-DOCA to 'CZ (omitting 'CQ). The first to arrive was G-DOCB, which was delivered to Heathrow on October 16, 1991 and operated the inaugural -400 series passenger service on October 21; 'BA356/357' from Heathrow to Lyons and back. Former Dan-Air example G-BNNL was the first -400 to be taken out of service on December 14, 1994.

The first of ten Boeing 737-500s entered BA service in February 2000 and these aircraft were based at Gatwick. A further five examples were operated by Maersk Air in BA livery from Birmingham. The last -500 flying routes for BA was withdrawn in October 2009.

### DAN-AIR TAKEOVER

The next intake of 737s came with the ▶

Below: **German regional carrier Delta Air** was acquired and renamed **Deutsche BA** in April 1992. It started with four leased 737-36Qs and by 1997 had a fleet of 18 aircraft. H M Helbig





Above: **Comair Boeing 737-236(A) ZS-NNG departs from Johannesburg. British Airways has a long-standing franchise agreement with the South African airline.** Key-Tony Dixon

buy-out of Dan-Air in November 1992. With mounting debts and no obvious suitor among independent airlines, British Airways bought the carrier for £1, plus the assumption of financial commitments of £50 million (including £37 million of debt).

While some of the Dan-Air fleet was sold or parked, its 737s formed the basis of a new short-haul British Airways operation at Gatwick, with two 737-300s and seven -400s. The routes that were kept were to Aberdeen, Athens, Brussels, Madrid, Manchester, Montpellier, Paris, Rome, Toulouse, Vienna and Zürich, and Dan-Air's sole route out of Heathrow, which was to Inverness.

Encouraged by the liberalisation of

commercial regulations in Europe in the 1990s, British Airways took advantage of the new climate and bought Delta Air. This was a small German regional carrier based at Friedrichshafen which it renamed Deutsche BA. For this operation it acquired four 737-36Qs from leasing company Boullion to fly from a new hub at Munich starting services in June 1992. By 1997 the fleet had grown to 18 -300s.

Although it was a brave move into foreign ownership, Deutsche BA never made money and by 2001 had amassed losses of £15 million, and a partner was sought to take the reins.

A merger with easyJet was nearly

completed but failed at a late stage. The airline was rebranded dba and took over Germania's low-cost Germania Express operation, also known as gexx, which came with a fleet of Fokker 100s. This made dba Germany's third largest airline after Lufthansa and airberlin. After a flirtation with German carrier LTU, the airline was bought in stages by airberlin, with 100% of the shares taken over on September 6, 2006, and the integration was completed two years later when the last dba flight operated on November 30, 2008.

London Gatwick-based GB Airways became a British Airways franchise in 1995, operating flights to the Mediterranean and North Africa. At that time the carrier flew five 737-200s (three leased from BA and two sub-leased from the same source) and added a pair of former British Airways 737-400s. These were followed by three more -400 series aircraft and four -300s, including GB Airways' first ever brand new aircraft, G-OGBB and 'BC. When the new 737-300s began arriving in the fleet in January 1998, GB Airways started to return its -200s to BA, the last one leaving the airline in March 1998. GB Airways placed an order for nine Airbus A320 family aircraft in November 1998 to replace the 737s which were gradually phased out in the early 2000s. Boeing 737-3L9 G-OGBD was the last to leave the fleet, returning to lessor Orix Aviation Systems on March 11, 2004.



Above: **Maersk Air Boeing 737-5L9 G-MSKD on short finals to Birmingham Airport.** Key Collection

Below: **Deutsche BA was rebranded dba and took over the Germania Express low-cost operation, making it Germany's third largest airline. It was eventually consumed by airberlin in September 2006.** H M Helbig





Above: To combat the rise of easyJet, Ryanair and other European low-cost carriers, British Airways launched Go. Each of the Stansted-based airline's 737s was painted in a different colour and wore 'Go' themed slogans on each side of the fuselage. Key Collection

## AFRICAN CONNECTION

British Airways has a long-standing franchise agreement with South African airline Comair, which was formed at the end of December 1943 as Commercial Air Services. Today it operates a network from Johannesburg to major South African cities as well as short-haul international destinations, including Windhoek in Namibia, Livingstone in Zambia and Harare and Victoria Falls in Zimbabwe. It flew 16 737-200s including 11 -236s from British Airways and currently has a fleet of four 737-300s and 12 examples each of the -400 and -800. The 737s are flown in BA livery and its -800s are the only New Generation 737s to do so.

The rise of easyJet and the transformation of Irish carrier Ryanair forced British Airways to address the low-cost airline phenomenon. Plans for a new carrier began in November 1997 under the codename Operation Blue Sky. British Airways' general manager for New York, Barbara Cassani was placed in charge of the new carrier and London Stansted Airport was chosen as its base. The name Go was adopted and the 737-300 selected for the new carrier.

The first two aircraft were delivered from Philippine Airlines and took up registrations G-IGOC and 'OE, ready for the carrier's inaugural flight on May 22, 1998 from

Stansted to Rome Ciampino. Other early routes included Bologna, Milan Malpensa, Copenhagen, Glasgow, Munich and Venice. A raft of Iberian destinations followed – Malaga, Madrid, Faro, Lisbon, Alicante, Ibiza and Bilbao, and a second UK base in Bristol. Despite the expansion, the operation was not profitable, and there were additional concerns at the top that Go was taking passengers from British Airways flights, so a buyer was sought. In June 2001 there was a management buy-out, with the assistance of private equity firm 3i, for the price of £100 million. The following year easyJet paid £374 million for the airline to expand its own operations.

In Go's short life, it had 27 737-300s; six were new from Boeing and leased via GECAS, with the others coming from a diverse range of sources, including America West Airlines, Garuda Indonesia, dba, SATA Portugal, Air Europa and British Midland. Each aircraft wore a variation of the Go brand – some examples on the left side of the fuselage included 'Go Getter', 'Go On Then', 'Go As You Are', and to ensure the airline's name came first on the right side the slogans read 'Away We Go', 'Ready To Go', 'On The Go', 'Get Set Go' among others. The last 737 in Go livery was painted into easyJet's colour scheme in April 2003.

Below: Boeing 737-436 G-DOCX departing Turin en route to Gatwick on September 30, operating flight BA2579 which was the last revenue service by a British Airways 737. Marco Rossi

## FINAL CALL

Back at base, the end of the 737 era at British Airways began as early as August 1998. The airline had inherited a small fleet of ten early-build Airbus A320-100s when it took over British Caledonian in early 1988. A decade later British Airways placed a massive \$11 billion order with Airbus for 59 narrowbody aircraft plus 200 options. British Airways had gone from having never purchased an aircraft direct from Airbus to placing what was at that time the biggest order ever received by the Toulouse-based airframer.

The obvious loser was the 737 fleet, and the chance of 737 New Generation aircraft – 737NGs – replacing the Classics at Heathrow was now zero. The first of the massive Airbus order to arrive was G-EUUA which landed at Heathrow on January 31, 2002, and the writing was on the wall. Gradually the Airbus A320s supplanted the 737s, which retreated to the Gatwick base over the following two years, with the last Heathrow 737-400 flights taking place in late 2004.

The Gatwick base continued to fly 737-400s but with the A320 gradually encroaching here also. As the old Boeings came up to heavy maintenance checks or as potential buyers presented themselves, their numbers gradually shrank. A retirement date of late 2012 was set, but despite an average age of 16 years the aircraft had relatively low cycles on airframes so were granted a reprieve which extended their service with BA to 2015. On October 23, 2014, G-DOCB was donated to Cranfield University, the short positioning flight operating as 'BA9253'.

The final revenue flight was BA2578/9 Gatwick-Turin and return, flown by G-DOCX on September 30.

Over 200 737s have appeared in British Airways liveries and, while the curtain has fallen on the British carrier's operations with the famous airliner, Comair's examples are set to fly on. **AN**



# USAFE PHANTOMS

PART 2

## WILD WEASELS AND RECCE



In the second instalment of this two-part article, **Doug Gordon** looks at United States Air Forces in Europe (USAFE) Wild Weasel and recce Phantoms and their role in the 1991 Gulf War.



Left: On May 13, 1965 the first two RF-4Cs for USAFE arrived at RAF Alconbury for the 10th TRW. They were flown into the base by the wing's commander, Col DeWitt Spain and Major Gary Wright. Col Spain poses with RF-4C-21-MC, 64-1020 on the day they arrived for an historic photo opportunity. Randy Romanchek



Below left: An F-4G of the 81st TFS at RAF Greenham Common in June 1981. Richard Andrews via Adrian M Balch collection

Pilot Captain Bruce 'Spike' Benyshek (Ret'd), who flew with the 81st TFS, described a typical training sortie in Europe: "I showed up at the height of the Cold War. The wing had just recently converted to flying 'Mixed Pairs' – where F-16C Block 30s were our wingmen, having replaced the F-4Es.

"A typical sortie would be a two-ship. We would do an interval take-off, join for tactical formation flying line-abreast, about a mile apart, and fly a low-level route we had created for that flight.

"The 'targets' were army radar sites, Kasernes (barracks), microwave towers or just about anything. There were two special low-fly areas that had small radar units that gave signals similar to Soviet equipment.

"As Wild Weasels we would set up a working space called a ROZ, or Restricted Operating Zone. It was a square, and it reflected what we would do in wartime.

"We would orbit at low altitude to negate radar-guided SAMs and let the F-4G's APR-47 locate the radar site. We had a built-in threat generator that would put targets on our display or, if there were real radars in the area, we would work them.

"When the system had a solution, we would employ weapons: AGM-45 Shrikes for F-16s and HARMs for the F-4G. It was assumed that communications would be jammed in a Warsaw Pact war, so tactics were mostly silent.

"Using tactical turns, the F-4G, who was always the lead in the ROZ, would point the flight at the threat. We would rock our wings as a preparatory signal and, at the proper range, perform a hard turn towards the F-16 of 90°.

"This was his signal to pull up about 30°, shoot and turn to follow us, diving down and going to tactical. We would pass well below him during his pull. This loft profile gave the Shrike more range.

"The next year, an interim solution was found for carrying HARMs on the F-16. The target was determined by the F-4G's EWO [electronic warfare officer] and required a radio call. The 'Viper' driver would have to program the HARM for the desired threat."

The F-4Gs also practised air-to-air engagements. Some were impromptu, occurring when other NATO fighters were encountered during the course of a Weasel mission.

Others were more organised in restricted airspace. 'Spike' Benyshek explained: "Air-to-air training was the best of my career from 1988 to 1990 – Europe was abuzz with

The F-4G was the last Phantom variant to serve with the United States Air Forces in Europe (USAFE). A development of the F-4E, the mission of the 'Wild Weasel' and the 52nd Tactical Fighter Wing (TFW) at Spangdahlem Air Base in West Germany was the suppression of enemy air defences (SEAD).

The internal gun carried by the F-4E was replaced by AN/APR-38 radar, homing and warning (RHAW) equipment, enabling the aircraft to locate and identify radars and attack them using its own weapons or to direct other aircraft. The system was later updated to the AN/APR-47.

The principal suppression weapon of the F-4G was the AGM-88A High-Speed Anti-Radiation Missile (HARM). It could also carry the AGM-78 Standard ARM in addition to the AGM-65 Maverick missile and a variety of bombs plus AIM-7 Sparrow and AIM-9M Sidewinder air-to-air missiles. The ALQ-131 ECM pod was also integrated onto the jet.

Spangdahlem was the only base in Europe to host the F-4G. The first unit to receive them was the 81st Tactical Fighter Squadron (TFS) in 1979, followed by the 23rd and 480th TFSs in 1983. At this point all three units had both F-4Gs and F-4Es, which flew together in hunter-killer teams.

The 'G' model carried the specialised Wild Weasel equipment to detect radars, though it also carried weapons on SEAD missions. The other part of the hunter-killer team, F-4Es (later replaced by F-16Cs), acted as 'shooters'.

Left: Two F-4Gs of the 52nd TFW. The aircraft in the background is carrying a pair of AGM-88A HARM air-to-ground missiles. This variant of the Phantom was optimised for suppression of enemy air defences. USAF National Archives



Above: **Three shark-mouthed Phantoms of the 480th TFS/52nd TFW. Two F-4Es flank an F-4G Wild Weasel. The aircraft are armed with an AGM-78 Standard Anti-Radiation Missile (F-4G), AGM-45 Shrike air-to-surface missiles, AIM-7 Sparrow III and AIM-9 Sidewinder air-to-air missiles. The aircraft are equipped with electronic countermeasures pods. The F-4E in the foreground is also carrying four Mk82 general purpose bombs.** USAF National Archives



Below: **An F-4G of the 23rd TFS from Spangdahlem AB.** Adrian M Balch collection

fighters. American F-15s, F-16s, A-10s; British and German Phantoms and Tornados; French Mirages, Alpha Jets; Canadian Hornets; and US F-111s.

"On a daily Weasel mission you might see nothing... or you might get radar contact of some fighters, known due to certain IFF [identification friend or foe] replies.

"What to do? Just like war, in a few seconds, lead would decide to try and go around them or engage. We didn't require detailed briefings to do this, but the reactions were limited. Engage, turn up to 180° then rock your wings and stop. It was far better

than any Red Flag or major exercise I was in because it included the element of uncertainty.

"We also did conventional air-to-air in protected airspace, about 9,000ft to FL230, called TRAs or Temporary Reserved Airspace. Sometimes it was F-4 v F-4; others it was F-4 v F-16."

In the first half of the 1990s, the 52nd Tactical Fighter Wing (USAF designations changed in 1991 when it became the 52nd Fighter Wing) gave up its F-4Gs – starting with the 480th TFS in 1990, the 23rd TFS (which became the 23rd Fighter Squadron) in 1991 and the 81st FS in 1994.

The last four aircraft left Spangdahlem in late March that year. Towards the end of 1990 the 81st TFS had exchanged its F-16Cs for F-4Gs from the 480th TFS and became an all-F-4G squadron. In the meantime they would go to war...

## RECONNAISSANCE

The RF-4C was developed in response to Special Operations Requirement 196 (SOR 196) published on May 29, 1962, which called for an all-weather reconnaissance version of the F-4C fighter-bomber. It also specified a nuclear delivery role.





Above: In 1987 the 52nd TFW F-4Es were replaced by F-16C/Ds. All three squadrons of the wing used F-4Gs and F-16C/Ds in the SEAD role. These aircraft wear all three fin tip colours of the three squadrons at Spangdahlem: the 23rd, 81st and 480th TFSs. USAF National Archives

The Phantom was in competition with the North American RA-5 Vigilante and the Republic RF-105, but won the day.

Most of the reconnaissance-gathering equipment was carried in the redesigned nose of the aircraft. The original recce fit consisted of a forward oblique KS-87, low-

altitude panoramic KA-56, framing KS-72 and AN/AAD-5 infrared cameras; side-looking airborne radar (SLAR); and forward-looking radar (FLR) sensors.

The cameras could be swapped for others, depending on the mission requirements: for example, the high-altitude panoramic KA-91.

The first flight of the RF-4C, actually a reconfigured naval F-4B (62-12200), was on August 8, 1963. McDonnell Douglas test pilots then undertook extensive testing of its reconnaissance systems prior to the delivery in September 1964 of the first production model to the USAF's 33rd Tactical Reconnaissance Training Squadron (TRTS) at Shaw AFB, North Carolina. All initial production aircraft were delivered to this unit.

In 1965 some of the squadron's aircraft were transferred to the first operational RF-4C unit, the 16th Tactical Reconnaissance Squadron (TRS), also at Shaw – the first aircraft moving over on January 28.

The first RF-4Cs for USAFE were delivered to the 1st TRS, 10th Tactical Reconnaissance Wing (TRW) at RAF Alconbury (now in Cambridgeshire) in May 1965, followed by the unit's 30th TRS later that year.

The 10th TRW had previously flown the Douglas RB-66 Destroyer from Spangdahlem. When French President General Charles de Gaulle ordered all foreign nuclear forces out of France in 1959, Spangdahlem came under the command of the 49th TFW which moved in from Étain-Rouvres. At the same time the 10th TRW moved to Alconbury.

In July 1965 the 26th TRW was activated by USAFE at Toul-Rosières AB in France. Among squadrons assigned to it was the 38th TRS, which remained at Ramstein, West Germany, having previously transferred from the 66th TRW at RAF Upper Heyford, Oxfordshire. It converted from the McDonnell RF-101C Voodoo to the RF-4C in early 1966, the first aircraft arriving on April 8.

The 26th TRW also stood up the 32nd TRS in July 1965, but it had no aircraft or aircrew; in mid-1966 the squadron transferred to the 10th TRW at Alconbury and received the RF-4C.

In December 1965 the RF-4C-equipped 22nd TRS joined the 26th TRW from the US. In September the following year it left the



Above: McDonnell Douglas RF-4C-23-MC s/n 64-1077 was flown by the 32nd TRS which joined the 1st and 30th TRSs at Alconbury in 1966. The 32nd TRS received its first RF-4Cs after arriving at its new base. Denis Dawes

Below: The 22nd TRS was briefly attached to the 26th TRW at Toul-Rosières AB between December 1965 and September 1966. USAF





Above: This RF-4C belongs to the 17th TRS based at Zweibrücken. The aircraft was visiting RAF Upper Heyford when photographed in October 1970. Adrian Balch

Right: The RF-4Cs of the 30th TRS of the 10th TRW at RAF Alconbury initially wore a red tail band and then switched to a black and yellow chequer pattern as illustrated here. via Bob Archer



upgraded. Various sensor systems were upgraded or added as technology developed. Three of the most important new additions were the AN/ALQ-125 Tactical Electronic Reconnaissance (TEREC) system, the Lear Siegler ARN-101 DMAS (Digital Modular Avionics Suite) and

26th TRW and returned home to join the 67th TRW at Mountain Home AFB in Idaho.

President de Gaulle announced on March 7, 1966 that France would withdraw from NATO and the US had to remove its military forces by April 1, 1967. Consequently, the 26th TRW Headquarters moved to Ramstein – and the 66th TRW moved to Upper Heyford in December 1966. At the time, the 17th and 18th TRSs were flying the Voodoo, the former converting to the RF-4C in 1969.

On September 26, 1969 it was announced that the 20th TFW would move into Upper Heyford and displace the 66th TRW. The 17th TRS meanwhile relocated to Zweibrücken to join the 86th TFW. When the 26th TRW and the 86th TFWs swapped bases in 1973 the former took the 38th TRS to Zweibrücken and acquired the 17th TRS.

As well as conducting recce of ground targets, RF-4Cs were also called on to shadow the Soviet Mediterranean Fleet. Pilot Captain Kirk Ransom (Ret'd), who flew with the 32nd TRS of the 10th TRW, said: "I do not recall [its] name but there was a year-long

operation out of Morón [in southern Spain] to monitor the movement of the Soviet fleet in the Mediterranean Sea.

"These were 30-day deployments to Morón by each recce squadron in USAFE. On some missions we would fly [a] two-ship from Morón, refuel north of Algeria, proceed all the way to the eastern end of the Mediterranean and refuel again on the return trip. These were about five-plus hour missions. Other missions were single-ship in the western or central part of the Mediterranean.

"Very early in this operation I had an aircraft with the new RHAW gear. That made it really easy to find the Soviet fleet. On the first mission where we found the fleet, we dropped down to photograph them as we were supposed to.

"There were 14 ships in two columns and we flew at about 200ft, 360kts, down between them with the cameras running. It was spooky, as every gun and missile tracked us the whole way."

The RF-4C fleet was being constantly

the KS-127A LOROP (Long-Range Oblique Photography) camera system.

The TERC system provided precision direction-finding, passive ranging and emitter threat identification including SAM and AAA batteries. In the ongoing Cold War in Europe, TERC-equipped aircraft were assigned to the 38th TRS at Ramstein, and later Zweibrücken, and proved invaluable to the success of many missions.

The equipment was effective for triangulating the positions of enemy radars. Stand-off missions could look over borders and download information in real time. The efficiency of TERC was demonstrated in one Display Determination exercise in which the 38th TRS participated.

Pilot Major Charles Munroe (Ret'd) was involved: "What happened was an utter disaster for the US Navy and their side of the exercise, and it was some very good luck for the opposing forces and their TERC crews," he said.

"As it happened, on that day some navy maintenance types made what at first

The 1st TRS flew the RF-4C from Alconbury from 1965 until the unit was deactivated in 1987. Adrian Balch





The 81st TFS destroyed 142 radar sites, mainly using HARM missiles. For a period after the war, 16 jets remained at Shaikh Isa AB in case trouble flared up with Iraq. The Spangdahlem crews were commanded by Colonel Gene Patton from George AFB, California. Some of the crews visited Kuwait and brought back this SA-2 radar dish on which the colonel is standing. All 16 crews deployed at that time are shown in the photo including Bruce 'Spike' Benyshek and Larry 'LA Bud' Allen. via Captain Bruce 'Spike' Benyshek (Ret'd)

appeared to be a minor mistake. It would, normally, have been just that, but not on that day and at that time. One of the navy fighters, a Grumman F-14 Tomcat, was receiving some radar maintenance. For a very brief moment – less than 30 seconds, I've been told – the fighter's radar was turned on.

"That was long enough! A Zweibrücken RF-4C 'armed' with TEREK was airborne and close enough to record some lines-of-position (LOPs) off the plane's radar frequency, which identified the type of aircraft involved: a US Navy fighter. Those TEREK results were data-linked to a ground receiver, then to an exercise battle staff, and in short order the US aircraft carrier was 'destroyed'!"

The TEREK system was also used by the 38th TRS in medium- and high-altitude 'Banzai' missions at the time of the Polish crisis of 1981, when workers at the Gdansk shipyards staged strikes and demonstrations against their Communist masters. Their Solidarity movement, as it was known, declared openly it was against hardliners in the Polish Government. In the

preceding decades uprisings in Hungary and Czechoslovakia had been ruthlessly crushed by the Soviet Union and its armoured divisions.

Lieutenant Colonel Jim 'Mugs' Morgan (Ret'd) was a pilot with the squadron at the time: "When the Polish crisis kicked off with what seemed to be a popular uprising of sorts, it seemed the world was holding its breath to see what the Soviets would do," he said.

"In the USAFE inventory, the 38th TRS was the only tactical reconnaissance unit with the required sensors, and were capable of making a rapid, sustained response.

"Under tasking from USAFE, we changed our mission tracks; all daily training was suspended and the squadron was organised into four flights of four. One was always on squadron alert, one on base alert, one on

home standby and one in crew rest. When the alert flight would launch, everybody moved up.

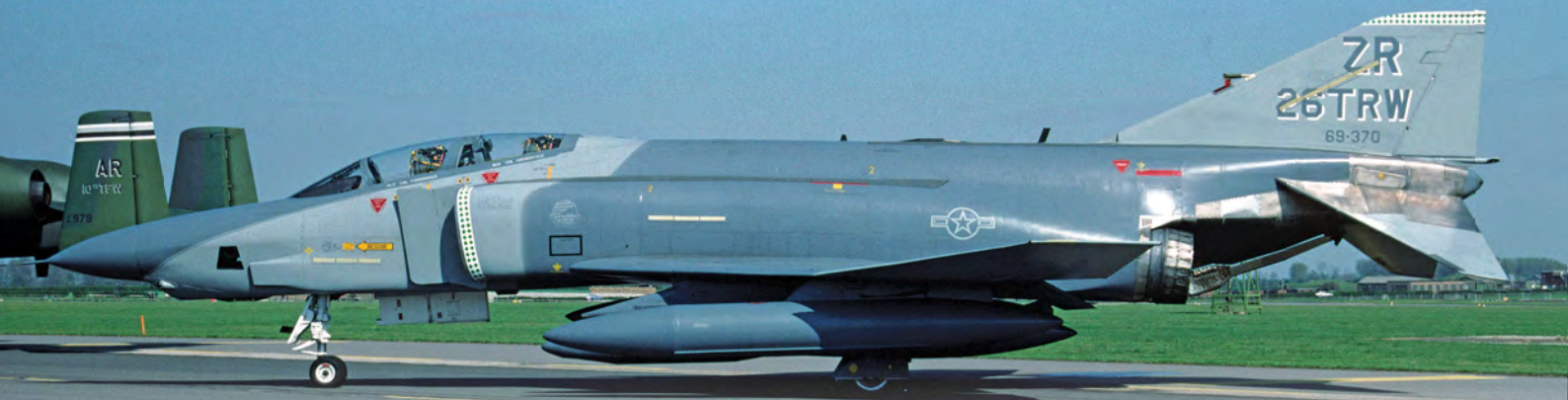
"We used four-ships only to make sure we could get two good sensor systems on the target, because though our TEREK was very reliable the SLAR [Side Looking Airborne Radar] was less so. This went on for the full extent of the crisis, at least two weeks, and we were able to determine there was no unusual Soviet activity in the Baltic, along the Polish coastline or in Gdansk.

"We called the flights 'Banzais' – the best I remember the term 'Banzai' came from some groundcrew wearing squadron scarves around their heads like some of the Japanese aviators from World War Two. It seemed to lend itself to the spirit of the missions, and everyone was on board.

"Crew members were issued red 'Banzai Dots' to be affixed to their name tags for every mission flown. It was a prized symbol because we all felt the missions were very useful to our country and everyone wanted to do his part."

Below: **The 17th TRS adopted this special tail scheme for its RF-4Cs participating in the Royal Flush reconnaissance competition at Bremgarten in West Germany in June 1975.** Doug Gordon Collection





The 38th TRS was the last USAF RF-4C unit to be based in Europe. It was deactivated on April 4, 1991. Adrian M Balch collection

The Lear Siegler ARN-101 Digital Modular Avionics Suite (DMAS) consisted of a digital integrated weapons delivery, reconnaissance and long-range radio aid to navigation (LORAN) system. Although RF-4s had a nuclear capability, only 10th TRW aircraft were fitted with a delivery system – in this case the Low Altitude Bombing System (LABS).

In 1976 the 30th and 32nd TRSs at Alconbury and the 17th TRS at Zweibrücken

and 81st TFSs from Spangdahlem flying the F-4G Wild Weasel and the 38th TRS at Zweibrücken with the RF-4C.

On September 5, 1990 the 81st TFS deployed 12 F-4Gs to Shaikh Isa AB (now just known as Isa AB) in Bahrain. Twelve more aircraft followed in December and the 23rd TFS sent F-4Gs and F-16Cs to Incirlik AB in Turkey in January 1991, the aircraft remaining until September.

'Spike' Benyshek arrived in Bahrain on

at us, then shut down.

"I wanted to shoot; Larry 'LA Bud' Allen said: 'Wait.' We passed the SA-2 and turned west. With the site at our six, he [Larry] shot, and [the SAM operator] shot at us.

"Our APR-47 lit up and announced it, but visibility to six was poor in the F-4G. We turned left and dove slightly, using minimum afterburner... our gas was always tight.

"As we turned, I saw it taking off. We put the site on the nose, shot a HARM and the

***"There were 14 ships in two columns and we flew at about 200ft, 360kts, down between them with the cameras running. It was spooky, as every gun and missile tracked us the whole way."***

were deactivated. This left the 1st TRS at Alconbury and the 38th at Zweibrücken as the only tactical recce units in USAF. The 1st TRS was deactivated in June 1987 while the 38th lasted until April 1991.

## TO WAR

Iraq's invasion of Kuwait on August 2, 1990 led the US military to send large numbers of forces to the Middle East for Operation Desert Shield and, later, Desert Storm.

Some of the aircraft came from USAF, including three F-4 Phantom units: the 23rd

December 27, and after settling in, began to fly training missions. He described flying combat for the first time after the war kicked off on January 17: "The first mission was after dawn. Most of the rest of the war my flight was taking off at midnight.

"During February I flew a day sortie, and we went northwest of Baghdad. We were supporting a Brit Tornado LGB strike on a railroad bridge. These missions were about 6.5 hours long; two refuellings before and two after. There was a known SA-2 west of Baghdad. As we left the tanker he would look

left engine compressor stalled. Put it in idle; recovered; let's get out of here!

"Another descending turn, right this time... Christ, we're low! We'd started at about 27,000ft, now we were 14,000. Night-time had taught me there was always tons of AAA in the air; I was certain we were in it, but I couldn't see it due to the sunshine.

"I couldn't see the SAM anymore with it at six o'clock again, but LA could. "He said: 'I've got it, just keep going... take it away!'

He saw our HARM explode and then started cheering because the SAM's radar signal died... which meant we got him. A few seconds later I saw a giant billowing black cloud boiling up from the desert, a few miles ahead at one o'clock.

"What's that?" I said in my best composure. "Uh... I think that's where the SAM crashed.' We determined later we'd only beaten the SAM by 5 to 15 seconds.

"I flew 33 missions in the war, always as number two. After the war, I flew another 206 missions in both the North and South No-Fly Zones. I was the mission commander for the very first Southern No Fly."

The F-4G was very successful in the Gulf War. Altogether the 81st and 561st TFSs flew 2,678 sorties with only one aircraft lost, 69-7571. This 81st TFS aircraft ran out of fuel while returning from a mission. It apparently missed the orbit of the tanker it was to refuel from and decided to try and make it to Prince Sultan Air Base AB in Saudi Arabia.



The 38th TRS took part in Gulf War One in 1991 – RF-4C 69-0370 wears mission marks under the cockpit and went on to fly 17 missions over Iraq. Patrick Bigel



After several abortive attempts to land due to poor weather the pilot and EWO ejected and the aircraft crashed. It was later discovered that small arms fire had damaged the fuel tanks which caused a fuel leak.

The 38th TRS and its parent 26th TRW were preparing for their demise. However, operations in the Gulf were being frustrated by a lack of reconnaissance, specifically bomb damage assessment (BDA). A suggestion was made to send the 38th TRS to Incirlik AB in Turkey to undertake recce on the northern front.

It would seem obvious in hindsight that the logical thing would have been to deploy a unit from USAFE to undertake valuable reconnaissance. But, as the squadron was so close to deactivation, there was initially a reluctance to postpone this and deploy it to the theatre of war.

The order came through on February 1, 1991. Within 48 hours, six RF-4Cs, a photo processing and interpretation facility and 168 personnel were on their way to Turkey.

The first wave of personnel arrived at

**Four F-4Gs fly over the oil terminal at Bahrain. Alongside the two Spangdahlem jets are a pair from the 38th TFS/35th TFW based at George AFB, California.** USAF National Archives

Incirlik on the evening of February 3 by C-9. Interestingly this naval reserve aircraft had flown a straight line from Germany to Turkey, overflying former Warsaw Pact nations. Times had indeed changed and so, it would prove, had the enemy!

One of the fundamental differences between reconnaissance operations in Desert Storm and those in previous conflicts such as Korea and Vietnam was the commitment to formation flying compared to single aircraft recce missions in the earlier conflicts.

The 38th TRS RF-4C community had for a long time been committed to the concept of formation integrity, having practised extensively in two-ship and four-ship employment; and Reconnaissance Air Meet competitions in the US had further underlined the importance of formation mission flying.

Typical targets in Iraq were airfields, POLs

(petrol, oil and lubricant) depots, nuclear and chemical weapon facilities, SAM sites and lines of communication.

Missions were flown as part of one of the strike packages that took off from Incirlik three times a day. Each of these comprised around 50 combat and support aircraft.

The role of the 38th TRS was principally, though not exclusively, pre-strike and BDA photography. In total it conducted 103 recce missions during the conflict, all flown at medium altitude.

The threat from SAM missiles and AAA was ever present, but never effective. The Wild Weasels had seen to that. The USAF and its allies had control of the skies.

The 38th TRS arrived back at Zweibrücken on March 11, 1991 and officially deactivated on April 4, having served 39 years as a part of USAFE.

The departure of the F-4G from USAFE in 1994 brought to an end the command's operation with the Phantom. The aircraft had performed a variety of roles and made a valuable contribution to the defence of Europe during the Cold War. **IAN**

**Crews from the 81st TFS/52nd TFW and the 561st TFS/35th TFW pose in front of two F-4Gs at Shaikh Isa AB in Bahrain in April 1991. Only one F-4G was lost during the 2,678 sorties flown by Wild Weasel Phantoms during the Gulf conflict.** USAF National Archives



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## PARIS

**AIRPORT: PARIS CHARLES DE GAULLE AIRPORT**

**HOTEL: HOTEL MERCURE PARIS CDG AIRPORT & CONVENTION**

*Aviation News* **Assistant Editor**

**James Ronayne** reports from a hotel at the heart of one of Europe's busiest airports.

**P**aris Charles de Gaulle Airport is one of Europe's major gateways, home to Air France and a key European hub for both the Star Alliance network and FedEx Express. Covering an area of 12.7sq miles (33km<sup>2</sup>) it is Europe's largest airport and celebrated its 40th anniversary last year with a record 63.8 million passengers passing through its terminals. It has two pairs of parallel runways, 08L/26R and 08R/26L to the south and 09R/27L and 09L/27R to the north. A wide variety of aircraft visit the airport from Airbus A380s and Boeing 777s to smaller Bombardier and Embraer regional jets and ATR turboprops. Because of France's close colonial ties to Africa, a number of the continent's airlines

serve Paris such as EC Air of Equatorial Guinea and Algerian carrier Tassili Airlines. Central Paris is easily reached via train from the nearby Roissy-pôle station.

### HOTEL

Hotel Mercure Paris CDG Airport & Convention is conveniently situated for aviation enthusiasts, overlooking the two taxiways that link the pair of parallel runways either side of the three terminal complexes. The rooms are spacious and beautifully furnished and the hotel has a heated indoor swimming pool, a solarium and a fitness centre as well as a restaurant and bar. Connection to the airport terminals comes via a free courtesy bus.



Top: **Qatar Airways Airbus A380 A7-APA** heads towards the southern runway for departure. The airline is one of several carriers to use the A380 to Paris. All photos Key-James Ronayne unless stated

Above: **The exterior of the hotel.** Hotel Mercure Paris CDG & Convention

Below left: **Lamp posts along the road in front of the hotel obstruct photography of larger aircraft on the nearest taxiway. However, smaller aircraft, like this Finnair Airbus A321, can be photographed with this shot taken at 90mm.**

Below: **This Adria Bombardier CRJ900 was photographed on the far taxiway at 170mm.**





Above: **Air France aircraft being towed from the airline's maintenance hangar to the terminal pass right in front of the hotel.**

Below: **British Airways Airbus A320 G-EUXX taxis in after arriving from London Heathrow Airport.**



The hotel is in a Y-shape and all rooms on its eastern side offer views of activity at the airport. The rooms with the best views are doubles or twins and the higher the floor, the less ground clutter there is to obstruct photography. Lamp posts along the road in front of the hotel are at too close an interval to shoot larger aircraft, such as an Airbus A380, on the nearest taxiway. It is possible to shoot smaller narrowbodies there with an Airbus A321 requiring around a 90mm focal length. An A380 or Boeing 777-300ER on the far taxiway can be photographed at 80mm while a Bombardier CRJ900 requires around 170mm.

## VIEWS

I had room 769 during my visit which is a Privilege Suite, complete with a SoundSpot music station and a Nespresso coffee maker. With traffic arriving from the east on

Right: **Room 769 at the hotel.** Hotel Mercure Paris CDG & Convention

Below: **Aircraft parked on the western end of Terminal 2A are visible from the hotel, although clutter and distance (and on this day heat haze) make photography challenging.**

## HOTEL DETAILS

**Floors:** 9

**Rooms:** 345

**Rating:** 4-star

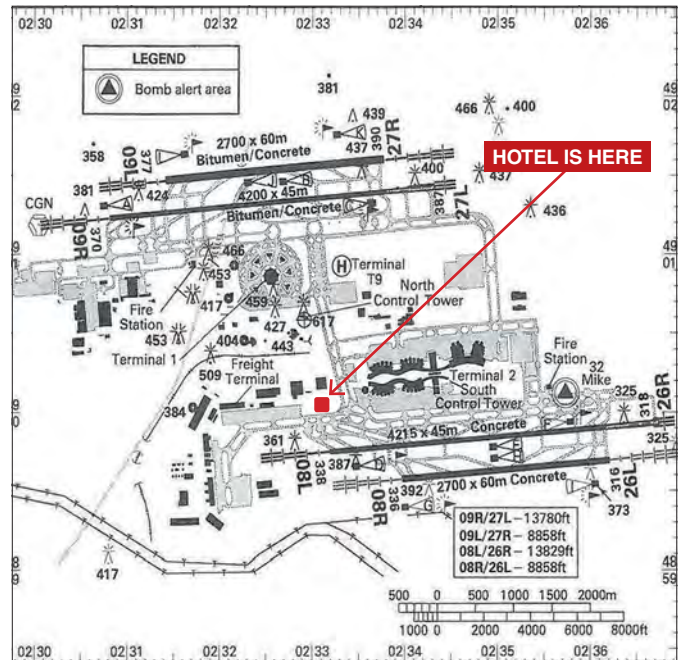
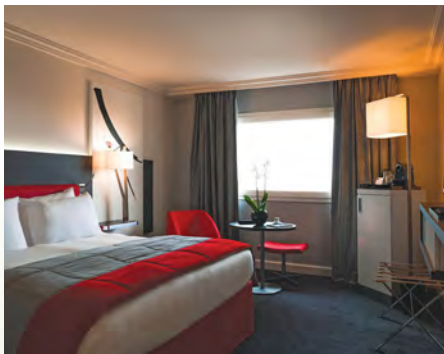
**Connection to airport:** free shuttle bus

**Parking:** 150 car parking spaces. Cost is €25 per 24hrs

**Internet Access:** free Wi-Fi is available in all areas

**Website:** [www.mercure.com/gb/hotel-0577-hotel-mercure-paris-cdg-airport-convention/index.shtml](http://www.mercure.com/gb/hotel-0577-hotel-mercure-paris-cdg-airport-convention/index.shtml)

**Telephone:** +33 1/49192929



Above: **A map of the airport with the hotel marked.** Not for airborne/operational use, Navtech Aerad

Runways 26 and 27, all inbound movements could be viewed. While aircraft departing from the southern runways could easily be seen, photography was challenging due to the angle of the windows to the runways causing reflections. A combination of trees and buildings meant photographing arrivals or departures on the northern runways was also out of the question.

Decent photography is challenging early on in the day with the sun in front and then moving overhead. As the sun moves around to the south of the hotel and because of the building's Y-shaped layout, rooms towards the southern end of the hotel may offer better photographic opportunities.

Aircraft parked on the western end of Terminal 2A as well as all those positioned on 2B, 2D and Terminal 3 are visible from the hotel, but distance and clutter makes decent photography futile.

The hotel provides a superb view of the comings and goings at the airport and coupled with the luxurious rooms is an ideal spot to relax while taking in the action. **AN**





# B-2A SPIRIT

## STEALTHY GLOBAL STRIKE

**Tom Kaminski**  
provides insight into the  
USAF's premier bomber,  
which has been used  
in three campaigns.

**A**s the US Air Force nears a decision regarding its planned \$80 billion Long-Range Strike Bomber (LRS-B) programme, the service continues to upgrade its small fleet of Northrop Grumman B-2A Spirit bombers.

The B-2A has served as the USAF's primary penetrating nuclear-capable bomber since achieving full operational capability

(FOC) in 2003 and is currently projected to remain in frontline service until 2058.

It has both nuclear and conventional roles and is the USAF's only long-range strike aircraft capable of penetrating advanced integrated air defence systems and attacking heavily defended targets.

With an unrefuelled range of around 6,000nm (11,112km), the stealth bomber



can fly up to 10,000nm (18,520km) with a single aerial refuelling and carry 60,000lb (27,216kg) of conventional or nuclear ordnance.

## OPERATIONS

First fielded in 1993, the B-2A fleet has flown around 3,000 combat hours since making its debut over Kosovo on March 24, 1999 – and was the first aircraft to penetrate Serbian air defences on that opening night of Operation Allied Force.

Over 35 days, six B-2As conducted 47 combat sorties from their home base at Whiteman AFB, Missouri, each averaging 31 hours in length. Although the aircraft were responsible for less than 1% of the overall sorties flown, they delivered 656 weapons totalling 1.3 million pounds (600,556kg) and destroyed 11% of the fixed targets in Serbia and Kosovo.

Spirits were the first aircraft to attack Afghan targets following the 9/11 terror attacks on New York and Washington DC, flying six missions in the early days of Operation Enduring Freedom from October 6 to 11, 2001.

During 44 hour-plus flights that began at Whiteman, crews delivered 64 weapons against targets in Afghanistan and recovered at a forward operating location (FOL) at Naval Support Facility Diego Garcia, British Indian Ocean Territory (BIOT). On several missions, engine running crew changes (ERCCs) were conducted, a second crew flying the 29-hour return flight to Whiteman. The type's longest total mission time, which included two sorties with an ERCC, lasted 73 hours.

The Spirit flew its first sorties in support of Operation Iraqi Freedom from Whiteman on March 21, 2003. Nine aircraft flew from the base and the bomber's first combat deployment saw four B-2As fly sorties from the Diego Garcia FOL. By April 8 they had delivered 676 GPS-guided Joint Direct ▶

Main photo: **A B-2A flying over Whiteman AFB in Missouri where the Spirit squadrons are based.** Sagar Pathak

Below: **There is always tight security around the B-2. This airman is guarding the stealth bomber at an airshow at Ellsworth AFB, South Dakota.** USAF/Staff Sgt Marc I Lane





Attack Munitions (JDAMs), GBU-37 GPS-Aided Munitions (GAMs) and unguided 500lb (227kg) bombs, totalling 1.5 million pounds (576,516kg), against approximately 600 individual targets in 41 missions.

On the night of March 19/20, 2011, three B-2As delivered 45 2,000lb (907kg) GBU-31 JDAMs which destroyed hardened aircraft shelters at the Ghurdabiyah airfield in Libya at the start of Operation Odyssey Dawn. Each of the 25 hour-plus, 11,418 mile (18,375km) round-trip taskings originated at Whiteman.

Since 2005, the B-2A has undertaken occasional deployments to Andersen AFB, Guam, sharing the duty with Boeing B-52H Stratofortresses and Rockwell B-1 Lancers, for US Pacific Command's continuous bomber presence in the region.

In late 2012, Air Force Global Strike Command (AFGSC) announced the B-2A fleet would begin regular training deployments to each of the US combatant command's areas of responsibility, starting in 2013. The plan called for small numbers of aircraft to visit forward operating locations.

As recently as August 7 to 28, the 13th Bomb Squadron (BS) deployed three aircraft to Andersen for familiarisation training activities in the Indo-Asia-Pacific region. While there, crews participated in several joint US and multinational training events, flying 300-plus hours over more than 25 sorties. The type also visited RAF Fairford in Gloucestershire in June.

Above: **The Spirit of Kittyhawk in landing configuration.** Ted Carlson/Fotodynamics.com

Below: **The B-2 is flown on operational missions by the active duty 13th and 393rd BS and the ANG's 110th BS.** Rob Edgcombe



### 509TH BOMB WING

Originally assigned to Air Combat Command (ACC), the B-2 fleet has been controlled by AFGSC via the Eighth Air Force since 2009. Stationed at Whiteman since September 30, 1990, the 509th Bomb Wing (BW) is responsible for the combat-coded B-2A fleet.

Currently led by Brig Gen Paul W Tibbets IV, who assumed command on June 5 this year, the wing traces its roots to the 509th Composite Group. Activated at Wendover Field, Utah, on December 17, 1944 it was commanded by Col Paul W Tibbets Jr, the

Below: **Inside one of the specially-built B-2 hangars at Whiteman.** Sagar Pathak

current CO's grandfather – who, on August 6, 1945, was at the controls of the Boeing B-29 Superfortress Enola Gay which dropped the 'Little Boy' atomic bomb on Hiroshima, Japan.

Owing to training and maintenance requirements only 16 B-2As are maintained as combat-ready aircraft by the wing's operational units, the 13th BS and the 393rd BS. Since entering service the B-2A fleet has flown more than 118,600 hours.

Training is conducted by the wing's 394th Combat Training Squadron, which was activated in 1996. Besides the B-2A, it uses 14 Northrop T-38A Talons as Companion Trainers, enabling pilots to maintain basic flying proficiency, airmanship and real-time decision-making skills at a lower cost compared to training on the B-2A. Operations are also supported with training aids including Weapon Systems, Mission and Cockpit Procedures Trainers.

Two Mission Trainers are used to teach the more complex functions assigned to the Spirit co-pilots, including radar operation and weapons delivery. Eight Cockpit Procedures Trainers, consisting of a full-scale cockpit, enable aircrew to become proficient on systems and procedures.

Meanwhile three full-motion Weapon Systems Trainers (WSTs) support initial and continuation aircrew training, and help crews become proficient in operating the aircraft and its weapon systems under simulated combat situations. They are also used for





rehearsals prior to an actual combat sortie launch.

Spirit pilots typically fly ten hours in a B-2A and six hours in a T-38A each month and spend four hours in a simulator. Col David Benson, the 509th Operations Group's commander, explained that the whole simulator system "does an outstanding job of representing the aircraft and mission.

"It is, in some ways, higher-fidelity training for our crews than flying the actual aircraft, as they are able to simulate emergencies and potential enemy threats." The system's electronic combat environment can provide up to 12,000 threats per mission, including radar emitters, surface-to-air missiles, anti-aircraft artillery and other aircraft.

The colonel added: "From a pilot's perspective, the B-2 is very easy to physically fly, but very challenging to employ. Additionally the B-2's advanced systems allow for a lot of information flow and combat

Above: **In the last two years B-2s have visited RAF Fairford in June. This example was part of a two-aircraft detachment in 2014.** USAF/ Tech Sgt Chrissy Best

Below: **The cockpit of a B-2. The aircraft is receiving a host of upgrades.** Ted Carlson/ Fotodynamics.com

ability that is, at times, difficult to manage – especially in the high-threat environments where we expect to employ."

The B-2 training system also includes around 50 devices for maintenance and weapons loading training.

Operations are also conducted by the Missouri Air National Guard's 131st BW and its 110th BS. This associate unit transitioned from the F-15 Eagle to the B-2A in 2007 and relocated from St Louis International Airport to Whiteman as part of the USAF's Total Force Integration (TFI) programme.

On June 18, 2008, the wing completed the first B-2A sortie to be launched and

flown by Air National Guard (ANG) personnel from Whiteman. It later became the first ANG unit certified to conduct the nuclear mission on completion of an Initial Nuclear Security Inspection in August 2013. The active duty and ANG wings completed the first TFI combat mission on the attack on Ghurdabiyah airfield in Libya on March 21, 2011.

Testing associated with the B-2A is undertaken by several squadrons. Development testing is the responsibility of the 412th Test Wing's 419th Flight Test Squadron at Edwards AFB, California, which is assigned to the Air Force Test Center. In addition to a single B-2A, the 'Global Bombers' test squadron operates examples of the B-1B and B-52H.

Also at Edwards is the 31st Test and Evaluation Squadron (TES) of the 53rd Wing's 53rd Test and Evaluation Group (TEG), which is based at Eglin AFB, ▶





Above: A B-2 Spirit drops 32 inert JDAMs on the Utah Testing and Training Range. USAF

Florida. It is tasked with conducting combined test and evaluation and normally uses the B-2A assigned to the 419th FLTS.

Whiteman also incorporates support units that use aircraft as required from the 509th BW: the 72nd TES, part of the 53rd TEG, conducts operational test and evaluation. The 325th Weapons Squadron meanwhile provides advanced training in weapons and tactics employment. It is assigned to the 57th Wing and the USAF Weapons School at Nellis AFB, Nevada.

Whereas the B-2A fleet operates from permanent climate-controlled hangars at Whiteman – and at the FOLs at

Andersen AFB, Guam and Fairford – at Diego Garcia it uses deployable, environmentally controlled hangars when required.

Known as the B-2 Shelter System (B2SS) or Extra Large Deployable Aircraft Hangar System (XLEDAHS), the structures are 250ft (76.2m) wide, 126ft (30.4m) deep and 55ft (16.8m) high and can withstand winds up to 110mph (177km/h).

Since entering service, one B-2A was written off in an accident when the *Spirit of Kansas* crashed during take-off at Andersen on February 28, 2008. Both pilots ejected safely. A second aircraft, *Spirit of Washington*, was heavily damaged by a

ground fire during engine start at Andersen on February 26, 2010. Repaired at a cost of more than \$105 million it returned to service nearly four years later in December 2013.

## PRODUCTION AND UPGRADES

Development of the Advanced Technology Bomber (ATB), which became the B-2, began in 1979 and the USAF issued a formal request for proposals in September 1980. Selected to construct the ATB in October 1981, Northrop initially received a contract for two structural test airframes, one flying prototype and five evaluation aircraft.

First flown at Air Force Plant 42 in Palmdale, California, on July 18, 1989, six aircraft that eventually supported the flight test programme were all later refurbished and entered operational service.

The first operational B-2A, s/n 88-0329 *Spirit of Missouri*, was delivered to the 509th BW at Whiteman on December 17, 1993 and the 393rd BS flew its first operational training sortie just five days later. Initial operational capability was achieved in April 1997.

The last of 21 operational bombers was delivered in 2000. Original plans called for the acquisition of 132 B-2s, but the number was reduced to 75 in 1990 after a Department of Defense Major Aircraft Review, and finally to 20. US lawmakers later authorised funding for conversion of the first test vehicle into a combat aircraft.

The B-2A was formally named the *Spirit* during ceremonies at Northrop Grumman's Palmdale final assembly facility on March 31, 1994 when aircraft AV-9 was christened the *Spirit of California*.

Six developmental B-2As (AV-1 to AV-6) were followed by ten Block 10 models (AV-7 to 16), which had a limited combat capability. Delivered between December 1993 and January 1996, Block 10 models were limited to delivering B61 and B83 nuclear and conventional 2,000lb (907kg) Mk84 gravity-fall bombs and could operate at a maximum weight of 305,000lb (138,846kg).

Block 20 aircraft were certified to operate at a maximum take-off weight of 336,500lb (152,634kg) and a GPS-Aided Targeting System (GATS) enabled them to deliver precision-guided 2,000lb (907kg) GBU-36/B and 4,700lb (2,132kg) GBU-37/B GAMs.

The Spirit's two weapons bays can carry 60,000lb of ordnance between them.

Sagar Pathak





Above: **Two groundcrew load a bomb into a B-2.** USAF/Master Sgt Val Gempis

Below: **The B-2 training squadron also uses T-38As so pilots can maintain airmanship skills at a lower cost than flying a Spirit.** Sagar Pathak



They also had a limited terrain following/terrain avoidance (TF/TA) capability for operating down at low level.

A B-2A can carry 16 GBU-36s or eight of the larger bombs. Both were developed specifically for the B-2A and produced in limited numbers, and were later replaced by different versions of JDAMs. The GATS worked in conjunction with the Raytheon AN/APQ-181's Synthetic Aperture Radar mode and a GPS receiver to determine target coordinates for the GAM.

The first Block 20 aircraft (AV-18) was delivered to the 509th BW on May 15, 1996 and the variant achieved IOC for both

***“the B-2A fleet has flown around 3,000 combat hours since making its debut over Kosovo on March 24, 1999...”***

Below: **Three B-2s taxi for a mission at the beginning of Operation Iraqi Freedom in 2003.** USAF/Tech Sgt Janice Cannon



nuclear and conventional warfare missions on April 1, 1997. Three aircraft (AV-17 to 19) were produced in Block 20 configuration and five Block 10 models (AV-12 to 16) were updated to match it. The final Block 20 delivery was in May 1997.

Later on Block 30 changes involved structural modifications, radar cross-section (RCS) and radar absorbent material (RAM) coating improvements, a partial rewiring, full JDAM integration and incorporation of bomb rack assembly units for the B-2A to carry the CBU-87 cluster munition, aerial mines and other smaller stores.

A Milstar satellite communications terminal was also incorporated and the Defense Management Subsystem (DMS) achieved full capability. New radar enhancements included a Ground Moving-Target Indication (GMTI) mode and enhanced TF/TA capabilities enabling the aircraft to fly lower.

The first of two production Block 30s (AV-20) took to the air at Palmdale on April 15, 1997 and arrived at Whiteman on August 7. Block 30 conversions began at Palmdale in July 1995 and the final upgraded aircraft (AV-1) was delivered in July 2000. The USAF announced full operational capability (FOC) for the B-2A force on December 17, 2003.

Since delivery, the entire Spirit fleet has had multiple upgrades, and the 20 surviving bombers are currently fielded in Block 30 configuration.

The Massive Ordnance Penetrator (MOP) 29,000lb (13,154kg) bunker-busting GBU-57 was also integrated onto the B-2A, with work starting in July 2007. It is designed for use against hardened, deeply buried targets. The Spirit is the only long-range, penetrating, anti-access/area denial (A2/AD) platform capable of carrying the MOP.

As part of the weapon's integration the aircraft's GPS antenna was upgraded to transmit enhanced GPS signals to smart bomb rack assembly and rotary launch assembly weapons prior to release.

The Link 16/Center Instrument Display/In-Flight Replanner (CID/IFR) gave crews access to theatre data links, improved onboard situational awareness and greatly enhanced theatre commanders' ability to co-ordinate the B-2A with other assets. The CID digital video recorder saves the display information for mission playback, operational assessments and debriefs to be conducted as well as assisting aircrew training. ▶

The APQ-181 multi-mode radar was updated as part of the USAF's B-2 Radar Modernization Program (RMP), which began in 2002. It replaced the system's passive electronically scanned antenna (ESA) with a Ku-band active electronically scanned array (AESA) antenna.

The RMP resolved potential conflicts in radio frequency usage between the bomber and commercial satellite systems operating in the same frequency spectrum. Flight testing of the new radar began aboard aircraft AV-3 in April 2006, after the B-2 Combined Test Force (CTF) completed initial radar-subsystem integration and acceptance testing.

The first aircraft to be equipped with the modified radar, as part of the RMP system development and demonstration (SDD) phase, returned to the USAF on March 17, 2009. Installation of the radar in the last of five SDD aircraft finished at Whiteman in November 2009. Low-rate initial production (LRIP) began in November 2008 and full-rate production in November 2009. Modifications were carried out on seven aircraft as part of the development programme and the first LRIP installations began in July 2010. Northrop Grumman completed delivery of the last of 13 production installations in September 2012.

## CURRENT PROJECTS

Spirit depot maintenance and major modifications are typically carried out by Northrop Grumman at its Aircraft Integration Center of Excellence at Palmdale – although this is managed by the USAF's Oklahoma City Air Logistics Complex at Tinker AFB, Oklahoma.

In June 2014, the contractor received a five-year, indefinite delivery/indefinite quantity Flexible Acquisition Sustainment Team (FAST) contract valued at up to \$9.9 billion, under which it provides support and modernisation for the Spirit fleet plus Contract Depot Maintenance (CDM) and Integrated Contractor Support (ICS).

Each B-2A had previously undergone Programmed Depot Maintenance (PDM) in Palmdale every seven years, but the overhaul cycle is being extended to nine years in an effort to increase the bomber's availability.

This will reduce the average PDM time from more than 400 days to 365 days, resulting in the addition of an operational aircraft to the fleet and saving around \$900 million in maintenance costs over the life of the fleet.

While PDM and major modification

## B-2A SPIRIT UNITS

**Air Combat Command (ACC) – JB Langley-Eustis, Virginia**

**USAF Warfare Center (USAFWC) – Nellis AFB, Nevada**

**53rd Wing**

53rd TEG      31st TES (see Note 1)  
72nd TES (see Note 1)

**Eglin AFB, Florida**

Edwards AFB, California  
Whiteman AFB, Missouri

B-2A  
B-2A

ED  
WM

**57th Wing**

USAFWS      325th WPS (see Note 1)

**Nellis AFB, Nevada**

Whiteman AFB, Missouri

B-2A

WM

**Air Force Global Strike Command (AFGSC) – Barksdale AFB, Louisiana**

**Eighth Air Force/Air Forces Strategic (8AF/AFSTRAT) – Barksdale AFB, Louisiana**

509th BW/OG      13th BS

Whiteman AFB, Missouri

B-2A

WM

393rd BS

Whiteman AFB, Missouri

B-2A

394th CTS (FTU) (see Note 2)

Whiteman AFB, Missouri

B-2A, T-38A

**Air National Guard (ANG) Units**

131st BW      (see Note 3)

Whiteman AFB, Missouri

WM

131st OG      110th BS

Whiteman AFB, Missouri

B-2A

**Air Force Materiel Command (AFMC) – Wright-Patterson AFB, Ohio**

**Air Force Test Center (AFTC) – Edwards AFB, California**

412th TW

Edwards AFB, California

ED

412th OG      419th FLTS

B-2A

### Notes

1      Uses aircraft borrowed from host wing.

2      Unit uses 13th BS and 393rd BS B-2As for training.

3      Wing operates and maintains B-2A as an associate alongside the host 509th BW.

### Abbreviations

BS      Bomb Squadron

BW      Bomb Wing

FLTS      Flight Test Squadron

FTU      Formal Training Unit

JB      Joint Base

OG      Operations Group

TEG      Test and Evaluation Group

TES      Test and Evaluation Squadron

TW      Test Wing

USAFWS      USAF Weapons School

WPS      Weapons Squadron

Left: This plan view of a B-2 shows its unusual shape. Sagar Pathak

programmes are conducted at Palmdale, smaller projects are carried out locally at Whiteman under the FAST and other contracts.

Hardware installation associated with the B-2 Extremely

High Frequency Satellite Communications (EHF

SATCOM) and Computer

Increment 1 programme

(B-2 EHF Inc 1) began

at Edwards AFB in early

2010. It replaces the

Spirit's ultra high frequency

(UHF) equipment with an EHF

SATCOM system compatible

with both the legacy EHF Satellite

(MILSTAR I/II) systems and the future

Advanced Extremely High Frequency

(AEHF) SATCOM systems.

It includes a new integrated processing unit, upgraded flight management computer processors, increased data storage, a

re-hosted Flight Management Operational

Flight Program and a high bandwidth data

bus which supports the EHF SATCOM

installation – and provides growth required

for future upgrades. In addition, a fibre optic

cable network will support high-speed data transfers within the aircraft.

Flight testing of Increment 1 began

at Edwards on September 1, 2010 and

LRIP began after the award of a \$108

million contract on September 28, 2012.

Initial operational test and evaluation was

conducted from June to August 2012.

The systems were certified as compatible

for nuclear operations on April 2, 2013 and

AFGSC authorised fielding and full-up

(conventional and nuclear) use of EHF-

modified aircraft on April 26, 2013. The first

production installation began in November

2013 and full-rate production was approved in

July 2014.

Increment 2 will install a new

communications terminal and AESA antenna

enabling the B-2 to transmit and receive

battlefield information securely by satellite

up to 100 times faster. Development of the

new antenna began in 2011. Increment 3

will integrate the B-2 into the Department

of Defense's Global Information Grid and

provide Net Ready capability.

Northrop Grumman and the USAF

completed a critical design review (CDR) of

the Flexible Strike Phase 1 programme in

February this year, the contractor receiving

approval to move ahead with the development

and integration of the new software and

hardware. The upgrade will serve as the basis

for future system enhancements, including the

ability to carry multiple weapon types.

## B-2A SPIRIT FLEET

Air Vehicle	Serial	Total Flight Hours – by Aug 20, 2015	Name	Notes
AV-1	82-1066	4884.8	<i>Spirit of America</i>	
AV-2	82-1067	7105.5	<i>Spirit of Arizona</i>	
AV-3	82-1068	4002.0	<i>Spirit of New York</i>	
AV-4	82-1069	6729.3	<i>Spirit of Indiana</i>	
AV-5	82-1070	6363.1	<i>Spirit of Ohio</i>	
AV-6	82-1071	5415.5	<i>Spirit of Mississippi</i>	
AV-7	88-0328	5560.1	<i>Spirit of Texas</i>	
AV-8	88-0329	5033.3	<i>Spirit of Missouri</i>	
AV-9	88-0330	5593.5	<i>Spirit of California</i>	
AV-10	88-0331	5915.5	<i>Spirit of South Carolina</i>	
AV-11	88-0332	4825.2	<i>Spirit of Washington</i>	Damaged by engine fire at Andersen AFB, Guam, on Feb 26, 2010. Returned to service on December 16, 2013.
AV-12	89-0127	5176.7	<i>Spirit of Kansas</i>	Crashed at Andersen AFB, Guam, on Feb 23, 2008 and written off.
AV-13	89-0128	6017.0	<i>Spirit of Nebraska</i>	
AV-14	89-0129	5327.4	<i>Spirit of Georgia</i>	
AV-15	90-0040	6865.7	<i>Spirit of Alaska</i>	
AV-16	90-0041	5786.2	<i>Spirit of Hawaii</i>	
AV-17	92-0700	7464.7	<i>Spirit of Florida</i>	
AV-18	93-1085	4151.2	<i>Spirit of Oklahoma</i>	Assigned to test duties at Edwards AFB, California
AV-19	93-1086	5291.1	<i>Spirit of Kitty Hawk</i>	
AV-20	93-1087	5979.5	<i>Spirit of Pennsylvania</i>	
AV-21	93-1088	5248.2	<i>Spirit of Louisiana</i>	



Above: **A B-2 lifts off from Andersen AFB on a training sortie.** USAF/Master Sgt Val Gempis

Below: **A B-2 taxiing at sunset at Whiteman AFB.** USAF/Airman 1st Class Joel Pfister

Previously known as the Stores Management Operational Flight Program (SMOFP) re-host and mixed carriage modification, the project will give the B-2 an expanded processing capability and enable it to carry a mixed weapons load with a rotary launcher assembly in one weapons bay and a smart bomb rack assembly in the other – as

well as allowing for full integration of B61-12 Life Extension Program (LEP) upgrades.

According to Col Robert Strasser, USAF, B-2 System Program Manager and chief of the B-2 division of the air force's Fighters and Bombers Directorate, this 'mixed loads' capability will "ensure maximum strategic nuclear and conventional strike capability"

Northrop Grumman started work on the three-year engineering and manufacturing development (EMD) portion of the Flexible Strike Phase 1 programme when it received a \$102 million contract in August 2014.

The upgrade will also reduce maintenance costs, improve mission flexibility and reliability and provide the Spirit with a single operational flight programme that will replace several mission-specific software versions.

In June, Northrop Grumman conducted test flights at Edwards demonstrating the capability to rapidly integrate new sub-systems onto the B-2A via the USAF's Open Mission Systems (OMS) architecture. The Spirit received targeting information from the company's Gulfstream G550 intelligence, surveillance and reconnaissance (ISR) test-bed via a battle management command and control (BMC2) ground node.

The B-2A's onboard OMS-compliant auto-routing function was subsequently used to re-plan its mission and conduct a simulated attack. Northrop Grumman integrated the onboard mission-planning auto-router with the B-2A in around six weeks.

The Defensive Management System Modernization (DMS-M), the USAF's number one priority modification programme for the B-2 fleet, is expected to cost around \$310 million. Meant to resolve the B-2 fleet's main obsolescence issue and improve sustainability, it upgrades the electronic support measures, passive antennas and display processing units that comprise the bomber's electronic warfare system.

This will enable the bomber to penetrate advanced integrated air defences thanks to improved threat location and identification capabilities and real-time rerouting. Initial flight testing of the DMS-M is planned for 2017 and LRIP will begin in 2020.

The project – currently in the third year of its multi-year Technology Development (TD) Phase 2, which began in February 2013 – includes a new avionics graphics processor developed by Lockheed Martin and new antennas developed by L3 Communications and Ball Aerospace. Four kits will be procured as part of the EMD phase in Fiscal Year 2016 and DMS-M is expected to be ready for service on B-2As by 2021.

Development associated with the Common Very Low Frequency Receiver (CVR Increment 1) began in 2013, and includes a very low bandwidth VLF receiver ►





Above: **A pair of B-2s taxiing at Whiteman in front of the hangars built for the stealth bomber.** USAF/Staff Sgt Nick Wilson

Right: **A member of the groundcrew walks a pilot to a B-2 during an engine running crew change at Andersen AFB, Guam.** USAF/Senior Airman Ryan Whitney

Below: **The B-2 has been involved in three campaigns: Kosovo, the 2003 Iraq War and Libya.** Ted Carlson/Fotodynamics.com

and antenna sub-system to give the bomber a secure and survivable, beyond-line-of-sight (BLOS), strategic nuclear communication capability.

Low Observable Signature and Supportability Modifications (LOSSM) and Aircraft Supportability Modifications (ASM) implement a mix of more than 20 improvements designed to slow signature degradation and improve low observable (LO) supportability.

LOSSM projects include structural modifications and material improvements that will afford advanced signature reduction, reduce LO maintenance and improve aircraft availability and overall survivability.

The USAF is also studying multiple structural and avionics modifications to improve the aircraft's performance and engines and reduce maintenance and logistics requirements. Numerous low-cost upgrades addressing safety, reliability, maintainability and improved system performance issues may also be adopted.

In addition, low-cost engine modifications will give the bomber's 19,000lb st (84.5kN) General Electric F118-GE-100 engines a service life extension. This \$13.8 million initiative includes an extended mission oil tank upgrade and engine fan blade improvements to enhance reliability and performance.

## WEAPONS

The B-2A's two side-by-side weapons bays are each capable of carrying up to 30,000lb (13,608kg) of ordnance on eight-round rotary launcher assemblies – and four smart bomb rack assemblies (SBRAs) mean the aircraft can engage as many as 80 separate targets.

Development of the SBRA began in January 2001 and was completed in March



2006 when the 54th example was delivered. The bomber can carry 16 2,000lb (454kg) GBU-31 JDAMs; 80 500lb (227kg) GBU-38 JDAMs; 36 CBU-87/89/97 cluster bombs; 16 AGM-154 Joint Stand-off Weapons (JSOWs) or AGM-158 Joint Air-to-Surface Standoff Missiles (JASSMs); eight 5,000lb (2,268kg) GBU-28, GBU-37 or EGBU-28 penetrator bombs; or a pair of 30,000lb (13,607kg) GBU-57 Massive Ordnance Penetrators (MOPs).

For the nuclear mission, it can carry 16 AGM-129 Advanced Cruise Missiles (ACMs) or 16 B61 or B83 nuclear free-fall bombs.

The Flexible Strike programme will give the B-2A the capability to be configured with multiple weapons, providing it with maximum strategic nuclear and conventional strike flexibility.

Planned weapons integration will include the precision-guided B61-12 nuclear bomb; advanced versions of the GBU-28E/B and GBU-28B/D 'bunker busters'; extended range AGM-158B JASSM-ER, a 5,000lb (2,268kg) version of JDAM; 2,000lb (907kg) GBU-56 Laser JDAM; 204lb (93kg) GBU-53/B Small Diameter Bomb II; and the planned Long


Range Standoff (LRSO) cruise missile.

According to Col Benson, the bomber's inventory of precision-guided munitions "provides us with the ability to hold more potential targets at risk around the world; providing increased strategic assurance and deterrence for our nation and our allies."

Discussing the B-2A's latest deployment to Guam, Lt Col Robert Makros, the 13th BS's commander, said the bomber's "flexibility and ability to strike, at the time and place of leadership's choosing, any target set on the globe – with precision, range, stealth and a massive payload, conventional or nuclear – is what makes this aircraft incredible."

Continued upgrades will ensure the Spirit remains viable until it is finally replaced by the LRS-B sometime in the middle of the century. **AN**





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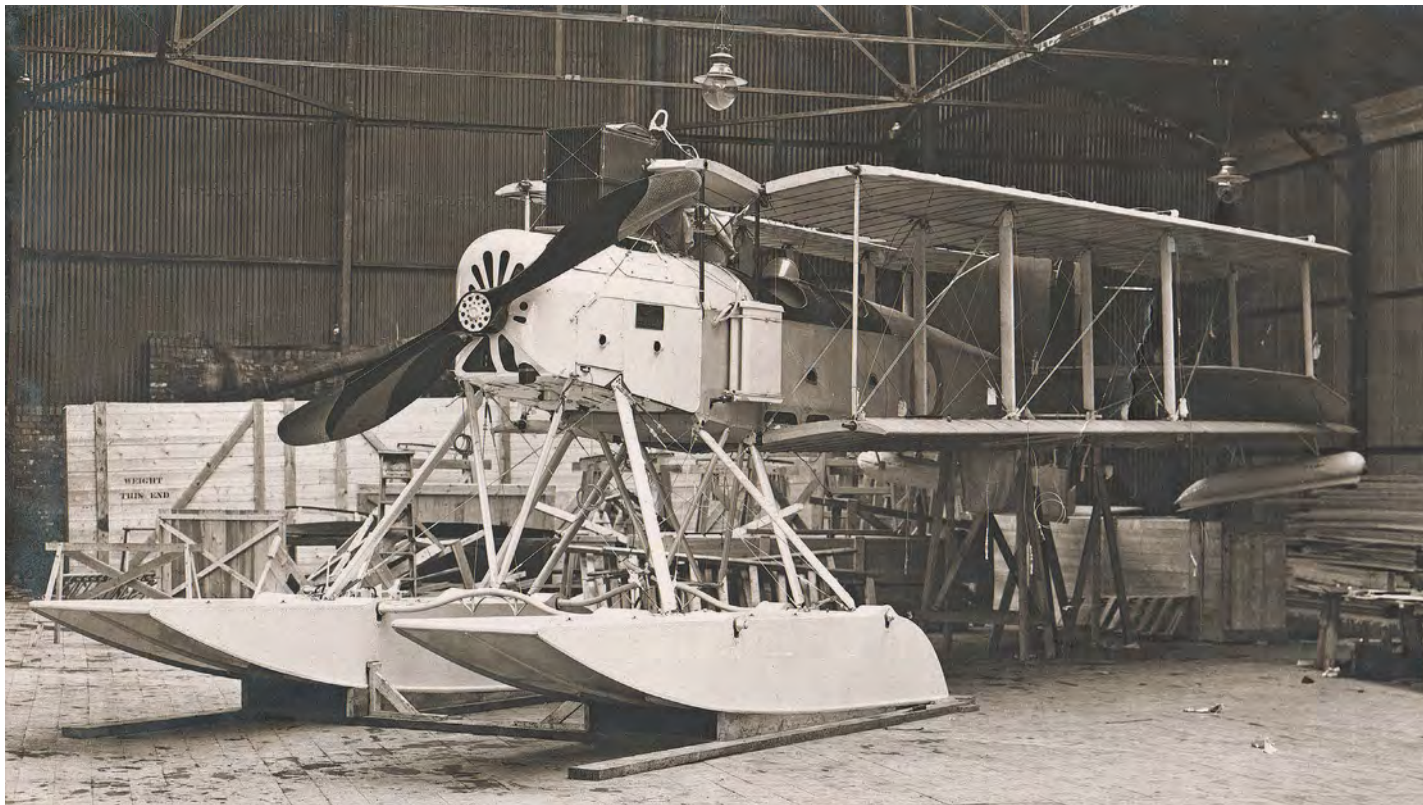
# WESTLAND

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## A CENTURY OF ACHIEVEMENT

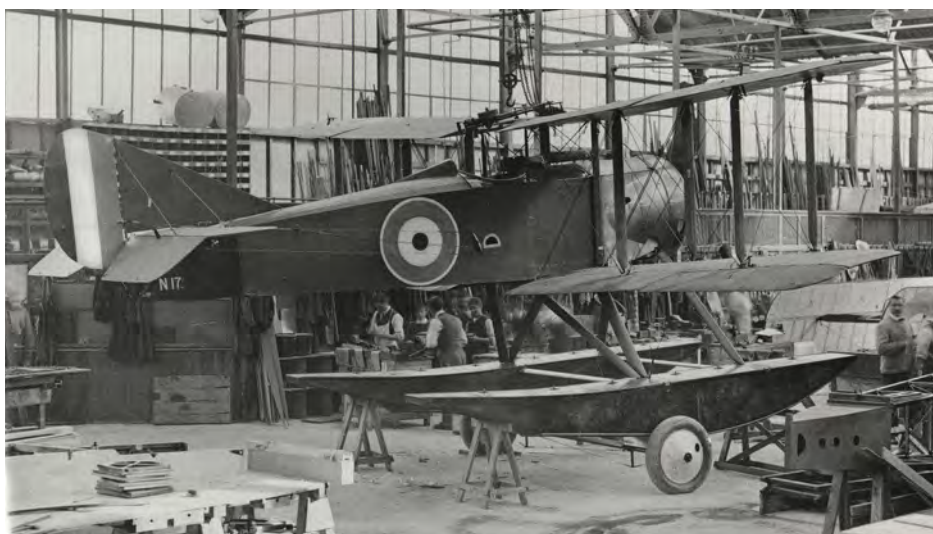


One hundred years ago a British aviation company was founded which is still very much alive and successful today. Originally named the Westland Aircraft Works, this Yeovil, Somerset-based firm, although originally an aircraft manufacturer, is nowadays firmly established as one of the world's premier designers and producers of helicopters. **Malcolm V Lowe** examines the history of this famous company which is now known as AgustaWestland.



Above: **Westland Aircraft Works began its aviation activities in Yeovil 100 years ago with the construction under licence of Short Type 184 seaplanes.** All photos AgustaWestland unless stated.

Left: **Westland is famous for producing helicopters such as the Sea King and Lynx.**  
AirTeamImages.com/Kieron



Above: **Westland was ambitious with its aviation activities from the start, and soon began designing its own aircraft. The first of these was intended to meet an Admiralty requirement and named N.1B, of which two were built, including N17 seen here.**

Below: **The Wapiti was the most important design and manufacturing programme for Westland in the inter-war period. It could be configured as a landplane or with floats, like this Wapiti IIA seaplane, J9497.**



**A**ircraft production in Yeovil began a century ago – as a result of expanding military requirements in World War One – and was started by a company with no previous direct connection to the aviation business.

The provincial market town of Yeovil in Somerset, like many small centres of population in England, had benefited during the Victorian era from developments in the Industrial Revolution and the arrival of the railway. These led to a considerable influx of people and the establishment of light industry in the town, much of it related to the needs of the local agricultural community.

## PIONEERING SPIRIT

One company that thrived at this time was an ironmongery and hardware business in the centre of the town that belonged to the Petter family, who also owned the Yeovil Foundry and had successfully moved from simply selling other companies' products into manufacturing its own.

This included the design and construction of oil engines, and the expansion of the engine and foundry business eventually led to the creation of a public company, Petters Ltd in 1910, with major production facilities at the Nautilus Works in the Reckleford area of Yeovil.

It proved so successful that a new site for further expansion opened at West Hendford on the western edge of the town.

Local folklore has it that this new location was christened 'Westland' by the wife of Percy Petter, one of the company's directors, when work began during 1913 to develop the site for a new foundry and workers' housing.

The following year, however, Europe slid inexorably into conflict, and with the coming of World War One a massive need arose for ►



Above: **Parked in the snow at Yeovil, this Curtiss fighter (AX900) underwent Westland's 'anglicisation' with different controls and Imperial instrumentation introduced to examples originally destined for France. The type later served with the RAF in large numbers as the Tomahawk.**

Below: **One of Westland's most notable aircraft is the Lysander. The type served almost worldwide with the Allies in various roles. This Mk.I, L4710, is flying a message pick-up training sortie for army co-operation work in Egypt.**

munitions of all types for Britain's armed forces.

During 1915, David Lloyd George, who became Minister of Munitions that year prior to stepping up to being Prime Minister in 1916, caused widespread unease by revealing the nation's shortage of weapons.

In the light of his concerns, a rapidly convened meeting of Petters' board of directors decided to put the company's expanding but already well established manufacturing resources at the disposal of the government to help out.

The resolution was at once communicated to the War Office and the Admiralty – and although the former did not bother to reply, the navy chiefs soon expressed great interest.

At a subsequent meeting in London between Admiralty representatives and Petters, it was pointed out that an area of concern was a lack of modern seaplanes, and

the question was asked whether the firm could sub-contract to manufacture some.

That the directors answered in the positive, and enthusiastically got to work on what was for their company a totally new area of interest, was a very bold and almost unique step.

In fact the company was highly motivated to move into the manufacture of what was then high-tech, state-of-the-art technology, a brave and enormous leap into the unknown. And so was born aircraft manufacture at Yeovil, which continues to this day.

The obvious location for Petters' new aviation enterprise was the company's Westland site, which offered sufficient room for expansion, the Reckleford facilities having by then reached their full capacity. Work quickly started to develop the Westland site for aircraft construction.

During 1915 the Westland Aircraft Works

started up as a division of the Petters organisation, taking its name from the site.

Initially the Admiralty called for the sub-contract manufacture of 12 Short Type 184 seaplanes. These large naval biplanes, fitted with twin floats, were a challenge, but the company wisely took on various talented individuals conversant with the aviation industry to oversee the new work.

Construction began on the first Type 184 in the late summer of 1915, and involved much communication between Westland and the aircraft's creator, Short Brothers. The first example was ready for delivery in the opening weeks of 1916 – and one Westland-built Type 184 gained considerable fame during the Battle of Jutland later that year.

The success of the Type 184's manufacture at Yeovil led to an order during 1916 for 20 Short Type 166 seaplanes, which was successfully completed during that year.

A facet of Westland's products evident right from the start was the exceptional quality of workmanship. There was a ready supply of talented labour in the Yeovil area, because the town had been an important centre of glove making. In particular there were many skilled seamstresses who were just as at home stitching fabric-covered aircraft structures as they were in making quality gloves.

Many more license-production contracts followed, including 125 Sopwith 1½ Strutter biplanes, completed during the winter of 1916-1917. Of great importance was sub-contract work Westland became involved with for the Aircraft Manufacturing Company (Airco), which eventually comprised 150 Airco DH.4 biplanes. Among these were the first aircraft to be actually flown at Yeovil.

Hitherto, all Yeovil-built aircraft were dismantled for land transportation and it was realised that an airfield at the Westland factory





Above: Despite not seeing frontline service, the Welkin high-altitude fighter project was important to Westland's future in establishing the company as a world leader in pressurisation and oxygen equipment for high-altitude flight.

Below: Westland's first helicopter was the Dragonfly, built under licence from Sikorsky. G-AKTW was the initial example.



was a must if production was to continue. So land from the adjoining Northover Fields was purchased and prepared, and the first aircraft to be test-flown there was a DH.4 in April 1917. The airfield has been in continuous use ever since.

Airco was very pleased with Westland's manufacture of the DH.4, and duly sub-contracted the DH.9 to be built at Yeovil. Westland was one of several sub-contractors for the type, but the aircraft's shortcomings were such that considerable refinement was necessary.

With Airco fully involved in the design and development of the DH.10 twin-engined biplane bomber programme, redesign of the DH.9 was entrusted to Westland. The company successfully reworked the whole design, adding revised wings and significant changes to the fuselage, particularly to accept the more powerful US-designed and built 12-cylinder Liberty engine.

The new Westland-developed DH.9A proved to be a vast improvement over the DH.9, and was built in significant numbers. The prototype first flew in the spring of 1918, and the type was constructed by several companies, including Westland – and placing the firm 'on the map' as a designer as well as a manufacturer of aircraft.

It had in fact already confidently started to design its own aircraft. The first were two small, single-seat N.1B seaplanes in 1917, built to meet an Admiralty requirement for a scout/reconnaissance type for launch from ships at sea. The need for this kind of aircraft was later revised, resulting in no orders for Westland's design – but it had shown promise.

Two more projects, the Wagtail fighter and Weasel fighter/reconnaissance aircraft, ►

Below: A link was established with the Italian helicopter company Agusta in the 1960s to build the Bell 47 as the Sioux for British military use – long before the current merged company came into being.



also failed to win production orders. They had been hampered by their poor performing engines from another company and the aircraft appeared towards the war when military procurement was being scaled back.

Sub-contract work also continued, with an order for 75 large Vickers Vimy twin-engined biplane bombers, although only 25 were completed before the end of World War One inevitably led to contract cancellations.

## INTER-WAR DEVELOPMENTS

Unlike some other companies that had entered into aircraft manufacture during the war, Westland had no intention of giving up its aviation work with the coming of peace in late 1918.

Although the post-war world turned out to be very lean for military production contracts compared to the war years, Westland nonetheless persisted and gained several

notable successes, including forays into civil aircraft design and manufacture.

The first Westland commercial aircraft, the single-engined Limousine of 1919, was followed by several more civil designs, notably the three-engined IV/Wessex airliner of the late 1920s and early 1930s and the attractive Widgeon light aircraft, which appeared in several versions.

Military projects followed, but were mainly centred on prototypes and private venture programmes, such as the Wizard fighter and small-scale contracts including the Walrus three-seat carrier-based spotter/reconnaissance aircraft which drew on aspects of the DH.9A layout.

Westland's design office nevertheless remained busy, and two important types for RAF service emerged during the inter-war period. These were the Wapiti and the Wallace general service single-engine biplanes. The Wapiti was in effect a DH.9A replacement and, following Westland's major input into the design of the latter, the company was well placed to create its successor.

First flying in March 1927, the Wapiti used spare DH.9A components such as the upper wings, many of which were already held in stock. More than 500 were built, a substantial number for peacetime, and were a mainstay of RAF operations in the Middle East and India during the peacetime years.

The Wallace, which first flew in October 1931, was similarly operated successfully by the RAF. Related to these developments was the Westland PV3 biplane – which, in modified form as the Houston-Westland, gained international headlines in April 1933 when, in company with the Wallace prototype PV6, it made the perilous first-ever flight over Mount Everest.

The on-board oxygen equipment for the aircrafts' crews was an important step forward for safe high-altitude flight.



**Above:** After switching its focus to helicopter production, Westland made an unusual foray back into aircraft matters, modifying Meteor F.4 RA490 for the Royal Aircraft Establishment at Farnborough for jet deflection tests. The large outlet for the deflected thrust can be seen below the port engine nacelle. The aircraft first flew in this configuration in early 1954.

**Below:** Based on the Sikorsky S-58, which Westland was licensed to produce, the Wessex was an outstanding success for the company, operating with military and civil operators around the world, including significant service in Britain. This is an export Wessex for Iraq.



**Below:** The Westland Scout (army) and Wasp (navy) helicopters were developed from the Saunders-Roe P.531 programme, which Westland took over in 1959. These three Scout AH.1s were operated by Britain's Army Air Corps.





Above: Westland's Lynx demonstrator G-LYNX became the most famous helicopter in the world when, in August 1986, piloted by Trevor Egginton, it set an absolute world speed record for helicopters by achieving 400.87km/h (249.09mph).

Westland's pioneering spirit was also manifested with work on the Pterodactyl series of experimental tailless aircraft designs developed by Capt Geoffrey Hill in the 1920s and early 1930s.

On July 4, 1935 the Westland Aircraft Works ceased functioning as a branch of Petters Ltd and was reorganised as a separate company, Westland Aircraft.

The Petters company then went its own way, specialising in internal combustion engines for industry, and later moved away from Yeovil. After several changes of ownership the name still exists, latterly as Lister Petter.

## THE FAMOUS LYSANDER

Westland Aircraft played a significant role in Britain's war effort during World War Two, both as a designer/manufacturer, and once again as a sub-contractor.

Its early contribution included 'anglicising' for RAF use aircraft originally destined for French service. Built in the US, but flown in British service after the fall of France in June 1940, were Curtiss Mohawk and Tomahawk fighters, a number of which were at Yeovil early in the war.

It is for the Lysander that Westland is best remembered in the context of World War Two. Created to Air Ministry Specification A.39/34 for an army co-operation aircraft, it first flew in June 1936 and went on to serve in other roles for the RAF in addition to its intended service, using its excellent slow-speed handling and short take-off and landing qualities.

More than 1,700 of these specialised aircraft were built, some famously serving in support of clandestine operations in Occupied France. The Lysander was also the first Westland design with a major input from W E W Petter, who was to become one of Britain's leading aircraft designers, responsible for aircraft such as the English Electric Canberra.

Less successful was the twin-engined

Whirlwind fighter, powered by two Rolls-Royce Peregrine inline engines. Prior to World War Two breaking out the Air Ministry identified a need for a long-range twin-engine fighter as it was envisaged that the main air battle would be over mainland Europe. The fall of France meant that the air battle would be conducted over Britain and the need for an aircraft such as the Whirlwind not only receded but would be a drain on resources. Further to this the Peregrine engine was at an early stage of development. The programme continued with a low priority and the type saw limited RAF service as a fighter-bomber up to 1943 and would have benefited from the installation of Merlin engines.

Always ready to pioneer, Westland returned to high-altitude flight with the Welkin fighter programme, the first aircraft flying in November 1942. Although the type did not enter frontline service, Westland's pioneering development of its on-board pressurisation system was not wasted. In the early post-war years the work successfully spun off into a separate sector of the business with the creation of Normalair.

This company rapidly became a world leader in environmental control systems for military and civil aircraft. It later became part of Honeywell though retains a significant presence on the Yeovil site with manufacturing and testing facilities.

As a sub-contractor, Westland made an important contribution to the war effort with license-manufacture of Spitfires and, in particular, Seafires.

All production Seafires were built by Westland and Cunliffe-Owen under license, reinforcing the link with naval aviation that had been at the start of Westland's aviation connection during World War One.

Westland had a hand in aspects of the Seafire's design, and also built (albeit in much smaller numbers) examples of the Fairey Barracuda. Not surprisingly, the company





Above: Symbolic of Westland's recent history and the excellent products the company has made in the past century, Apache AH.1 attack helicopters of the British Army Air Corps are proven in combat.

became the target of Luftwaffe air attacks during the early part of World War Two.

In 1944 the Admiralty released Specification N.11/44 for a shipborne fighter, which eventually matured as the Westland Wyvern naval strike fighter. The first example flew in December 1946 and, in a somewhat modified form, entered combat in the Suez operations of 1956.

## POST-WAR

Westland had gained little success with commercial aircraft in the inter-war years, and in 1946 it took the bold step to try something completely different: a move into a whole new branch of aviation – rotary-wing flight.

In the long run the decision proved to be the salvation of the company, but at the time the idea to concentrate on helicopter design and manufacture was bold.

The firm had made a brief excursion into rotary-winged aircraft during the 1930s by constructing Cierva autogyro designs. Now, a license deal was negotiated with an emerging giant in the new helicopter world, Sikorsky of the US.

License construction rights were granted in late 1946 to build the Sikorsky S-51, known to Westland as the Dragonfly. The first one built at Yeovil took its maiden flight in October 1948, and the type served with the Royal Navy and RAF.

Further development of the Dragonfly led to the Widgeon, but Westland's helicopter interests really took off when it gained licenses from Sikorsky to build the S-55 (which became the Whirlwind in Britain) in the early 1950s; and the S-58, known as the Wessex, which first flew in June 1958.

Both types – built at Yeovil in a variety of versions – were highly successful and served with the Royal Navy and RAF in addition to many export customers.

The late 1950s and early 1960s was a period of great change in Britain's aviation industry. Many famous manufacturers were forced to merge into groupings within a rapidly shrinking industry.

Westland was fortunate not to be swallowed up at the time, and instead took

over several other companies or parts of them.

These were the long-established Saunders-Roe, in 1959, with facilities on the Isle of Wight and at Eastleigh in Hampshire; the helicopter division of Bristol Aircraft in 1960 at Weston-super-Mare in Somerset; and the UK aviation interests of Fairey Aviation at Hayes in Middlesex the same year.

These takeovers brought new talent to Westland as well as existing projects – such as the Fairey Rotodyne convertible helicopter project (which did not enter production); the Bristol Belvedere twin-rotor tactical military transport helicopter, built in small numbers for the RAF; and the diminutive Saunders-Roe Skeeter helicopter plus its manufacturer's hovercraft interests.

The P.531 small helicopter programme also came from Saunders-Roe, Westland continuing to develop it as the Scout for the British Army and later the Wasp for the Royal Navy.

These changes led to the creation in 1961 of Westland Helicopters. The overall Westland Group continued – with various subsidiaries, such as Westland Engineers, proving very successful; and for many years Westland owned the main London heliport at Battersea.

## INTERNATIONAL PROGRAMMES

The importance of international manufacturing co-operation grew as the 1960s progressed. This included Westland working with Agusta

on the Bell 47, which the Italian helicopter specialist built for the European market under license from Bell. Westland built the type, licensed from Agusta, for the British Army as the Sioux.

A collaboration with Aérospatiale in France led to the design and manufacture in both countries of the Puma transport helicopter (which first flew in France in April 1965), the Gazelle light utility helicopter (April 1967), and the ubiquitous multi-role Lynx (which took its maiden flight in Britain in March 1971).

The Lynx has proved to be an international success virtually without equal, both in maritime and land-based versions, and is still an important helicopter for Britain's armed forces.

As the Lynx established itself with overseas orders, a decision was made to launch a larger aircraft, based on Lynx dynamic components as a private venture on the civil market. This was to be the 12000lb/14 passenger Westland 30. The W30 met with some initial success in the UK and USA, but the expected orders never materialised in time to fill the production gap which was predicted once the UK military orders had been delivered.

More co-operation with Sikorsky produced one of Britain's best known and loved helicopter types, the Sea King. Westland concluded a license agreement for the civilian S-61 and military SH-3D version in 1959. Westland made changes to the SH-3D and called the helicopter the Sea King. The first



Above: It took time for the three-engined EH101 to become firmly established but, now designated AW101, the type has been successful for AgustaWestland in the company's home countries of Britain and Italy as well as continuing to generate export sales. This is a Merlin of the Força Aérea Portuguesa.



Above: **RAF Sea Kings provided search and rescue operations from 1978 until this year.**  
AirTeamImages.com/Philippe Noret

example to fly from Yeovil took to the air in May 1969. The Westland version of the Sea King became a major service helicopter for the RAF and Royal Navy, and won more export orders than the US-built version.

Additional co-operation with Agusta in Italy saw the formation of EH Industries in 1980 to develop a three-engined helicopter, designated EH101, to meet military requirements in both countries.

But, despite several similar major programmes, Westland gradually fell into unprofitability. Sikorsky came up with a potential bailout deal in 1985 which split the British Cabinet and led to the resignation of the Secretary of State for Defence, Michael Heseltine, in January 1986.

The split, sometimes called the 'Westland Affair', was over whether a European deal,

or one with Sikorsky, should go ahead. Eventually it was Sikorsky, via its parent UTC, and Fiat that got to invest and so get a shareholding in Westland. The US link led to a limited license to allow the company to build some Black Hawks, initially for a possible contract with Saudia Arabia – but this order did not materialise and none of these helicopters were produced for any customers by Westland.

In 1994, Westland became a wholly owned subsidiary of engineering giant GKN.

Two years later the UK ordered the Apache attack helicopter that was to be operated by the Army Air Corps. Westland built these helicopters under license from Boeing.

Westland went on to merge with Finmeccanica's Agusta helicopter division in 2001. The new combination was named

AgustaWestland, which continues to this day.

In 2004, Finmeccanica acquired GKN's share in the joint venture. AgustaWestland is now one of the world's leading civil and military helicopter suppliers, with a range of helicopters, prefixed 'AW', featuring in many of the current weight and power categories.

One of the most important programmes is the Merlin, which grew out of the EH101 project into a major success story.

Yeovil's latest project is the AW159 Wildcat, a replacement for the Lynx, which is now in service with the Army Air Corps and Fleet Air Arm. The Republic of Korea Navy will follow suit next year.

Today the Yeovil site is a massive concern, with multiple buildings housing production and repair facilities, administrative offices and inside and outside test facilities for completed helicopters.

The company's original airfield is still very much in use, principally for helicopter test flying. That this is the site where the original production of Short Type 184 seaplanes began 100 years ago represents an amazing story of longevity and achievement.

Helicopter manufacture is still the main employer in Yeovil and the surrounding area, and will hopefully remain so, despite challenges in the future, for many years to come. **AN**

*Acknowledgement: The author wishes to express his sincere thanks to AgustaWestland, and particularly those who look after the company's archives, for their generous assistance during the preparation of this article.*

Below: **A Royal Navy Wildcat from 825 Naval Air Squadron flies over the English Channel. The Wildcat is AgustaWestland's latest generation multi-role helicopter featuring a more powerful engine than its predecessor, the Lynx, which the company says helps improve performance in hot environments and at high altitudes.** Crown Copyright 2014/LA(Phot) Iggy Roberts.



Right: **The official AgustaWestland logo honouring 100 years of Westland's aviation manufacturing.**



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The Battle of Britain itself receives a similar chronological treatment, but with the fascinating addition of photo diaries from 32 Squadron, RAF and the Luftwaffe's JG 26. The latter, famously led by Adolf Galland, includes previously unpublished images taken by the commander's adjutant during the battle. There is also information on the commanders and famous aces.

Excellent paintings from Simon Smith and Alex Hamilton bring the text to life, although with plenty of first-hand accounts it is never a dull read. The book is packed with period photos, as well as John Dibbs' superb air-to-air photography of contemporary warbirds. This title represents exceptional value at just £19.99.

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## KINGS OF THE AIR: FRENCH ACES AND AIRMEN OF THE GREAT WAR

**Book**

**Written by: Ian Sumner**

**Price: £25.00**

Pen & Sword's prodigious output occasionally produces a book so impressive that it can be regarded an instant classic, and Kings Of The Air is among the best volumes the publisher has produced. As is so often the case, its title sells the work a little short, since there is much more to Sumner's tome than a description of the aces and airmen flying for the French air arm in World War One.

The detailed, beautifully written text describes the formation of the country's initial heavier-than-air units and the early evolution of the aeroplane in France. Many readers will be familiar with the growing pains of British air power and be enlightened to discover that the French suffered similarly, but may be surprised to find just how extensive the French air force became – it was the largest by the cessation of hostilities.

Sumner has delved deep into the French archives to reveal the detail of how air power was moulded and applied, through the thoughts of the men and women involved. Much of his material appears for the first time in English and adds very significantly to our understanding of the war and military aviation. Although only 26 black and white images are provided, they are well reproduced and accurately captioned, completing an exceptional package.

*Published by Pen & Sword Aviation;  
ISBN1783463384 and is available from [www.pen-and-sword.co.uk](http://www.pen-and-sword.co.uk)*



## ZEMKE'S WOLFPACK: A PHOTOGRAPHIC ODYSSEY OF THE 56TH FIGHTER GROUP DURING THE SECOND WORLD WAR

**Book**

**Written by: Nigel Julian and Peter Randall**

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If you've read a few of these Flight Bag book reviews, you'll probably have seen poor image captioning bemoaned more than once. What a delight it is then to leaf through this truly exceptional work, which provides a fascinating photographic insight into the most successful of the 8th Air Force's fighter groups and could quite easily be used as a caption-writing master class.

Famous as 'Zemke's Wolfpack', the 56th was unique among 8th Air Force fighter groups in working up on the Republic P-47 Thunderbolt and retaining the type right through until D-Day. It took its nickname from its first wartime commanding officer, Hubert 'Hub' Zemke, and retained the esprit de corps that he engendered.

The majority of the more than 400 photographs gathered here are from the authors' archives, the 56th Fighter Group museum, and the collections of veterans and their families; the publisher claims that most have never been seen in print before. The book is separated into 14 chapters, each with a concise introductory text setting the subsequent photographs in context. In many cases the captions themselves are mini essays, however, and an incredible amount of detailed information has been packed in.

This book is a thing of rare quality indeed.

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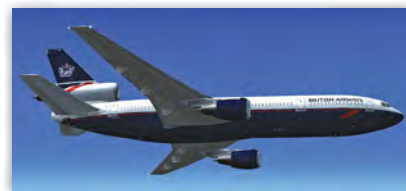
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Alitalia, British Airways, Continental, Ghana Airlines, KLM, Lufthansa, Monarch Airlines, Northwest Airlines and Swissair, while the -30F freighter is in the marks of Gemini Air Cargo and World Airways. Finally, the JT9D powered -40 is in the colours of JAL and the -40F freighter an Aeroflot example. Bare white schemes are also provided for the -30F, -40 and -40F variants and additionally a detailed paint kit is included for those wishing to create yet more colour schemes.

Animations include dynamic wing flex, the



cargo door on freighter models, drooping elevators on engine shut down and all the usual control surfaces and doors. The highly detailed cockpits are explained fully in the manual, which also describes a tutorial flight offered as part of the package.

Put together, this makes a superb package covering all the variants of this iconic 1970s design.

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WING COMMANDER TOM NEIL DFC\*, AFC

KEY

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# CARGOLUX

## EUROPEAN HEAVYWEIGHT

*Aviation News* **Assistant Editor James Ronayne** visits Cargolux to learn about operations at Europe's largest all-cargo carrier.



Above: **Boeing 747-8R7F LY-VCB** taxis at George Bush Intercontinental Airport in Houston, Texas. Cargolux links the city with Lagos in Nigeria, with both cities connected to the oil industry. [AirTeamImages.com/Nathan Zalcman](http://AirTeamImages.com/Nathan_Zalcman)

**C**argolux has become a well-established name in the freight market since its inception in March 1970. Europe's biggest all-cargo airline transports freight on both scheduled and charter services between more than 90 destinations in its worldwide network using a fleet of 25 Boeing 747 freighters. It employs 1,800 people, around 1,400 of whom are based in Luxembourg, where the company is headquartered.

The tiny country is an ideal base for freight operations thanks to its central location, with all major European cities accessible by road within 24 hours, and Cargolux works with a team of trucking



Above: **Cargolux Boeing 747-8R7F LX-VCD** departs from a wintry Ted Stevens Anchorage International Airport in Alaska. The carrier has a fleet of 25 Boeing 747s operated on its scheduled and charter flights to destinations around the world. [AirTeamImages.com/AngeloBufalino](http://AirTeamImages.com/AngeloBufalino)



Above: **Freight is unloaded from Boeing 747-4R7F LX-VCV** at Los Angeles International Airport in California. [AirTeamImages.com/BramBotterman](http://AirTeamImages.com/BramBotterman)

Bottom: **The company's aircraft are named after Luxembourgish towns, with LX-VCV christened after the commune of Walferdange, just north of Luxembourg City.** [Key-James Ronayne](http://Key-JamesRonayne)

contractors to move the freight between the airport and its customers. Luxembourg Airport is also suited to the airline's activities with a 13,123ft (4,000m) runway, all-weather Cat IIIb operations and high slot availability. The CargoCenter boasts bonded and chilled stores, as well as stables for the transportation of live animals. With 920,314sq ft (85,500m<sup>2</sup>) of warehouse space, the facility has 113 truck docks and ample parking positions. The distance from the lorry to the aircraft is just 354ft (108m). The CargoCenter has a handling capacity in excess of one million tonnes per year and the airside ramp is capable of accommodating eight widebody aircraft at once.

## CHINESE INVESTMENT

In June, the airline celebrated the first anniversary of its partnership with Henan Civil Aviation and Investment Co (HNCA). The investment wing of the government of Henan Province purchased a 35%

stake in the carrier from the Luxembourg Government for \$120 million. The deal included the development of a 'dual hub strategy', creating a European logistics centre in Luxembourg and a Chinese equivalent at Zhengzhou. Like Luxembourg, Zhengzhou has an extensive trucking network, enabling goods to be transported across China. Vice President Corporate Development and Strategic Alliances, Maxim Strauss, told *Aviation News*: "Luxembourg is a small country in Europe with a small airport but [it] was able to develop the cargo side, and in China they see themselves in the same role. So far we are very happy with the development, they have stuck to their commitments and we have introduced the flights to Zhengzhou. They also want growth; the European airlines are all being more prudent so that is good for us."

Cargolux currently flies eight times a week between Luxembourg and Zhengzhou, with an additional two flights per week ▶





**Outsized cargo is one of the areas Cargolux specialises in. One of the benefits of Boeing 747 freighters is the nose cargo door, which makes loading long objects easier.** Cargolux

between the Chinese city and Chicago, Illinois.

Other shareholders in the company are Luxair (35.1%), banks BCEE (10.91%) and SNCI (10.67%) and the Luxembourg State (8.32%).

## MARKETS

The carrier's strongest markets are out of Europe and out of Asia which account for around 35-40% each. The carrier has two bases in Asia, one in Hong Kong and the other at the aforementioned Zhengzhou. Strauss said the company's South American routes had been doing well but "stagnated" in the middle of last year. "We see South American economies being weaker," he

added. "Africa is a lot of project driven work in the oil and gas industry, so that market, because

of today's oil prices, is also stagnating. Our strongest markets have always been out of Europe and out of Asia. The demand from Europe to the US is also very strong."

That demand increased earlier this year when Cargolux took full advantage of a strike by workers at the Port of Los Angeles in California. "We added a lot of additional capacity, I think we more than doubled the number of charter flights we normally provide," Strauss revealed. "That is the flexibility of Cargolux. We added trans-Pacific routes out of Japan and out of Hong Kong so that has helped the results for this year."

After several "weak" years, Cargolux enjoyed a good 2014 and this year looks promising too. Strauss said the carrier was flying more and carrying more freight.

"Volumes are good, our yield is based on the underlying yield and the fuel surcharge that we invoice to our customers, so we

don't have the all-in system like some of the Middle Eastern carriers," he explained. "Revenues are down because of the fuel price and underlying revenues are more or less flat so the market is good but we don't know how it is going to continue. Summer is always weak; we make most of our money from September to December. Compared with last year, if you look at bottom line results, without telling you the exact numbers, last year we had a loss, year to date/half year this year we have a profit."

## FREIGHT

The airline carries a variety of different cargoes and has eight different products in its portfolio, each tailored to the various needs of individual sectors. The different services, all prefixed with the carrier's 'CV' IATA code, are; alive (animals), classic (general cargo), fresh (perishable goods), hazmat (hazardous material), jumbo (outsized goods), pharma (pharmaceutical and healthcare), power (cars/aircraft/engines) and precious (valuable goods ie art).

Cargolux became the world's first GDP (Good Distribution Practice) certified airline for the transportation of pharmaceutical products and offers dedicated and qualified carrier and ground handling staff trained in their transportation. The airline's fleet of 747s have four independently controlled temperature zones enabling the transportation of different types of goods on the same flight with constant temperatures in each zone.

Thanks to the aircraft's nose door, Cargolux has been able to transport a variety of large items, ranging from helicopters to flight simulators, heavy generators and oil exploration equipment. The airline transports around 3,000 horses per year and can carry 84 on its 747-400Fs and up to 90 on the 747-8F.

**Henan Province's investment wing, HNCA, purchased a 35% stake in Cargolux last year. Boeing 747-8R7F LX-VCJ carries the organisation's logo below the cockpit and is named *City of Zhengzhou*.** AirTeamImages.com/Andres Contador



Based at Milan Malpensa, Cargolux Italia has its own staff including aircrew. One of the carrier's Boeing 747-4R7Fs, LX-TCV, on short finals to Johannesburg OR Tambo International Airport in South Africa. AirTeamImages.com/HAMFive



## BOEING 747-8

When Cargolux was looking at its fleet renewal options in 2005, it had three aircraft to consider – the Airbus A380 freighter and Boeing's 777F and 747-8F. Cargolux ran the figures and soon dismissed the A380. While it performed well on long sectors it didn't do so well on the shorter flights that make up a lot of Cargolux's network – the carrier's average flight sector is five-and-a-half hours. It also has two decks that would need to be filled and lacks a nose door.

Despite the 777F becoming a popular platform with cargo operators worldwide, Cargolux opted to go for the larger 747-8F. The carrier's business model is based on operating one aircraft type, and with 747-400Fs already in the fleet it had crews available who could be easily trained to operate the new aircraft. The economics were also good for the latest variant of the jumbo, particularly on longer routes and with high loads. "If the markets are volatile or there is low demand, the 777 is better," explained Strauss. "If you take low markets and the dual fleet costs, the 777 is always more expensive than the -8 for us. If you are starting a company from scratch maybe the calculations are different but for us there was no option to get rid of all the -400s in one go. The 777 is a very expensive aircraft; if you look at the market values of a 777 compared with an -8 there is not much difference. You also have to wait longer for the 777."

Together with Japanese carrier Nippon Cargo Airlines, Cargolux was the launch customer for the Boeing 747-8F, placing an order for ten examples on November 15, 2005. A further three were ordered in March 2007. The new variant is 18.3ft (5.6m) longer than the -400F and has a payload capacity of 304,238lb (138 tonnes) – 44,095lb (20 tonnes) more than the older model. Powered by more modern

## CARGOLUX FLEET

Registration	Type	Name
LX-ACV	Boeing 747-4B5(BCF)	
LX-DCV	Boeing 747-4B5(BCF)	
LX-ECV	Boeing 747-4HQF(ER)	
LX-JCV	Boeing 747-4EVF(ER)	
LX-OCV	Boeing 747-4R7F	<i>City of Differdange</i>
LX-RCV*	Boeing 747-4R7F	<i>Spirit of Schengen</i>
LX-SCV	Boeing 747-4R7F	<i>City of Niederanven</i>
LX-TCV*	Boeing 747-4R7F	<i>City of Sandweiler</i>
LX-UCV	Boeing 747-4R7F	<i>City of Bertrange</i>
LX-VCV	Boeing 747-4R7F	<i>City of Walferdange</i>
LX-WCV	Boeing 747-4R7F	<i>City of Pétange</i>
LX-YCV*	Boeing 747-4R7F	<i>City of Contern</i>
LX-VCA	Boeing 747-8R7F	<i>City of Vianden</i>
LX-VCB	Boeing 747-8R7F	<i>City of Esch-sur-Alzette</i>
LX-VCC	Boeing 747-8R7F	<i>City of Ettelbruck</i>
LX-VCD	Boeing 747-8R7F	<i>City of Luxembourg</i>
LX-VCE	Boeing 747-8R7F	<i>City of Echternach</i>
LX-VCF	Boeing 747-8R7F	<i>City of Grevenmacher</i>
LX-VCG	Boeing 747-8R7F	<i>City of Diekirch</i>
LX-VCH	Boeing 747-8R7F	<i>City of Dudelange</i>
LX-VCI	Boeing 747-8R7F	<i>City of Troisvierges</i>
LX-VCJ	Boeing 747-8R7F	<i>City of Zhengzhou</i>
LX-VCK	Boeing 747-8R7F	<i>City of Contern</i>
LX-VCL	Boeing 747-8R7F	<i>Joe Sutter - Father of the Boeing 747</i>
LX-VCM	Boeing 747-8R7F	<i>City of Redange-sur-Attert</i>

\*Operated by Cargolux Italia

General Electric GENx engines, the 747-8 delivers improved fuel efficiency, range and noise reduction.

The 13th and final 747-8F has just been delivered to the airline, and Strauss admitted it would consider increasing that number when

older -400s leave the fleet. "We are happy with the -8, we are probably looking for more," he said. "Going forward, we will re-fleet step-by-step with more modern aircraft and we will probably stabilise with a [total] fleet size of 25."

Strauss admitted Cargolux was uncertain what Boeing's plan was for the -8 variant and said in an ideal world its "wish is a -8 with two engines".

The arrival of the -8s has allowed Cargolux to use the 747-400Fs more flexibly. The airline owns several of the aircraft and operates the others on favourable lease arrangements. The older jumbos have proved useful for flying into markets where a smaller capacity aircraft is required or to airports where the -8 is not yet certified.

"We have 747-400s which are almost fully repaid or we have them on lease on flexible terms – we only pay when we fly them," revealed Strauss. "If you take a -8 it has ownership costs of, on lease, \$1.5 million, you currently get -400s at a third of that. That gives you more flexibility; they don't need to fly 16 hours a day

like our -8s are doing. Even if they are not 100% full, only 90%, it's still sufficient."

Strauss says the aircraft that the company owns will be retained to provide flexible capacity and once they reach around 100,000 cycles, the engines will be removed and kept, and the airframe scrapped.

## MRO OPERATIONS

Luxembourg Airport is dominated by Cargolux's large red hangar which opened in May 2009. At 656ft (200m) wide, 295ft (90m) deep and 138ft (42m) high, it can accommodate two Boeing 747-8s or a pair of Airbus A380s. Here Cargolux carries out work up to C checks. The company's aircraft enter the hangar during the early part of the week when demand is lower and are turned around



Freight is processed via the Cargocenter at Luxembourg Airport.

Key-James Ronayne

ready to fly again on the Thursday or Friday when the airline is at its busiest. Strauss says consultants often question why Cargolux doesn't outsource all of its maintenance but for the company, retaining control of the process is crucial. "Our own maintenance is very important for us, the reason being we want a very high daily utilisation," he explained. "Historically, we've always been above 15-16 block hours per day and that can only be achieved if all the departments work together. If you outsource it the service is not as good. It is a core pillar; yes we do cost counting and we look to see what the real cost is but the maintenance is there to cover our whole business model, otherwise it doesn't really work."

Workshops behind the hangar carry out repairs on parts, and Cargolux and Atlas Air have entered into a joint venture holding a



Above: **Cargolux's 747s have two cargo holds, one each in the belly and on the main deck.** Key-James Ronayne



Left: **Groundcrew load belly cargo on to Boeing 747-8R7F LX-VCC at Luxembourg Airport.** Cargolux

common stock of spare parts for the 747-8. Russian freight airline Air Bridge Cargo is a customer for this service. Instead of all three airlines stocking two spare parts, the joint venture carries four. Two are positioned in Luxembourg and two in Hong Kong to provide flexibility while repairs for the joint venture are carried out at Cargolux's hangar.

Third party maintenance and repair work is also carried out by the company when its schedule permits, and clients include Corsair, Atlas Air, Air Bridge Cargo and Silk Way. While specialising in 747 line and hangar maintenance, the company also holds approvals for other aircraft, including the 737, 757, 767 and 777. With the fixed costs, personnel and installation in place, Strauss says it makes sense to fill the holes in the maintenance schedule with work for other airlines. He said: "The quality we have here is reliable, we never have problems. We have very experienced knowledgeable people."

## COMMERCIAL CO-OPERATION

Cargolux has been successful in establishing partnerships with other airlines that open up new markets for its customers.

Turkmenbashi Airport in Turkmenistan was added to the airline's network in June signalling the start of a commercial co-operation with Turkmenistan Airlines. Strauss says the tie-up with the carrier will allow Cargolux to serve airports where its aircraft cannot land or where it has no traffic rights by transferring the freight. He said: "Turkmenistan has the fifth largest gas reserves in the world and it is now

starting to develop it. There are interesting opportunities there. It also gives us better access to Kazakhstan and other countries around it."

A similar partnership exists with Azerbaijani airline Silk Way. Cargolux flies the cargo into Baku and it is transferred onto smaller aircraft operated by Silk Way and distributed around the region. "It's not just about the aircraft type, it's also about traffic rights," emphasised Strauss. "We fly Boeing, a US product, so we cannot always fly to all the countries we want to."

Cargolux's association with Oman Air is slightly different, but no less beneficial to both parties. Weak demand saw Cargolux pull the plug on its Indian operations but the collaboration with Oman Air resulted in a weekly flight to Chennai being introduced in April, with a second rotation added in August.

The arrangement allows Cargolux to use some of the belly capacity of Oman Air's fleet, and transport goods to a range of destinations in the Middle Eastern



Belgian cartoonist Philippe Cruyt designed a special livery for the 13th Boeing 747-8F, LX-VCN, to be delivered to Cargolux, celebrating the carrier's 45th anniversary. The cutaway design features cartoons of the various different types of freight Cargolux carries and is the biggest decal that Boeing has ever applied to an aircraft, consisting of 460 individual parts. Cargolux

## HISTORY

Cargolux was founded on March 4, 1970 as a joint venture between Loftleiðir, Salén, Luxair and private investors. Surplus Loftleiðir Canadair CL-44s were transferred to Cargolux via Salén and the airline flew its first service to Hong Kong in September 1970. In October 1973 Cargolux entered the jet age taking delivery of a Douglas DC-8-61 freighter which was replaced the following spring by a DC-8-55. A total of 13 DC-8s flew for Cargolux and in January 1979 the airline received its first Boeing 747-200F, LX-DCV, with a second example, LX-ECV, following in October 1980. The jumbo has been associated with the company ever since and in 1990 Cargolux placed an order for three 747-400Fs. The first of those aircraft arrived in November 1993 and was the world's first 747-400F in revenue service, carrying 255,736lb (116 tonnes) of cargo on its maiden flight from Seattle, Washington State, to Luxembourg.

carrier's network, including 11 in India, that it otherwise couldn't reach. For Oman Air the key benefit is access to Cargolux's worldwide network while it is hoped the venture will boost the Gulf State's standing as a major freight hub. "We stop in Oman on the way from Luxembourg to Shanghai and they put freight onto the aircraft," explained Strauss. "India is a very difficult market; there is a lot of demand to the US so we give them [Oman Air] access on our aircraft to ensure they are covered there. For us strategically it was a win-win situation because we share, more or less, the risk of going into India."

## THE ITALIAN JOB

Cargolux Italia was founded in December 2008 as a joint venture between the company and Italian investors. The airline

**Lantau Island's mountainous terrain provides a stunning backdrop as LX-VCG climbs away on departure from Hong Kong International Airport.** AirTeamImages.com/Colin Parker

**Cargolux owns several of its 747-400 fleet with the others leased on 'pay when they fly' agreements.** AirTeamImages.com/Jan Severijns



is based at Milan Malpensa Airport and has three Boeing 747-400Fs, leased from the parent airline.

"In 2009 we saw the opportunity with Alitalia going out of the market," said Strauss. "We saw it as an opportunity to get closer to our customers because we had a lot of trucking from Italy to Luxembourg and we thought it would be better to have our own office there and our own aircraft based there. We also have different traffic rights there; we don't only rely on Luxembourgish traffic rights."

The Italian operation's network and some overhead functions are co-ordinated with Luxembourg but it has its own staff, including flight crews. "They fly specialist routes to Japan but they also fly on routes to Africa and the US," added Strauss. "It is very flexible – we can exchange the aircraft, so

they can wet lease the aircraft to Cargolux when needed. This gives us the flexibility of optimising the schedule, especially in August when the Italians close the offices more or less for a month."

Strauss revealed a project is in the pipeline to launch Cargolux China. "That is a joint venture based in Zhengzhou and will cover the Asian market and the transpacific market," he said. "It is still in the study phase, our shareholders are still looking at it but that would then give us Chinese traffic rights."

Cargolux has come a long way since it was launched 45 years ago. With the transition to a modern fleet and new opportunities arising in the Middle East and China, the airline looks set to further strengthen its position as one of the world's leading cargo operators. **AN**



# AIR MAIL

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The Editor reserves the right to edit all letters.



## Dunsfold Jumbo



As a long-standing reader of your magazine I wonder if I might ask you a question. It concerns the Boeing 747 in residence at Dunsfold Park. It is regularly seen on [the BBC's] *Top Gear*.

I was at Dunsfold recently to see the aircraft at close quarters and observed that the engines have been mounted together on the inner pylons.

I would think it is a research aircraft. Could you please give me some information on this aircraft? It carries the registration N88892.

**Brian L Pass, Bath**

*Editor's reply: This is Boeing 747-236B, c/n 21831, which was built in 1980 for British*

**The Boeing 747 purchased by Aces-High is now operated as a joint venture with Dunsfold Park and resides at Dunsfold aerodrome.**

*Aces-High*

*Airways. It was named City of Birmingham and registered G-BDXJ. It flew for the airline until 2002 when it was bought by European Aircharter. In 2004 it was purchased by Air Atlanta Europe and the following year by Aces-High, which specialises in aviation filming. It flew into Dunsfold on May 25, 2005.*

*The aircraft has appeared in numerous adverts and TV programmes as well as the Westlife music video for the song Home. The podded engines and fuel tanks on the outer pylons were added for the 2006 James Bond film Casino Royale.*

## LETTER OF THE MONTH

Welcome to the Aviation News incorporating Classic Aircraft letters page.

The writer of the Letter of the Month, Peter H Bowers, will receive three DVDs: *Vulcan: Spirit of Great Britain*, *Air Canada Airbus A330-300* and *Mirage 2000-5*.

## Southend Candid

I read with interest your excellent article on the Ilyushin Il-76 in the October issue. Two Algerian Air Force Il-76TDs were based at Southend airport for six months each having TCAS systems installed, and then test flights: 7T-WIE visited in 1999 and 7T-WIV in 2001.

**Simon Murdoch, Southend-on-Sea**



**Algerian Air Force Il-76 7T-WIV at Southend airport in 1999, where it was based for six months for TCAS trials.** Simon Murdoch

## British Pride

I enjoyed reading your article on the BAe 146 /Avro RJ 'Whisper Jet' in the September edition. I have long been a fan of the 146 as British Airways, Dan-Air and our own Jersey European/British European/Flybe used all three versions for many years here in Jersey.

British European was so happy with the largest -300 that it ordered 12 of the new Avro RJXs only to be told that the aircraft was not to be built and deposits were returned.

I was pleased to learn that almost 400 were built as I thought the figure was around 300, so the 146/RJ almost did as well as the Vickers Viscount turboprop.

It was I believe a well made, rugged little aircraft that could have had even more sales success if rebuilt as a twin.

I do feel it a great loss to Britain that we no longer are builders of great airliners, and

only wing builders for Airbus.

Thankfully Rolls-Royce is still leading the world with the building of aero engines for many airliner manufacturers.

**Peter H Bowers, by e-mail**

*David Dorman – co-author of the article with Dene Bebbington and a PR consultant to BAE Systems Regional Aircraft – gives us some insight into the points raised by Mr Bowers:*

*Along with Druk Air of Bhutan, British European was a launch customer for the RJX. Druk Air ordered two RJX85s and British European 12 RJX100s, with eight more on option.*

*The MoU for the 20 aircraft package was announced on March 1, 2001 and the termination of the Avro RJX programme was announced by BAE Systems on November 27, 2001. BAE Systems was*

*prepared to build the 12 aircraft for British European as per its agreed contract. However, on January 23 the following year British European announced that, following discussion with BAE Systems, the airline had taken the decision not to accept the risks of operating an "orphan fleet" in the absence of the RJX being offered to sale to any other customer. Obviously, deposits were returned to the airline.*

*The question of a twin design cropped up several times in the latter stages of the programme and actually before the RJX was started. At one time the company proposed the BAe 146-NRA (New Regional Aircraft) – with the same high-wing configuration but with a CFM56 engine under each wing – which would have seated 125 in a five-abreast layout. But a lack of airline interest meant it didn't proceed.*

# AIRPORT MOVEMENTS

A round-up of notable aircraft visiting UK airports.



## BELFAST INTERNATIONAL

**1/6 EC-LUD A320-214 Iberia Express Dublin**

Diversion. 3/6 94-6707 C-130H 130th AS, 130th AW, USAF n/s also 6th and 11th-17th. 4/6 165159 C-130T VR-54, USN n/s. 6/6 C-GWQR Challenger 605; HB-GPI Beech 300LW n/s also 7th-12th. 9/6 92-1454 C-130H 156th AS, 145th AW, USAF, dep 11th. 11/6 YR-BAZ 737-405 Blue Air. 12/6 OY-JTJ 737-301/F Jet Time op for TNT Airways. 13/6 YR-BAU 737-405 Blue Air. 17/6 94-6708 C-130H 130th AS, 130th AW, USAF n/s also 20th n/s. 22/6 98-0001 C-32A 1st AS, 89th AW, USAF. 24/6 N900FV TBM 900 on delivery to USA. 25/6 SE-DJL Falcon 7X; S5-ICR Citation 560XL n/s. 27/6 OY-RUE MD-83 Danish Air Transport; YR-FKA Fokker 100 Carpatair; OY-RCG A319-115 Atlantic Airways. 30/6 01-0040 C-40B 1st AS, 89th AW, USAF; 165830 C-40A VR-59, USN n/s.

**1/7 EW-303PJ CRJ200LR Belavia dep 3rd;** OM-GTD 737-46J Go2Sky. 2/7 RA-76503 Il-76TD-90 Volga-Dnepr Airlines n/s. 6/7 D-CMDH Citation 680 Sovereign n/s; HB-FRT PC-12; EI-FLM 737-85F Meridiana; SX-BDS A320-214 & SX-BDW 737-37Q both Hermes Airlines. 7/7 OE-GEC Learjet 75 n/s also 8th n/s; OY-CVW Beech 350 n/s. 8/7 OY-CHT ATR 42-312 FlyDenim also 10th; 74-1670 C-130H USAF dep 9th also 10th-12th. 9/7 164598 KC-130T VR-55, USN dep 12th. 15/7 N950VM TBM 900 on delivery to USA. 16/7 UR-CGW & UR-CZZ An-12BPs Ukraine Air Alliance; CS-TRW 767-35DER euroAtlantic Airways n/s. 17/7 OE-IBW 737-4Q8 TNT Airways; D-CRIS Astra SPX; 168981 C-40A VR-1, USN dep 19th. 18/7

**Israel's national football team flew into Cardiff on September 4 for its Euro 2016 qualifying match with Wales on board Arkia Israeli Airlines Embraer 190LR 4X-EMB (c/n 19000616).** Phil Woods

N900AY TBM 900 on delivery to USA; D-CMED Learjet 55C. 19/7 02-1463 C-130J 115th AS, 146th AW, USAF n/s. 20/7 OE-LID ATR 72-600 InterSky. **21/7 N980GA Gulfstream G280.** 22/7 9A-BTE Fokker 100 Trade Air also 24th. 23/7 UR-CGV An-12BP Ukraine Air Alliance; 164106 KC-130T VR-55, USN n/s.

## BIGGIN HILL

**1/5 PH-TOO Cessna U206G dep 4th.** 3/5 D-ETWR Diamond DA20 n/s. 4/5 N437YV Dash 8-202 Berry Aviation. 6/5 D-IBBS CitationJet 525A CJ2 n/s; PR-WTR Gulfstream G200 dep 13th. 7/5 D-FIPA PA-46-500TP dep 9th; D-KUKU Stemme S-10VT dep 9th. 9/5 D-HRGG Robinson R66. 12/5 **SP-CLS PA-46-350P.** 13/5 F-GLBZ TBM 700; HB-PSK PA-46-350P dep 17th. 14/5 D-EDMN PA-28R-200 dep 17th; HB-JII Global Express n/s; OE-LII Global 6000 n/s. 15/5 D-MHBA Flight Design CTSW; D-MVBB Fascination D4; D-MYLA TL Ultralight TL-96; **SP-FBI Cessna 310Q n/s.** 18/5 OH-AKW Diamond DA42NG dep 21st. 21/5 D-CCWM Phenom 300; 2-CHEZ PA-28-161. 22/5 D-EALL PA-46-500TP dep 24th; D-ETED Cessna 182T n/s. 23/5 D-EJLY Cessna 182K dep 27th; D-ETFT Mooney M20K. 24/5 D-KDMJ Hoffman HK-36TTC. 27/5 D-CMED Learjet 55C. 30/5 HB-VTS Premier 1A n/s.

## BIRMINGHAM

**2/8 D-CDOC Learjet 45;** OY-JAI Citation 500 I. 3/8 N673HA Gulfstream G650. 5/8 SP-KPH SAAB

340A/F SprintAir; EC-KUL ATR 72-212A Air Europa op for Flybe; D-CFAN Learjet 60. 6/8 D-IRKE CitationJet 525 CJ1. 8/8 SP-ENY 737-86N Enter Air f/v. 10/8 OE-GMM Citation 680 Sovereign. 11/8 D-CELI Citation 550 Bravo; D-ISCH & OO-DDA CitationJet 525A CJ2s. **13/8 LZ-LDW MD-83 Bulgarian Air Charter op for** Mistral Air. 14/8 **B-2491 767-34PER Hainan Airlines f/v.** 15/8 D-AMGL BAe 146-200 WDL; LZ-FLA An-26B Bright Flight also 28th. 17/8 F-GMTJ Citation 510 Mustang. 20/8 UR-CKL An-12BP Ukraine Air Alliance; ES-SAM A320-232 SmartLynx Estonia f/v. 23/8 F-RAJB A340-212 ET03.060, French AF; UR-CGV An-12BP Ukraine Air Alliance. 24/8 RA-26086 An-26B Pskovavia; UR-CAK An-12BP Ukraine Air Alliance also 26th; F-RADA A310-304 ET03.060, French AF. 25/8 SP-KPE SAAB 340A Direct Fly; UR-CAJ An-12BK Ukraine Air Alliance also 27th; D-FALB Cessna 208B; F-GVYC Citation 560XLS; F-HBPP CitationJet 525B CJ3; OE-GBD Gulfstream G150. 26/8 0454 C-295M 242 tsl, Czech AF f/v; D-FKAI PC-12. 27/8 SP-MRB SAAB 340A(QC) Sky Taxi. 28/8 OO-FPC CitationJet 525B CJ3. 29/8 OE-GGG Citation 560XLS+; F-HAHA Citation 510 Mustang. 30/8 LZ-FIB Galaxy BH Air.

## BRISTOL

**1/8 S5-FUN Challenger 300 dep 4th,** also 19th-22nd. **3/8 OY-CVW Beech 350;** YU-BTB Citation 550 Bravo n/s. 4/8 OM-GTA 737-4Q8 Go2Sky; C-GLNL Learjet 35A n/s. 6/8 D-ISAR Premier 1A. 11/8 LX-LAR Learjet 35A. 18/8 LZ-LDW MD-82 Bulgarian Air Charter. 19/8 D-CEFD CitationJet 525B CJ3. 23/8 9H-WII Citation 650 VII. 25/8 ES-ACC CRJ900 Estonian Air. 28/8 N382G Gulfstream G200 n/s; OE-GPS Citation 550 Bravo. 31/8 D-ILAP Phenom 100.

## CAMBRIDGE

**15/6 EC-LGV Falcon 2000LX;** D-ECHG Cirrus SR20; D-EAJM Cessna R182. 17/6 F-GRNT Merlin IIIB Airlec Air Space. 20/7 OY-NCM Do 328JET Sun-Air; 2-FIFI PA-46-500TP; **ZK-KFB Gulfstream G650 type f/v.** 21/6 HB-KED Robin DR400/180. 24/6 2-ROAM Commander 114B. 26/6 D-CHLR Phenom 300. 28/6 OK-PPP Nextant 400XT.

**2/7 H-21 A109BA 1 Wing,** Belgian Defence – Air Component. 3/7 OY-NCP Do 328JET Sun-Air. 4/7



**Casa 212-300MP s/n 537 (c/n 460, ex 17202) was one of two former Portuguese Air Force examples which night stopped at Aberdeen on September 20 on delivery to the Uruguayan Air Force. The second example was registered 536 (c/n 459, ex 17201).** Donald Douglas



**Slovak Government Flying Service Tupolev Tu-154 OM-BYO made two visits to Birmingham on September 4, carrying VIPs who were visiting the nearby Jaguar Land Rover site at Solihull.**

Rob Edson

HB-VRV Phenom 100. 7/7 D-GTAC PA-34-220T; D-EGHX Cirrus SR22; N1TF Gulfstream G650. 5/7 I-FXRJ Avanti. 9/7 D-EJMU Bölkow Bo208C. 10/7 **OK-CAR Cessna T182T**; HB-JGT Challenger 605; F-HBIR Citation 510 Mustang; D-EEST PA-28R-200; D-ETFT Mooney M20K; F-GMLM Cessna 182F; F-GCHF Cessna FR182; PH-KAX PA-28-181; F-GLPT Merlin IIIB Airlec Air Espace; F-GMIP Cessna 172S; F-GMKM Robin DR400/140B; D-GTIM Tecnam P2006T; D-GALF PA-30-160. 12/7 N685CP Cessna T310R; D-EKNR PA-28RT-201; D-ISRM Citation 510 Mustang; PH-RAD & PH-JLK Diamond DA40Ds; F-GORD & F-GMKM Robin DR400/140Bs; F-HDKY Cessna 172s; F-HMUT Beech 300. 21/7 N331BD Gulfstream G200. 22/7 B-8131 Gulfstream G550. **27/7** D-ISBC Beech C90GTi. 29/7 OE-GMG Citation 650 VII. 31/7 9H-BOO Challenger 850 Air X Charter.

## EAST MIDLANDS

**2/8** UR-CKC AN-74TK-100 Cavok Air; OO-ACC CitationJet 525A CJ2+. 6/8 UR-82008 AN-124-100M-150 Antonov Airlines. 7/8 UR-KDM An-12BK Cavok Air also 12th; D-CFAI Learjet 55. 13/8 VP-CKK 737-9AER BBJ3; PH-TXA Citation 510 Mustang also 17th. 14/8 UR-82029 AN-124-100 Antonov Airlines. **20/8** EW-259TG An-26B Genex. 21/8 UR-CKL An-12BP Cavok Air also 26th. 23/8 D-IDBA Premier 1A; D-CJOS CitationJet 525B CJ3 also 27th. 25/8 PH-FJK CitationJet 525B CJ3. 28/8 D-AFAA Challenger 604. 29/8 D-CJPJ Learjet 35A. 31/8 EC-ISQ Citation 560XL; N243PC Hawker 4000; **VP-BCK 737-4Q6/SF AirBridgeCargo op for TNT Airways.**

## EXETER

**20/6** HB-IUW Falcon 900B. 21/6 2-DOLU Beech 58. **27/6** YR-FKA Fokker 100 Carpatair. 30/6 ZM402 Atlas C1 70 Sqn, RAF; 69 Xingu 28F, French Navy.

**1/7** D-CJPG Learjet 35A; ZJ182 Apache AH1 3/4 Regt, AAC. 5/7 N673BF 767-238ER. 6/7 PH-ANV Cirrus SR22; D-IFMG Premier 1. 8/7 PH-TXW Cirrus SR22; ZH004 Defender T3 651 Sqn, AAC. 15/7 CS-DIY CitationJet 525B CJ3. 16/7 F-HOUR Citation 510 Mustang; SE-RCM Citation 560XLS.

Flybe Aviation Services

**13/7** OO-DWB RJ100 Brussels Airlines dep. 17/7 G-PRPB Dash 8-Q402 delivered from US in United Express livery.

## GLASGOW

**1/7** OE-GDP Phenom 300; P4-MES 767-33AER. 3/7 **OK-MES ATR 72-212A CSA**; LX-MES Falcon 7X. 4/7 CS-DIY CitationJet 525B CJ3. 5/7 LX-FLY Global XRS. 6/7 OE-GXX Learjet 40XR. 7/7 OY-CKN Falcon 2000; F-HBPE ERJ 145LR Pan Européenne Air

Service; EC-LTF Global 6000. 8/7 9H-AHA 737-505 Air X Charter with Fleetwood Mac; LN-BAA Beech 200. 9/7 HB-CQS Cessna P210N. 10/7 VP-CPX PC-12; EC-JNX CRJ200ER Air Nostrum; N650XY Gulfstream G650; D-ARTE Challenger 601-3A. 11/7 SE-RIL Citation 560XLS. 13/7 EC-KKD Beech 400A. **14/7 N467SP Basler BT-67 Samaritan's Purse.** **15/7** I-FORR Learjet 40. 17/7 165737/BH, 166511/BH & 166810/BH KC-130Js VMGR-252, USMC. 18/7 ES-ACC CRJ900ER Estonian Air. 19/7 N889JG TBM 850. 21/7 HB-JFB Global 5000. 24/7 F-HAFS ERJ 145EP Enhance Aero Group. 28/7 **VP-BBR 787-8 Dreamliner Azerbaijan Airlines with Qarabağ FK who returned home in A320-214 4K-AZ80 on 30/7**; F-GZTA 737-33V & F-GZTM 737-3B3 Europe Air Post. **29/7** F-GKOM Falcon 900B. **31/7** OK-HWK Hawker 900XP; VP-BGM Challenger 605.

## GLOUCESTERSHIRE

**3/6** D-EKSS Mooney M20J. 5/6 H-35 A109BA 1 Wing, Belgian Defence – Air Component. 10/6 D-ERLM Aquila A210 n/s. 15/6 T-404 & T-420 SAAB MFI-17s FLSK, Royal Danish AF both n/s, both also 16th n/s. **19/6** F-HEXP Cirrus SR22; HZ-MEJ1 Challenger 604. 21/6 NC17633 Spartan 7W Executive also 23rd. **25/6 EC-DAC AA-5A Cheetah also 30th**; OE-KMX Beech F33A n/s. 26/6 HB-FVD PC-12 n/s; OO-CEJ CitationJet 525 CJ1 n/s; OO-PGG Citation 560XL. **27/6** F-GHPQ PA-28-161 dep 29th; F-GSBA Robin DR400/140B dep 29th.

## GUERNSEY

**1/7** OE-GGP Citation 560XLS; M-LIZI EC155B1 dep, arrived in June as 3A-MPG. 2/7 9H-FAM Phenom 100; HB-DGI Mooney M20K. 3/7 SE-LTN PA-28RT-201; F-GVAK Robin DR400/180. 6/7 2-GOOD PA-32R-301T dep, arrived in June as N4178W; F-HUMM Diamond DA40. 7/7 OE-FHC CitationJet 525A CJ2+. **8/7** RS-04 Sea King Mk48 40 Sqn, Belgian Defence – Air Component. 11/7 F-HASP Diamond DA40D. 12/7

F-HBIR Citation 510 Mustang; HB-VPE CitationJet 525A CJ2+. 16/7 F-BMZJ CEA DR250/160; F-HNDI Robin DR400/140B. 18/7 F-GZSA Robin DR400/180. **22/7** D-EEDI Wassmer WA.54; 2-COOL PA-46-500TP. 23/7 F-GHPP PA-32R-301; F-GYVC Robin DR400/120; F-HFPJ Cessna 182T. 27/7 F-GYKL Robin DR400/160. 30/7 F-GISH Citation 510 Mustang. **31/7** D-EGOF PA-28-161; D-ELFC PA-28R-180.

## LEEDS BRADFORD

**1/7** HB-VOU Citation 560XL; OE-FLG CitationJet 525 CJ1. 2/7 D-CLUZ Learjet 60; CS-TQU 737-8K2 Euro Atlantic op for Jet 2. 5/7 9H-AHA 737-505 Air X Charter; OE-LID ATR 72-600 InterSky. 8/7 2-BEST Commander 114B. 9/7 D-ELVW Cirrus SR22; PH-CDO 737-86J Corendon op for Jet2; EI-DVA 737-36E Mistral Air also 23rd; EC-MFS 737-4Y0 AlbaStar. 10/7 YU-BTM Citation 650 VII. 11/7 F-HIJD CitationJet 525A CJ2; D-IGST Premier 1A. 13/7 I-TOPX Beech 400XP. 14/7 OO-ACO Citation 510 Mustang. 16/7 VP-BVM Global 6000; D-CHIO CitationJet 525B CJ3. **18/7** OK-PPP Beech 400XP. 22/7 F-GLPK Beech C90B. 25/7 YR-FZA Fokker 100 Carpatair, Catalan Dragons rugby team to play Leeds Rhinos; OH-FOX Falcon 2000EX. 30/7 **9A-BIH PA-31T1 Cheyenne 1A.**

## LIVERPOOL

**2/7** OK-PRA Cessna 414. 3/7 D-CLUZ Learjet 60; D-CFTG Learjet 35A. 4/7 OE-GPS Citation 550B Bravo. 7/7 **OK-AAL Beech 200 also 8th**; 2-ROCK Cirrus SR22. 8/7 D-ITEM PA-31T2 Cheyenne IIXL. **12/7** D-IBBS CitationJet 525ACJ2+. 17/7 OK-MEK A319-112 CSA Czech Airlines inaugural Prague service. 22/7 LZ-ABR An-26B Air Bright. 23/7 LY-ETM ATR 42-312F Aviaivla; OE-HCA Challenger 300; PH-MJP Fokker 100 FlyDenim also 24th & 31st. 24/7 EC-MFS 737-4Y0 & EC-LNC 737-4K5 (also 31st) AlbaStar; 9A-JSC CitationJet 525 CJ2. 25/7 CS-TFX A340-542 Hi-Fly Liverpool FC team charter. 26/6 D-IPCC CitationJet 525A CJ2+. 29/7 F-RACD DHC-6-300 GAM 00.056, French AF; OE-GDP Phenom 300. 31/7 OK-HWK Hawker 900XP; SX-RFA 757-23N GainJet Liverpool FC team charter.

## LONDON GATWICK

**3/7** LN-LNF 787-8 Dreamliner Norwegian Long Haul f/v; OK-TVY 737-8Q8 Travel Service. 5/7 OK-TSF 737-86J Travel Service. 7/7 OY-JBJ Hawker 800XP; 3A-MGA Falcon 7X. 10/7 OK-TSC 737-8FH Travel Service. 11/7 EC-MGF A319-111 Vueling Airlines. **12/7 ANX-1207 Gulfstream G550 Mexican Navy.** **14/7** C-GTQC 737-8Q8 Air Transat; EI-FLM 737-85F Meridiana. 16/8 A6-EOE A380-861 Emirates f/v. 19/7 A6-EOK A380-861 Emirates f/v; OK-GLF Gulfstream



**Cirrus SR22 OK-POK was among a group of 14 foreign-registered light aircraft that made an overnight stop at Perth on September 10. The group also visited Sywell and Glenforsa on Mull during their UK tour.** Martin Davidson



**Jersey welcomed Ivorian-registered Cessna 208B Caravan I TU-GOD (c/n 208B-1195) on September 1. The aircraft had routed via Las Palmas and Malaga.** Graham Hocquard

G200. 21/7 C-GTQG 737-8Q8 Air Transat. 28/8 LN-LNB 787-8 Dreamliner Norwegian Long Haul. **29/7 OY-RUP A320-231** Danish Air Transport op for Norwegian. 31/7 I-PCSC Beech 400A.

**1/8 EC-MGZ & EC-MHA A321-231s** Vueling Airlines f/v. 2/8 EC-MGY A321-231 Vueling Airlines; EW-407PA 737-36M Belavia; TC-JYN 737-9F2 Turkish Airlines; 9H-VVB 737-4K5 VVB Aviation op for Iraqi Airways; F-HFKC ERJ 145LR Enhance Aero Maintenance. 3/8 EC-MHB A321-231 Vueling Airlines f/v. 4/8 YR-FKA Fokker 100 Carpatair. 5/8 TC-DCI A320-216 Pegasus Airlines. 8/8 CS-TKS 767-36NER euroAtlantic Airways op for Vueling Airlines; 4L-GSN 737-405 Luftline Georgia op for Iraqi Airways. 9/8 OE-LEF A320-214 Niki f/v. 13/8 OE-LNE A319-112 Niki; SX-BDS A320-214 Fly Vista op for Iraqi Airways. 14/8 9H-AJW 737-3U3 Maleth-Aero op for Aurigny Air Services. 21/8 A6-EOG A380-861 Emirates f/v; OK-PBS CitationJet 525 CJ1. 22/8 EI-FHJ 737-8JP Norwegian Air Shuttle f/v. 23/8 OK-NEM A319-112 CSA Czech Airlines op for Travel Service. 24/8 **OK-GFS ATR 72-212A CSA Czech Airlines op for Travel Service.** 27/8 TC-JSU A321-231 Turkish Airlines. 31/8 OK-TSJ 737-86J Travel Service; EC-MFT Citation 560 V.

## LONDON HEATHROW

**1/8 D-ABMR 737-86J** Air Berlin op for Germanwings; 9H-BOO Challenger 850 Air X Charter. 2/8 D-CCWM Phenom 300. 3/8 A7-BEE 777-3DZER Qatar Airways f/v. 6/8 OO-TCQ A320-214 Brussels Airlines f/v. 8/8 TC-JSU A321-232 Turkish Airlines f/v. 9/8 N1911W Gulfstream G550. 12/8 SX-DNA A320-232 Aegean Airlines f/v. 13/8 A6-APD A380-861 Etihad Airways f/v; OY-KFM CRJ900 SAS f/v; TC-JOL A330-303 Turkish Airlines f/v. 15/8 7T-VJB A320-202 Air Algerie f/v. 17/8 HZ-A6 Gulfstream V. 19/8 OE-IZM Gulfstream G550. **20/8 9K-GBA A340-542** Government of Kuwait. 21/8 HL8006 777-3B5ER Korean Air f/v. 23/8 9K-APA A330-243 Kuwait Airways f/v; A6-EOM A380-861 Emirates f/v. 26/8 B-KQZ 777-367ER Cathay Pacific Airways f/v. 29/8 LX-GVI Gulfstream G650 f/v. 31/8 TC-JIV A330-223 Turkish Airlines f/v.

## LONDON LUTON

**18/7 D-AERO** Legacy 650; VP-CEW Global 6000; B-8269 Gulfstream G550; CN-TLA Citation 680 Sovereign. 19/7 HZ-A13 Gulfstream G450; VP-CTG Falcon 7X; B-8155 Gulfstream G450; HB-JFE Global 6000. 20/7 LY-GVS Falcon 2000S; N1454H Gulfstream G650ER. 22/7 9K-GGA Gulfstream G650

Government of Kuwait; VP-CYL Gulfstream G650. **23/7 HA-LYT A320-232(SL)** Wizz Air f/v; XA-ZTK Gulfstream G550. 24/7 N817GS Gulfstream G650; **LZ-ORO Avanti**; PH-FKD Legacy 600. 25/7 OO-GEE PC-12; SX-JET Falcon 7X; B-8296 Gulfstream G550; N737LE 737-75V BBJ1. 26/7 VQ-BTA 737-7P3 BBJ1. **28/7 N121PC** Phenom 100. 31/7 N411TF Hawker 4000; HB-VWJ Citation 560XL; F-HFKE ERJ 145LR.

## LONDON SOUTHEAST

**21/7 EI-GJL AS365N3.** 22/7 P4-NOF 737-4Y0 to ATC (Lasham); OE-GPS Citation 560 V n/s. 25/7 EI-FBM 717-2BL Volotea Airlines; D-ITRA CitationJet 525 CJ1; SP-FMG Legacy 600 dep 28th. D-CJPG Learjet 35A. **30/7 S5-AAO CRJ900** Adria Airways; D-IROL Do 228-100 Businesswings n/s; F-GUFD ERJ 145MP Hop! to Air Livery, seen hangared on 6/8 in LAM Mozambique colours as C9-MEK, dep 7/8 as F-GUFD.

## MANCHESTER

**1/8 9H-BOO** Challenger 850 Air X Charter f/v. 2/8 C-GHPE 767-33AER Air Canada Rouge f/v; 9H-VVB 737-4K5 VVB Aviation op for Iraqi Airways. 3/8 D-CEFE CitationJet 525C CJ4 f/v. 6/8 D-CDOC Learjet 45 f/v. 7/8 VQ-BHW 747-4F6 Transaero Airlines f/v, for painting at Air Livery; D-ABYA 747-8I Lufthansa technical diversion FRA-JFK, first passenger -8 to visit. 10/8 D-AIUM A320-214(SL) Lufthansa f/v. 12/8 9H-CLG Challenger 850 Air X Charter f/v. 15/8 B-KQZ 777-367ER Cathay Pacific f/v; VP-CZB Gulfstream G650 f/v; D-CYKP Citation 550 Bravo f/v. 16/8 SX-BDS A320-232 Fly Vista f/v op for Iraqi Airways. 17/8 OY-JRK A320-231 Danish Air Transport f/v, Club Brugge to play Manchester United; D-ABMD 737-86J Air Berlin f/v. 18/8 OY-JJG Do 328JET Sun-Air f/v; OY-LHD A320-231 Danish Air Transport f/v; OO-JAS

737-7K5 Jetairfly f/v. 19/8 OO-JAO 737-7K5 Jetairfly f/v; D-ABMQ 737-86J Air Berlin f/v. 20/8 TF-AMN 747-4F6(BSF) Saudia Cargo f/v. 21/8 A6-EOL A380-861 Emirates f/v; N724FD A300B4-622RF FedEx Express f/v, for maintenance. 24/8 F-HOSB Hawker 750. 25/8 HZ-MS4B Gulfstream G450 Saudi Aeromedical Evacuation f/v; F-HFBY Global 5000 f/v. **26/8 EC-JVM** Learjet 60 f/v. 28/8 OO-SLM Citation 560XL f/v; F-HAJV Citation 550 II f/v. 29/8 TC-JYP 737-9F2ER Turkish Airlines f/v; SE-RMO Learjet 45XR f/v. 30/8 9H-PAL Citation 550 Bravo f/v; LX-VMF Citation 560XL f/v; SE-RHJ Citation 560XL; SE-RIN Citation 525A CJ2; D-ISAG Premier 1A f/v. 31/8 TC-JYO 737-9F2ER Turkish Airlines f/v.

## NORWICH

**1/7 OK-BHX Bell 429**; 2-RICH PA-46-500TP. 4/7 N457DC 737-8GJ to KLM Maintenance dep 11th. 6/7 OK-PPP Beech 400A also 16th. 17/7 OO-DFJ Mooney M20J; **N104CJ MiG-15UTI.** 19/7 OE-LID ATR 72-600 InterSky. 21/7 D-COMO Learjet 60. 25/7 **5H-EXU AW139 Bristow Helicopters.** 26/7 OE-LIB ATR 72-600 InterSky. 28/7 F-HCPE Avanti II.

**1/8 PH-EUG AW139** CHC Netherlands. 2/8 PH-DIX PC-12. 4/8 **OK-VAV Extra EA200**; PH-EUH AW139 CHC Netherlands. 6/8 PH-EUJ AW139 CHC Netherlands. **9/8 PH-EUF AW139** CHC Netherlands. **12/8 SE-DSY RJ100** Malmo Aviation to Air Livery dep 14th. 13/8 N674AC 737-7L9 dep ex KLM Maintenance. **14/8 SE-DSX RJ100** Malmo Aviation to Air Livery dep 17th. 15/8 **P2-PXQ Dash 8-Q402 ex Air Niugini to Air Livery.** 16/8 A6-RJ1 RJ85 Dubai Air Wing to KLM Maintenance. 20/8 T-785 Falcon 900EX LTDB, Swiss AF; **ZS-TSN Challenger 600S.** 25/8 2-AZFR Cessna 401B; OO-NSN AW139. 26/8 **P2-PXP Dash 8-Q402 ex Air Niugini to Air Livery**; PH-HHO EC155B1 Heli Holland.

## SOUTHAMPTON

**1/8 EC-MFT BAe 146-300QT** TNT Airways horse charter. 2/8 VP-BGO Challenger 605. 6/8 9H-AJW 737-3U3 Multiflight. 18/8 R91/61-ZI Transall ET01.061, French AF; N503PQ Falcon 50EX. 19/8 D-BMAD Do 328JET Sun-Air. 28/8 LX-SAB Falcon 900DX. **26/8 OK-AML Citation 510 Mustang.** 27/8 YR-FZA Fokker 100 Carpatair op for Flybe; OH-SWI CitationJet 525A CJ2+. 28/8 EC-LTG 737-4K5 AlbaStar, Lourdes charter. 29/8 9H-PAL Citation 550 Bravo.

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



**Beech 390 Premier 1 YL-KSG (c/n RB-46) flew into Edinburgh from Aarhus on September 9, departing back to the Danish city the following morning.**

With thanks to: D Apps, D Banks, D Bougourd, S Boyd, J Brazier, N Burch, P Claridge, A Clarke, I Cockerton, KW Ede, M Farley, N French, P Gibson, D Graham, A Greening, J Gregory, I Grierson, D Haines, M Harper, K Hearn, G Hocquard, B Hunter, S Lane, G Morris, S Morrison, R Richardson, R Roberts, E Russell, RJ Sayer, M Shepherd, A Smith, D Turner, JA White, G Williams, Blackpool Aviation Society, Manston Movements, Solent Aviation Society/'Osprey', South Wales Aviation Group, CIAN, GSAE, The Aviation Society, EGPE ATC, www.dtmovements.co.uk, Aerodata Quantum Plus, RHADS.

# AIR BASE MOVEMENTS

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



## RAF BRIZE NORTON

4/8 11-0058 & 08-0050 CV-22Bs 7th SOS, 352nd SOW, USAF. 12/8 50+75 Transall LTG63, German AF. 13/8 10+24 A310-304MRTT FBS, German AF. 18/8 278 AW139 301 Sqn, Irish Air Corps. 19/8 603 An-26 59 HRE, Hungarian AF. 24/8 G-273 C-130H-30 336 Sqn, Royal Netherlands AF. 26/8 0008/F-RBAB A400M ET01.061, French AF.

## RAF CONINGSBY

6/8 ZK552 & ZK553 Chinook HC6s Odiham Wing.

## RAF CRANWELL

3/8 ZJ199 & ZJ229 Apache AH1 3 Regt, AAC. 10/8 ZZ501 Avenger T1 750 NAS, RN. 11/8 ZK025/P & ZK028/S Hawk T2s 4(R) Sqn, RAF.

## RAF FAIRFORD

19/8 08-8191 C-17A 437th/315th AW, USAF. 25/8 80-1073/BB & 80-1090/BB U-2S 99th RS, 9th RW, USAF; both dep 28th. 27/8 68-10337 U-2S 99th RS, 9th RW, USAF. 28/8 68-10336 U-2S 99th RS, 9th RW, USAF dep 1/9.

## RAF LAKENHEATH

6/8 33/XA & 125/XO TBM 700s French AF; 02-0201 C-40C 201st AS, DC ANG; 84-0096 & 84-0083 C-21As 76th AS, 86th AW, USAF. 19/8 04-3142 C-130J-30 37th AS, 86th AW, USAF also 27th. 28/8 168071/BH KC-130J VMGR-252, USMC.

## RAF LEEMING

Tornado GR4s continue to arrive for reduction to produce: ZA412, which arrived on 2/7, has been processed and the remains scrapped during August. 27/8 ZD749/097 arrived from 31 Sqn.

9/9 ZD788/098 arrived from 31 Sqn, ZA456/023 arrived from 9 Sqn. 10/9 ZA461 arrived from 15(R) Sqn.

## LEUCHARS

6/9 ZJ694 Sentinel R1 5(AC) Sqn, RAF o/s also 25th o/s. 13/8 XZ578/30 Sea King HU5SAR Gannet SAR, RN.

## RAF LOSSIEMOUTH

1/8 165159/CW C-130T VR-54, USN dep 5th. 2/8 165158/CW C-130T VR-54, USN. 6/8 91-1238

Brize Norton hosted Lockheed NP-3C Orion 158204 from US Navy VX-20 at NAS Patuxent River in September. Chris Globe

C-130H 165th AS, Ky ANG. 28/8 12-5757 MC-130J 67th SOS, 352nd SOW, USAF.

## RAF MILDENHALL

1/8 81-0988/DM, 81-0992/DM, 82-0647/DM, 82-0648/DM & 82-0656/DM A-10Cs 355th FW, USAF all n/s. 3/8 165161 C-20G VR-51, USN. 4/8 156514/514 EP-3E VQ-1, USN dep 6th. 11/8 50+75 Transall LTG63, German AF n/s. 13/8 87-9285 C-130H 328th AS, AFRC dep 15th. 14/8 75-0557/OK E-3B 552nd ACE, USAF dep 21st. 17/8 08-8605/RS C-130J-30 37th AS, 86th AW, USAF. 18/8 94-6707 C-130H 130th AS, WV ANG dep 21st. 18/8 92-3282, 92-3283 & 92-3284 C-130Hs 96th AS, AFRC all n/s; 87-9281 & 91-9141 C-130Hs 328th AS, AFRC n/s both also 31st. 21/8 58-0100 KC-135R 100th ARW, USAF dep to USA, replacement KC-135T 59-1471 arrived 28th. 27/8 80-0323 C-130H 158th AS, Ga ANG n/s. 29/8 87-0031 C-5B 337th AS, AFRC also 30th n/s. 31/8 62-3551 KC-135R 100th ARW, USAF dep to USA.

## RAF NORTHOLT

5/8 CD-01 Falcon 900B 15 Wing, Belgian Defence – Air Component. 13/8 252 CN235-100MPA 101 Sqn,

Irish Air Corps, also 13th. 14/8 ZJ178 Apache AH1 3 Regt, AAC, also 16th. 16/8 144618 CC-144C 412 TS, RCAF. 25/8 68/XO TBM 700A ET006.060, French AF.

## RAF ODIHAM

2/9 ZK559 Chinook HC6 arrived on delivery from Liverpool Docks.

## RAF SHAWBURY

11/8 XX306 Hawk T1A dep by road to Scampton to become the base gate guardian. 12/8 ZJ215 Apache AH1 673 Sqn, AAC. 26/8 ZJ127/L Merlin HC3 845 NAS, RN. 27/8 ZD566/301 & ZD257/302 Lynx HMA8SRUs 815 NAS, RN.

## RAF VALLEY

13/8 ZJ694 Sentinel R1 5(AC) Sqn, RAF o/s. 18/8 R91/61-ZI Transall ET00.064, French AF; ZZ502 Avenger T1 750 NAS, RN. 18/8 ZM402 Atlas C1 70 Sqn, RAF.

## RNAS YEOVILTON

12/8 ZZ520 Wildcat AH1 on delivery to 1 Regt, AAC.

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



Lockheed Martin AC-130W Stinger II 88-1306 visited Mildenhall on September 3. It is based at Cannon AFB in New Mexico with the 16th SOS, 27th SOW. Ryan Dorling

# REGISTER REVIEW

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



Newly registered easyJet Airbus A320-214 G-EZOU (c/n 6754) on short finals to London Gatwick Airport on September 19. James Ronayne

Just one new type joins the UK register this month in the shape of Extra EA.400 G-CITW, a high-winged, six-seat, all-composite aircraft and one of only 27 built. Ozone Power Spark G-CITU and Air Création iFun Pixel G-CIXL are variations on existing types.

Airliner additions include a couple of Airbus A320s; a new one for easyJet and a former TAM Brazil example for British

Airways' Gatwick operations. Another former Republic Airlines Bombardier Dash 8-Q400 has moved to Flybe while new on the bizjet front are a Falcon 2000EX and a Citation XLS. The sole warbird this month is P-51D Mustang G-CITN, a former air racer from the USA, which crashed near Aspen, Colorado on July 15, 1984. Although its new owner's address is in France it is unknown where it is currently undergoing restoration.

Irish additions are mainly airliners for onward lease or Irish operators, but there is also an ex-Portuguese BRM Land Africa ultralight and a brand new AW109SP helicopter. New on the Manx register are a couple of Gulfstream G450s, an Avro RJ70 for Formula 1's Bernie Ecclestone, a Learjet 60 and a Global 6000. The two Guernsey additions are both airliners bound for new operators.

## RESTORATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-AYLL	4018C9	Jodel DR1050 Ambassadeur (built by Centre Est Aeronautique)	11	G Bell and A Shipp, (Hemingborough, North Yorkshire/Hull, East Yorkshire)
G-BSLJ	406FOE	Denney Kitfox (built by AF Reid)	PFA 172-11589	RA Budd, (Barton under Needwood, Staffordshire)
G-BVTD	40399D	CFM Streak Shadow (built by M Walton)	PFA 206-11972	JGN Diana, (Strabane, Co Tyrone, Northern Ireland)
G-CHHK	405609	Schleicher ASW-19B	19384	P Lysak and R Hubrecht, Dunstable, Bedfordshire
G-CIAG	406A1D	Diamond DA20-A1 Katana	10277	Blekinge Flygklubb, Ronneby, Sweden
G-CLAX	40179E	Jurca MJ.5 Sirocco (built by GD Claxton)	PFA 2204	GS Williams, MOD St Athan, Glamorgan
EI-RJB	4CA5BD	Avro RJ85	E2230	CityJet Ltd, Dublin, Republic of Ireland

## NEW REGISTRATIONS

REG'N	MODE(S)	TYPE	C/N	OWNER
G-CIMC	406DA0	Hoffmann H36 Dimona	36269	MT Collins, Brighton Shoreham, West Sussex
G-CIOV	406E44	UltraMagic H-31	31/14	H Board, (Kings Hill, Kent)
G-CIPW	406EA1	AgustaWestland AW139 (built by AgustaWestland Philadelphia)	41344	Bristow Helicopters Ltd, Aberdeen, Aberdeenshire (NB)
G-CIPX	406EA2	AgustaWestland AW139 (built by AgustaWestland Philadelphia)	41346	Bristow Helicopters Ltd, Aberdeen, Aberdeenshire (NB)
G-CIRJ	406EBO	Extra EA.300/LT	LT030	Murray Rene Ltd, (Ramsey, Isle of Man)
G-CIRZ	406ECB	Comco Ikarus C42 FB80 Bravo (assembled by Red Aviation)	1506-7403	Mainair Microlight School Ltd, Barton, Greater Manchester
G-CITD	406EF4	Fournier RF-5 (built by Sportavia-Putzer)	5115	JP Harrison, Trustee of G-CITD Group, Darlton, Nottinghamshire
G-CITN	406EF8	North American P-51D-25-NA Mustang	122-39655	P Earthey (Laycoussaude, France)
G-CITU	406F14	Ozone Spark PPG/Kobra PPG Basik Trike	SK30-P-01D-011	TA Dobbins, (Birmingham, West Midlands)

G-CITW	406F08	Extra EA.400	20	LAC Marine Ltd, Lydd, Kent
G-CIUA	406F06	UltraMagic B-70	70/12	KW Graham, (Spennymoor, County Durham)
G-CIUG	406F1B	Aeropro Eurofox 912(S) (assembled by Eurofox Aviation)	47515	RM Cornwell, Oaksey Park, Wiltshire
G-CIWT	406EAA	Comco Ikarus C42 FB80 Bravo (assembled by Red Aviation)	1507-7398	JW Lorains, (Caldy, Merseyside)
G-CIXL	406F13	Air Création iFun 13 Pixel 250 XC	A15071-15060	SC Reeve, Headon Farm, Headon, Nottinghamshire
G-CIXS	406F23	Zenair CH.701SP STOL	LAA 187A-15336	S Foreman, (Kenninghall, Norfolk)
G-DAMB	405129	Sequoia Falco F8L (built by A Powell & GK Brothwood)	PFA 100-12153	SO Foxlee, Cumbernauld, North Lanarkshire
G-DBNK	406973	Airbus Helicopters EC120B Colibri	1673	Tesschoob Ltd, (Chadwick End, West Midlands)
G-DCII	406E25	AgustaWestland AW139	31703	Profred Partners LLP, Bristol International, Somerset
G-DEKX	406F21	Schleicher Ka.6E	4027	JS Halford, Eyres Field, Dorset
G-EGBJ	402923	Piper PA-28-161 Warrior II	28-8116061	Aviation Advice and Consulting Ltd, Gloucestershire
G-EZOU	406E66	Airbus A320-214	6754	easyJet Airline Company Ltd, Luton, Bedfordshire (NB)
G-GATP	406B82	Airbus A320-232	1804	British Airways PLC, London Gatwick, West Sussex
G-HIOW	406EC5	Airbus Helicopters EC135T3	1190	Bond Air Services Ltd, (for Hampshire and Isle of Wight Air Ambulance, Thruxton, Hampshire)
G-KIAN	406EFF	Piper PA-28R-201 Arrow III	28R-7837022	M Al-Souri, (Perivale, Greater London)
G-LINZ	406F12	Robinson R44 Raven II	11911	Helicentre Aviation Ltd, Leicester, Leicestershire
G-LLOO	406EFC	SOCATA TB20 Trinidad	1195	J-P Nicoletti, Valenciennes-Denain, France
G-LNDN	406EF2	MD Helicopters MD902 Explorer	900-00125	London's Air Ambulance Ltd, RAF Northolt, Greater London
G-MAXD	406F1A	Robinson R44 Raven I	1907	RSM Aviation Ltd, (Boroughbridge, North Yorkshire)
G-MHSJ	406EDD	Robin DR400/140B Ecoflyer	2682	JA and CS Bailey trading as SJ Aircraft, Elstree, Hertfordshire

## PREVIOUS IDENTITIES

REG'N	P.I.	REG'N	P.I.
G-CIAG	ex (SE-MIJ)	G-PRPC	ex N338NG
G-CIMC	ex CS-ASJ	G-RYSE	ex G-BZVO
G-CIPW	ex 5H-EXT	G-SASR	ex G-LNAA
G-CIPX	ex 5H-EXU	G-YFOX	ex OH-FOX
G-CITD	ex D-KCID	G-YROV	ex G-UMAS
G-CITN	ex N5449V	G-ZENT	ex OE-GSP
G-CITW	ex N400LY	EI-FLK	ex CS-UOM
G-DAMB	ex G-OGKB	EI-FLP	ex 5Y-KYJ
G-DBNK	ex G-PERF	EI-FLR	ex JY-EMG
G-DEKX	ex BGA2757	EI-FLZ	ex LZ-MDA
G-EGBJ	ex G-CPFM	EI-IAL	ex I-EASU
G-EZOU	ex D-AXAK	EI-LED	ex D-AYAD
G-GATP	ex OE-IDU	EI-OZM	ex HL7244
G-HIOW	ex D-HCBB	EI-RJB	ex G-CEBS
G-KIAN	ex SE-LLP	EI-STI	ex N938NZ
G-LINZ	ex SP-GTE	M-ABRJ	ex N452NS
G-LLOO	ex F-GKUR	M-PING	ex M-NELS
G-LNDN	ex A7-NHA	M-STRY	ex A6-LIW
G-MAXD	ex OO-TOM	M-YCYS	ex A6-CYS
G-ORVX	ex G-OHIY	M-YSSF	ex EI-SSF
G-OUCP	ex G-GURN	2-OSJN	ex HS-CTA
G-PPLS	ex F-GDIL	2-TBXD	ex B-5034



**This Gulfstream G450 has been re-registered from M-NELS to M-PING (c/n 4284).** James Ronayne

M-STRY	43EA65	Avro RJ70	E1267	BC Ecclestone, Biggin Hill, Kent
M-YCYS	43EA63	Learjet 60	60-341	CYS Ltd, TBA
M-YSSF	43EA64	Bombardier Global 6000	9521	Springtime Ltd, Moscow Vnukovo, Russia
2-OSJN	TBA	Airbus A320-231	308	Phoenix International Investment Group Co Ltd (BVI), (stored Jakarta Soekarna Hatta International, Indonesia)
2-TBXE	TBA	Boeing 737-79P	30036	Raya Airways SDN BHD (for Southwest Airlines as N7833A)

## CANCELLATIONS

REG'N	TYPE	C/N	REASON
G-AWAT	Druine D62B Condor	RAE/627	Cancelled by CAA (badly damaged when it stalled on take off from a private strip east of Oxford 10.9.15)
G-AWGD	Reims Cessna F172H	0503	Cancelled as Permanently WFU (crashed on take off from Manor Farm, Keyston, Cambridgeshire 15.4.15)
G-AZVF	SOCATA MS.894A Rallye Minerva 220	11999	To USA
G-BAHD	Cessna 182P	182-61501	Cancelled as Destroyed
G-BDAR	Evans VP.1 Srs.2	PFA 1537	Cancelled by CAA (Permit to Fly expired 20.7.84)
G-BGWN	Piper PA-38-112 Tomahawk	38-79A0918	Cancelled by CAA (CofA expired 17.7.08, last reported stored at Wickenby, Lincolnshire 11.12)
G-BHSN	Cameron N-56	595	Cancelled by CAA (CofA expired 9.7.05)
G-BLAH	Thunder Ax7-77	526	To USA
G-BMSL	Clutton FRED Srs.3	PFA 029-11142	To USA
G-BOMN	Cessna 150F	150-63089	Cancelled by CAA (CofA expired 11.4.09, last noted stored at Abbeyshrule, Republic of Ireland 11.13)
G-BTCS	Colt 90A	1895	Cancelled by CAA (CofA expired 30.5.12)
G-BUGE	Bellanca 7GCAA Citabria	339-77	To Republic of Ireland
G-BWXG	Slingsby T.67M-260 Firefly	2242	To Royal Jordanian Air Force
G-BWXH	Slingsby T.67M-260 Firefly	2243	To Royal Jordanian Air Force
G-BWXK	Slingsby T.67M-260 Firefly	2246	To Royal Jordanian Air Force
G-BWXN	Slingsby T.67M-260 Firefly	2249	To Royal Jordanian Air Force
G-BWXR	Slingsby T.67M-260 Firefly	2252	To Royal Jordanian Air Force
G-BWXX	Slingsby T.67M-260 Firefly	2258	To Royal Jordanian Air Force
G-BWXY	Slingsby T.67M-260 Firefly	2259	To Royal Jordanian Air Force
G-BWXZ	Slingsby T.67M-260 Firefly	2260	To Royal Jordanian Air Force
G-BYMY	Cameron N-90	4653	Cancelled as Permanently WFU (CofA expired 17.8.15, was based in France)
G-BZFP	DHC-6 Twin Otter Srs.310	696	To Switzerland as HB-LRQ
G-CCNG	Flight Design CT2K	8004	Cancelled as Permanently WFU (crashed on landing at North Coates, Lincolnshire 23.5.15)
G-CDVF	Rans S.6-ES Coyote II	PFA 204-14465	Cancelled as Destroyed (crashed just after take off from Mill Farm, Shifnal, Shropshire 5.7.15)
G-CEBS	Avro RJ85	E2330	To Republic of Ireland as EI-RJB
G-CGVO	Alpi Pioneer 400	LAA 364-15006	Cancelled as Destroyed (crashed in Blackwood Forest near Popham, Hampshire 3.1.15)
G-CHCP	AgustaWestland AW139	31046	To Netherlands as PH-IEH
G-CIAG	Diamond DA20-A1 Katana	10277	To Sweden (reserved as SE-MJU but not take up and restored again four days later)
G-CIGM	BN-2B-20 Islander	C2312	To Germany as D-IFCS
G-CIMR	Airbus Helicopters AS350B3 Ecureuil	8021	To USA as N506JA

G-OIHY	406EFD	UltraMagic S-70	70/10	M Cowling, Perth, Perth & Kinross
G-ORVX	40568E	Van's RV-10 (built by MA Hutton and CD Meek)	PFA 339-14730	CD Meek, (Ripe, East Sussex)
G-OUCP	400C94	Piper PA-31-310 Navajo C	31-7912117	GGL James, Sleaf, Shropshire
G-PPLS	406F04	Reims Cessna F152	F15201828	C Bennewith, Trustee of South East Area Flying Section, Rochester, Kent
G-PRPC	406D99	Bombardier Dash 8-Q402	4338	Flybe Ltd, Exeter, Devon (NB)
G-RLDZ	406EB4	Cameron A-315	11914	Red Letter Days Ltd, (London N10)
G-RYSE	404525	Cessna TR182 Turbo Skylane RG	R18200990	KCD Nutt, Old Sarum, Wiltshire
G-SASR	4043F8	MD Helicopters MD902 Explorer	900-00074	Specialist Aviation Services Ltd, (for Cornwall Air Ambulance, Newquay, Cornwall)
G-TVAL	406EC4	Airbus Helicopters EC135T3	1189	Bond Air Services Ltd, (for Thames Valley & Chiltern Air Ambulance, RAF Benson, Oxfordshire)
G-UWEB	406EDE	Cameron Z-120	11927	GWE Business West Ltd, (Abbots Leigh, Somerset)
G-YFOX	406F1D	Dassault Falcon 2000EX	067	London Executive Aviation Ltd, London Stansted, Essex (NB)
G-YROV	4054EF	AutoGyro MT-03 (assembled by Rotorsport UK Ltd)	RSUK/MT03/024	PKPS Aviation Ltd, (Lytham St Annes, Lancashire)
G-ZENT	406E72	Cessna 560XL Citation XLS	560-5756	Jet Aircraft Ltd, Biggin Hill, Kent
EI-FHJ	4CA4CC	Boeing 737-8JP	42069	Norwegian Air International Ltd, Oslo Gardermoen, Norway
EI-FLK	Not allocated	BRM Land Africa	0018/05	J Tierney, Carrickmore, Co Tyrone, Northern Ireland
EI-FLP	4CA4CE	Embraer 170	17000128	Celestial Aviation Trading 71 Ltd, (for Aeromexico Connect, Mexico City)
EI-FLR	4CA4CF	Embraer 195	19000088	Celestial Aviation Trading 2 Ltd, (Shannon, Republic of Ireland)
EI-FLZ	4CA504	Airbus A320-232	2732	BGR2732 Aircraft Leasing Ltd, (stored at Shannon, Republic of Ireland)
EI-IAL	4CA52C	AgustaWestland AW109SP Grand New	22343	Ion Aviation Ltd, Dublin, Republic of Ireland
EI-LED	4CA4D2	Airbus A321-211	6726	Sky High XXXVI Leasing Company Ltd, (leased to Transaero Airlines, Moscow Domodedovo, Russia)
EI-OZM	4CA516	Airbus A300B4-622R	722	ASL Airlines (Ireland) Ltd, Dublin, Republic of Ireland
EI-STI	4CA383	Boeing 737-476F	24435	ASL Airlines (Ireland) Ltd, Dublin, Republic of Ireland
M-ABRJ	43EA61	Gulfstream 450	4094	MGEC Transport Finance Ltd, TBA
M-PING	43E9BE	Gulfstream 450	4284	Asset Trend Ltd, Farnborough, Hampshire

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**Airbus Helicopters AS350B3 Ecureuil N506JA (c/n 8021) was cancelled from the UK register as G-CIMR on August 21.** Clive Glaister

G-CIRA	Robinson R22 Beta	1403	Cancelled as Permanently WFU (no UK CoFA issued, was based in Italy)
G-CKGU	Schleicher ASW-19	19208	Cancelled by CAA (no UK CoFA issued)
G-CPFM	Piper PA-28-161 Warrior II	28-8116061	Re-registered as G-EGBJ
G-DCFE	Schleicher ASK-13	13112	Cancelled by CAA (CoFA current to 9.4.16, last noted at Saltby, Leicestershire 6.15)
G-DCVS	PZL-Bielsko SZD-36A Cobra 15	W-610	Cancelled as Permanently WFU (CoFA expired 7.1.14)
G-DECF	Schleicher Ka.6CR	856	Cancelled by CAA (CoFA expired 1.5.12)
G-DHOX	Schleicher ASW-15B	15326	Cancelled as Permanently WFU (CoFA expired 9.7.13)
G-EIBM	Robinson R22 Beta	1993	Cancelled by CAA (CoFA expired 4.3.10, reportedly to Italy as I-7208)
G-FBEE	Embraer 195	19000093	To Turkey as TC-YAR
G-GURN	Piper PA-31-310 Navajo C	31-7912117	Re-registered as G-OUCP
G-IOMI	Cameron Z-105	11426	Cancelled as Permanently WFU (CoFA expired 30.8.14, was based in Italy)
G-JMCE	Boeing 757-25F	30758	To USA as N169CR
G-KITY	Denney Kitfox Mk.2	PFA 172-11565	Cancelled as Permanently WFU (crashed at Black Springs Farm, Castle Bytham, Lincolnshire 19.11.14)
G-LNAA	MD Helicopters MD902 Explorer	900-00074	Re-registered as G-SASR
G-MDGE	Robinson R22 Beta	1475	To Austria as OE-XXK
G-MJMN	Mainair Tri-Flyer 330/Flexiform Striker	087/04882	Cancelled by CAA (Permit to Fly expired 22.7.05)
G-MTPE	Solar Wings Pegasus XL-R	SW-WA-1260	Cancelled by CAA (Permit to Fly expired 25.3.12)
G-MTVR	Thruster TST Mk.1	8028-TST-057	Cancelled by CAA (Permit to Fly expired 30.7.08)
G-MVHL	Thruster TST Mk.1	8098-TST-103	Cancelled as Permanently WFU (Permit to Fly expired 16.7.02)
G-MVPY	Solar Wings Pegasus XL-Q	SW-WQ-0188	Cancelled as Permanently WFU (Permit to Fly expired 17.5.13)
G-MWDC	Solar Wings Pegasus XL-R	SW-WA-1450	Cancelled by CAA (Permit to Fly expired 21.3.08)
G-MYAJ	Rans S.6-ESD (Modified)	PFA 204-12227	To New Zealand
G-MZPW	Pegasus Quasar IITC	6892	Cancelled by CAA (Permit to Fly expired 10.7.15)
G-OAJC	Robinson R44 Raven I	1381	Cancelled by CAA (crashed after striking power lines while landing in a field near Kinnitty, Co Offaly, Republic of Ireland 1.8.14)
G-OGKB	Sequoia Falco F8L	PFA 100-12153	Re-registered as G-DAMB
G-OHIY	Van's RV-10	PFA 339-14730	Re-registered as G-ORVX
G-OOMC	Raytheon 390 Premier 1	RB-146	Cancelled as Destroyed (badly damaged when it overran the runway on landing at Blackpool, Lancashire 12.3.15)
G-PADI	Cameron V-77	1809	Cancelled as Permanently WFU (CoFA expired 15.4.14, was based in France)
G-PERF	Airbus Helicopters EC120B Colibri	1673	Re-registered as G-DBNK
G-RASC	Evans VP-2	PFA 063-10422	Cancelled by CAA (Permit to Fly expired 14.12.06)
G-REDY	Robinson R22 Beta II	2402	Cancelled as Permanently WFU (CoFA expired 1.4.10, was based in Italy)
G-RENO	SOCATA TB-10 Tobago	249	Cancelled by CAA (CoFA expired 3.6.10, was based in Bulgaria)
G-TAGF	Dassault Falcon 900EX	604	To Canada as C-GLFU

EI-DSJ	Airbus A320-216	3295	To Germany as D-ABZJ
EI-DSN	Airbus A320-216	2412	To D-ABZD but not taken up, then 9Q-CKD
EI-FBF	Airbus A321-231	1062	To Bulgaria as LZ-PMZ
EI-FBH	Airbus A321-231	1293	To Cambodia
EI-FGR	Airbus A319-131	2308	To Tanzania as 5H-FJF
EI-FKJ	Boeing 767-36NER	30853	To Portugal as CS-TKT
EI-FLB	Airbus A330-243	625	To Turkey as TC-OCI
EI-FLC	Airbus A330-243	632	To Turkey as TC-OCJ
EI-SSF	Bombardier Global 6000	9521	To Isle of Man as M-YSSF
EI-STB	Boeing 737-476	24440	To Austria as OE-IAJ
M-ABFO	Hawker 400XP	RK-417	To USA as N600WM
M-GEAA	Boeing 737-7JW	38408	To Cayman Islands
M-NELS	Gulfstream G450	4284	Re-registered as M-PING
M-YRGP	Embraer 170	17000005	To USA as N305EC
2-COOL	Piper PA-46-500TP Malibu Mirage	4697061	To Bulgaria as LZ-00I
2-CRRT	Airbus A330-343E	1098	To Netherlands as PH-IBC
2-TBXD	Boeing 737-79P	30036	To USA as N7833A

## UPDATES & CORRECTIONS

REG'N	DETAILS
G-BGFI	Became D-EBCA 11.5.15
G-BIRH	Became N666WR 4.8.15
G-BZER	Type officially changed to an X'Air 582(2) 17.8.15
G-CCNF	Type officially changed to an X'Air Falcon 912(2) 10.8.15
G-CDHH	Became ZS-RUK 12.8.15
G-CDHU	Type officially changed to a SkyRanger Swift 912(1) 12.8.15
G-CETR	Type officially changed to a C42 FB80 25.8.15
G-CGUB	Became VH-ZFQ 12.8.15
G-CIHV	Type officially changed to a SkyRanger Nynja 912(1) 6.8.15
G-DLAA	Became F-HSVS 7.8.15
G-EGTC	Became D-HEFA 22.4.15
G-GDEZ	Became F-HMED 7.15
G-GERY	Cancellation on 24.4.15 was as a result of rolling to the left on take off at Redhouse Farm, Hollym, East Yorkshire 21.3.15. The left wingtip struck the ground, the nose dropped and the aircraft then struck the ground. Damage to fuselage, wings and tailplane, and engine shock-loaded.
G-JEEB	Became I-JEEP 7.15
G-MYYV	Type officially changed to a Rans S.6-ESD XL (Modified) 21.8.15
G-MYZR	Type officially changed to a Rans S.6-ESD XL (Modified SS) 21.8.15
G-MZGJ	Cancellation on 25.6.15 was as a result of a forced landing in a field soon after take off from Otherton, Staffordshire 10.3.15. The aircraft's left wheel struck a wooden post and the left undercarriage leg dug into the ground. Airframe buckled, left main landing gear, nose cone and internal structure of left wing damaged.
G-MZIH	Type officially changed to a Mainair Blade 912 20.8.15
G-PWNS	Became N153MR 12.8.15
G-SHMK	Became D-EMID 20.5.15
M-ABIP	Actually became XU-706 3.7.15 (corrects page 74, October 2015)

Key: NB – Nominal Base

A place name in brackets relates to the owner's address as where the aircraft is based is unknown.





# MISSIONARY FLIGHTS INTERNATIONAL

## *FLYING WITH FAITH*

**Geoff Jones** joined the crew of a Missionary Flights International DC-3C-65TP, flying from Florida to Haiti and the Dominican Republic.

**W**ith a 50-year history and an immeasurable number of support and aid flights to several island communities, Florida-based Missionary Flights International (MFI) has lived up to its motto 'Standing in the Gap'.

Now with a pair of turbine-powered Douglas DC-3C-65TP aircraft, MFI has transitioned from the era of piston-powered DC-3s, using them to carry personnel, cargo and mail for church groups and families involved in aid work in Haiti and the Dominican Republic.

Missionary Flights International's headquarters moved up the Florida coast from West Palm Beach to Fort Pierce in 2006. It comprises the main 28,000sq ft (2,601m<sup>2</sup>) aircraft hangar and offices and neighbouring 'Larry and Sarah Campbell Maintenance Complex' which covers 15,000sq ft (1,400m<sup>2</sup>).



In 2010, following the catastrophic January 12 earthquake which centred on Haiti's capital, Port-au-Prince, MFI's Ft Pierce base became the centre of a huge international aid relief operation. One of the carrier's DC-3s was the first aircraft carrying emergency water treatment equipment, tarpaulins and medical supplies to arrive in Port-au-Prince less than 24 hours after the initial quake.

Because of MFI's vast experience in Haiti, many other relief organisations piggy-backed the carrier with a variety of other aircraft operating aid flights from Ft Pierce in support of its DC-3 fleet, including a leased Lynden Air Cargo Hercules.

In April I flew with MFI aboard Douglas DC-3C-65TP turbine conversion N500MF (c/n 27047) from its base at Treasure Coast International Airport (formerly St Lucie County Airport), Ft Pierce, Florida, to Haiti and the Dominican Republic, delivering aid workers, cargo and mail. During the 12-hour day, the aircraft covered 1,600nm (2,963km), visiting Cap-Haïtien (Haiti), Barahona and Santiago (Dominican Republic).

## THE FLIGHT

Missionary Flights International operates a twice-weekly 'schedule' on Tuesdays and Thursdays, its current principal destinations being Cap-Haïtien, Port-au-Prince and Pignon in Haiti and Barahona and Santiago in the Dominican Republic (DR). Requests have recently been made for MFI to add a Cuban stop.

Other flights are made on demand, to destinations including the remotest Bahamian islands and Providenciales (Turks and Caicos), following the September 2008 hurricane that hit this island. The operator is an FAA Part 125 air carrier.

The aircraft for my flight, N500MF (c/n 27047), is ex-USAAF 43-49786, built at Santa Monica, California, in December 1944. It was converted from a C-47B to a DC-3C by Rhoades Aviation in June 1990 and subsequently to a DC-3C-65TP when the engines were changed to Pratt & Whitney PT-6As in March 1991 by Aero Modifications International of Ft Worth, Texas. Its most recent overhaul was in 2011 after MFI

Main photo: **Missionary Flights International's Douglas DC-3C-65TP N500MF departs from the organisation's Treasure County International Airport base in Ft Pierce, Florida.** Paul Filmer

Left: **Captain Harold Martin and First Officer Kevin Stratton, the flight crew for the author's flight.**

**One of N500MF's Pratt & Whitney PT-6A turbine engines during the cruise over the Caribbean en route to Haiti.** All photos Geoff Jones unless stated



acquired the aircraft as N376AS from the US Forestry Service.

All major checks, loading, cargo/passenger manifests and fuelling were completed the afternoon before the flight. In the dark at 0600hrs I joined Capt Harold Martin and First Officer Kevin Stratton, both with many thousands of hours of DC-3 time, in the MFI hangar at Ft Pierce.

They completed the remaining paperwork, carried out a final aircraft check, drained the fuel and helped the ground crew push the DC-3C-65TP out on to the ramp.

Two passengers – electrical and sound engineers – joined the aircraft, but the flight was considerably below the aircraft's 26,900lb (12,202kg) maximum take-off weight. More than 700 US gallons (2,650 lit) of fuel was loaded.

The pre-take-off brief included a short prayer.

## DEPARTURE

At 0635hrs, with the first glimmer of dawn, the flight departed Ft Pierce for Cap-Haïtien, non-radio under VFR, and the crew immediately spoke to Miami Center (air traffic control) to establish IFR clearance for the flight's track to the southeast and over the Bahamas.

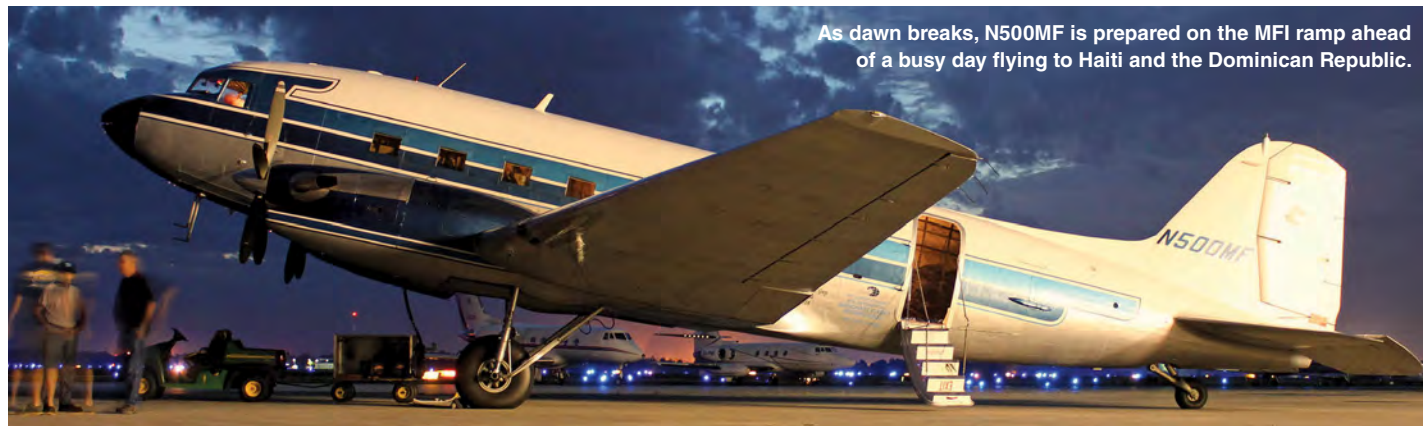
They were given a direct track to the Dunno reporting point at Great Inagua (southern Bahamas) and climbed at more than 1,000fpm (305mpm) to the ascribed FL110 (11,000ft). Indicated airspeed in the cruise was 170kts but ground speed was a tremendous 205kts, thanks to a substantial tail wind.

There is no autopilot fitted to MFI's DC-3C-65TPs so all the flying is by hand. Instruments are a blend of older analogue together with a modern Garmin 530 GPS and Bendix EFIS (electronic flight instrumentation system).

The turbine DC-3 is more economical than the older piston DC-3s, the climb considerably better and the cruise about 30kts faster. It can also carry a greater payload (which will be increased soon by 1,500lb/6,804kg after an MFI-initiated spar modification) and uses cheaper and more widely available Jet A-1 fuel (rather than Avgas).

The old MFI DC-3s used to make an outbound fuel stop at Exuma in the Bahamas, but the turbine DC-3s can easily fly direct from Ft Pierce to Cap-Haïtien or Port-au-Prince with plenty in reserve. Another big difference is the systems management for the PT-6A engines, and the MFI pilots report the DC-3C-65TP as being more pitch-sensitive.

The aircraft uses about 500lb/hr (227kg/hr) of fuel on each engine, which is 75 US gal (284 lit) per side per hour. This means that, ►



**As dawn breaks, N500MF is prepared on the MFI ramp ahead of a busy day flying to Haiti and the Dominican Republic.**

Right: At Barahona the cargo is unloaded and placed on the concrete ramp for a security inspection before being reloaded onto trolleys and hand-wheeled to waiting pick-up trucks.

Centre: Cargo is carried on the right-hand side of the hold, with seating for passengers on the left.

Far right: Pratt & Whitney PT-6A engines were fitted to DC-3C-65TP N500MF (formerly 5Y-BNK and ZS-OBV) in 1991.



including overhaul and repair costs, the DC-3C-65TP costs MFI about \$1,200/hr to run.

The PT-6A engines are far more reliable than the old Wright or Pratt & Whitney pistons, but when they do have to be removed for routine servicing, it can't be done in-house by MFI and is extremely expensive.

Fuel management during the 3hr 20min flight to Cap is important, as although the two piston-era 200 US gal (757 lit) tanks on each side are still installed, an additional 116 US gal (439 lit) tank is fitted behind each engine and it's essential to ensure these aren't overfilled, causing feedback. Fuel can also be cross-fed.

## HAITI

At 0920hrs the pilots transferred radio communication from Miami to Port-au-Prince – and in turn to Cap-Haïtien where they were given the weather and the runway in use, 05. This has been upgraded and lengthened from 4,265ft (1,300m) to 7,500ft (2,286m) since my last visit and there is now a security wall and lighting encircling the airport.

The apron has been enlarged and work is about to start on a new terminal, financial

support for which has come from Venezuela – and the airport has been named Hugo Chávez International Airport after the former Venezuelan president as a thank you gesture.

The pilots shut down on the apron – next to a Sunrise Airways Jetstream 32EP which had just landed from Port-au-Prince – and the passengers, freight and mail were unloaded. An additional 50 US gal (189 lit) of Jet A-1 was taken on board but the flight's departure to Barahona in the Dominican Republic at 1030hrs was delayed by the arrival of a Chilean Air Force C-130 Hercules, there in support of a large contingent of Chilean UN forces providing security for the airport.

The DC-3C-65TP's tremendous rate of climb was put to good use on departure, the aircraft reaching 9,500ft (2,896m) and heading southeast over the mountains. It was then a rapid descent to the coastal airport at Barahona in the southwest of the DR, changing radio calls mid-route from Port-au-Prince to Santo Domingo.

The MFI flight landed at a deserted Barahona at 1125hrs – the only flight of

the day here! With fuel at US\$2.40 per US gallon (allegedly heavily subsidised by Venezuela) the DC-3C-65TP took on a full load after the cargo had been removed by hand. Missionary Flights International flies to Barahona about once a month so it accounts for a significant part of this flight's cargo.

The strong, warm breeze off the Caribbean belied the 95°F (35°C) temperature. At 1220hrs the Turbo Dakota was airborne again, putting its climb ability to the test, heading back north towards Santiago over the 10,000ft-high (3,048m) mountains of Hispaniola's Cordillera Central.

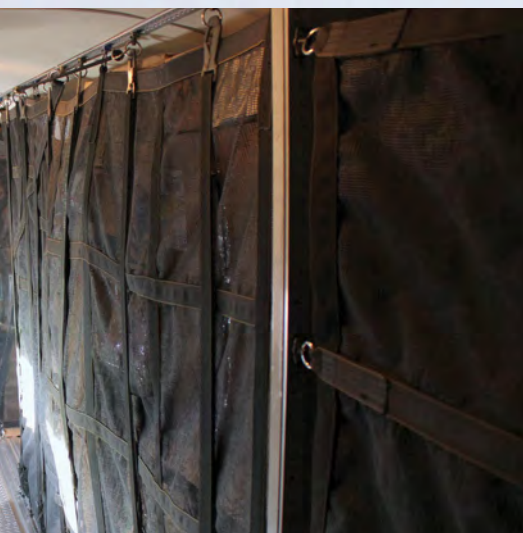
With good weather and little cloud the pilots were able to fly VFR through a pass in the mountains, a thrill for all on board, with the nearby slopes a short distance away on both sides.

## SANTIAGO

Cibao International Airport is a very busy international facility, the flight landing there at 1245hrs on Runway 11 behind a Delta Air Lines Boeing 737-800.

Santiago also took a considerable load of





cargo, unloaded via a mechanical conveyor belt. In stark contrast to Barahona, there was airline, executive jet, general aviation and helicopter traffic coming and going during the turnaround period.

At 1400hrs the DC-3C-65TP backtracked Runway 11 and lined up for the four-hour return flight to Ft Pierce. A circling climb over Santiago took the Turbo Dakota to its cruise level of FL120 in less than 15mins but the crew had to deviate from their track heading of 310° to avoid bad weather over northern DR.

Even at 12,000ft (3,658m) the outside air temperature was 52°F (11°C) and the ground speed came up as 193kts, giving an ETA of 1800hrs at Ft Pierce. The crew relaxed a little as they flew over the azure lagoons of the Bahamas archipelago, taking it in turns for 30-minute sessions in control of the DC-3C-65TP.

Missionary Flights International's crews are checked rigorously by its Chief Pilot, Rik Hallquist – and, with no simulators for the type, have check-rides every six-months that are assessed by FlightSafety of Vero Beach, Florida. Many of MFI's 11 captains will also ▶



## MFI AIRCRAFT

1961-1970	Piper PA-22 Tri-Pacer	N4831A
1964-1972	Riley Twin Navion	N105N
1961	Bellanca Cruisemaster	N6553N (short term use whilst PA-22 u/s)
1967-1979	Beech D-18	N300MF [1], N325D (ex N8069C)
1970-1983	Beech D-18S	N328D (ex N90553)
1970-1972	Cessna 180	N3392D
1972-1978	Beech C-45H	N325D (ex N1772 & 52-10765)
1973-1975	Piper PA-23 Aztec	N4526P
1977-1998	Douglas DC-3 (C-47)	N200MF [1] (ex N66697)
1981-2012	Douglas DC-3 (C-47)	N300MF [2] (ex G-APBC, Skyways) Re-registered N271SE on sale
1984-2015	Douglas DC-3 (C-47)	N400MF (ex N2400) to Alaska
1996-1998	Douglas DC-3 (C-47)	N2401
1996-present	Cessna 310N	N911MF (ex N4180Q)
1998-2002	Douglas DC-3 (C-47)	N200MF [1] (ex N13JA, purchased from Wycliffe Bible Translators). Re-registered N200MX on sale
2003-present	Douglas DC-3-65TP	N200MF [2]
2012-2013	Douglas DC-3-65TP	N467KS (short-term lease)
2010-present	Douglas DC-3-65TP	N500MF (ex N376AS)
2015?	Douglas DC-3-65TP	To become N300MF [3], being refurbished.

*(MFI has used many aircraft and components during its history without owning them, including Bellanca Cruisemasters, three Beech 18s, a Bellanca Viking, two Cessna 310s, a Cessna 172, two S-61 helicopters and a Convair 240. Note: the same registration has been worn by several aircraft)*

Left: After 3hrs 25mins flying, the Turbo Dakota is on short finals to land on Cap-Haïtien's recently rebuilt Runway 05.

Below: Missionary Flights International's DC-3C-65TP N500MF taxis to the ramp at Cap-Haïtien.





Left: Using a conveyor belt, ramp staff unload cargo from N500MF at Santiago in the Dominican Republic.

fly in the right-hand seat and are qualified airframe and/or powerplant mechanics.

At 1730hrs the crew started the descent towards Ft Pierce and soon the Florida coast came into view. With clearance to land on

Runway 10R, the flight touched down at 1758hrs, two minutes ahead of the estimate.

The crew, author and a single passenger, collected in Cap-Haïtien, made a short visit to US Customs and Border Protection and

Below: MFI's other Turbo Dakota, N200MF, at Exuma, Bahamas – which in the days of the organisation's piston Dakotas was a regular fuel stop en route to Haiti.



**The next issue will be on sale on November 19, 2015\***

\*UK scheduled on sale date. Please note that the overseas deliveries are likely to be after this date.



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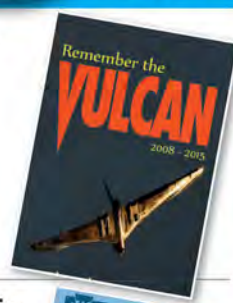


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