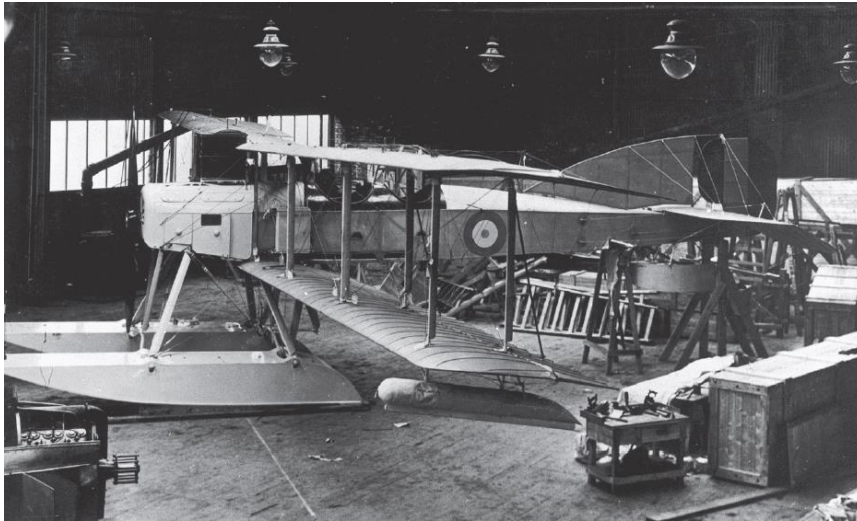


Westland - A Yeovil Centenary

2015 marks the centenary of aircraft construction in Yeovil. The company has its origin with Petters Ltd: Petters were initially famous for their domestic ironware made at the Nautilus Works, and were later well known for their diesel engines.



One of the first 12 aircraft to be built by Westland, a Short 184

- Short 184 seaplane: twelve aircraft, first aircraft delivered January 1916
- Short Admiralty Type 166 seaplane: twenty, first aircraft delivered July 1916
- Sopwith 1½ Strutter: seventy-five, delivery from late 1916
- AIRCO DH4: at least 125 (some sources 140 or 150)
- AIRCO DH9
- AIRCO DH9A
- Vickers Vimy: twenty-five aircraft
- Westland N1b Scout
- Westland Wagtail
- Westland Weasel

Early Westland built aircraft, including the Short 184, Short 166 and 1½ Strutter, were delivered by rail, prior to the establishment of an airfield next to the works, the airfield coming into use in April 1917.

Westland was responsible for the DH9A, which was transformed from the AIRCO DH9 by the use of the American Liberty engine. AIRCO would normally have carried out this development, but were too busy with contracts for the DH10. At least 350 DH9A were built by Westland.

The fact that Westland held contracts for DH9A production, development and repair, (and was subsequently to develop the type into the highly successful Wapiti), protected the company from the worst of the lean years after the First World War. Even so, the company did find it necessary to produce products for other markets, leading, for example, to the production of relatively small numbers of Westland-built pianos.

The company built 8 examples of the Westland Limousine in three variants, the type being intended for

Petters' aviation department was formed in 1915 by the Petter twins - Percy and Ernest. At the time aircraft construction in Britain was expanding rapidly to meet the needs of the First World War. The aircraft department was styled Westland Aircraft Works (Branch of Petters Ltd), with telegraphic address 'Aircraft', Yeovil. The company built a variety of types during the First World War including the following:



Westland were responsible for the DH9A, a Westland-built example being seen here in front of the 'Vimy hangar' at Yeovil

the commercial market.

Westland developed the DH9A into the Wapiti - the quintessential long serving (and unglamorous) general purpose aircraft of the inter-war years. The Wapiti prototype J8495 was first flown on 7 March 1927, the main production variant being the Wapiti IIA, 413 of which were built for the RAF.



The last surviving Westland Wapiti is preserved in the Indian Air Force Museum at Palam, near Delhi

In 1930 Westland was advertising: 'The Wapiti general purpose two-seater. Wherever Service aircraft are called upon to operate under arduous conditions; where reliability and performance are vital factors - over the arid wastes of Iraq and Arabia; above Indian jungles; across the African veldt and Australian desert - the WESTLAND WAPITI is the standard chosen by the Air Forces both at home and abroad. This was nothing less than a true reflection of the operational use and value of this robust machine.

The Wallace was a refined development of the Wapiti,

which first flew, as the Westland PV6 K3488/P6, on 31 October 1931 (the prototype being a converted Wapiti V).

The PV6 (as G-ACBR) was used as the back-up aircraft to the Westland-Houston PV3 G-ACAZ, which made the first flight over Mount Everest on 3 April 1933.

Wallace production comprised a mix of new-build aircraft and Wapiti conversions.

Westland's only entry into the private aircraft market to reach production status was with the Widgeon. The 1096 cc Blackburn Thrush-powered

Widgeon I first flew at Yeovil on 22

September 1924. The type was a parasol monoplane with folding wings of 'lozenge' planform with pronounced compound taper, a feature subsequently adopted on the Lysander. The Widgeon II G-EBJT was powered by a 60 hp Genet I engine and was a re-built version of the Widgeon I. This proved to be a wholly practical machine and pointed the way to the Widgeon III, which was placed in full production.

The Widgeon III featured revised fuselage lines and a conventional constant chord wing planform. The Widgeon III was fitted with a number of engine types and production comprised the prototype Widgeon I (subsequently converted to Widgeon II), a prototype Widgeon III, and twenty-five production machines.



Westland Wallace fuselage on display at the RAF Museum, Hendon.

The Westland IV civil airliner was a wooden passenger transport powered by three Cirrus III engines. The prototype, later to be registered G-EBXK, flew at Yeovil on 22 February 1929. The second machine G-AAGW featured Cirrus Hermes engines and introduced metal construction for the rear fuselage. The Westland IV was followed just over a year later by the more powerful Genet Major powered Wessex, which flew in May 1930.



The Westland IV civil transport



Pterodactyl 1a J8067 is displayed in the Science Museum, London

A notable, though ultimately unsuccessful, venture was the series of striking Pterodactyl tailless aircraft. These aircraft were originated by Professor GTR Hill, the first aircraft being flown as a glider by the then Capt. Hill in 1924, and as a powered aircraft (Pterodactyl 1a J8067) at Farnborough, Hampshire on 3 December 1925. Capt. Hill joined Westland in 1928, Westland taking over the subsequent development of the Westland-Hill Pterodactyl in its various forms.

The Pterodactyl Mk IV was a Gipsy III powered, three seater, which was used to develop the control system for the type and proved to be remarkably successful. During its test

programme, this model performed aerobatics and was extensively spun. The final Pterodactyl was the large and powerful Mk V K2770, which was flown at Andover in May 1934. This ambitious type was intended as a fighter, which would have mounted a rear turret exploiting an exceptionally large field of fire. The Pterodactyl Mk V was regarded as being comparable in performance to in-service designs such as the Hawker Demon.

Westland had an early involvement in rotating wing aircraft with the construction of two autogiros, the Cierva C.29, and the CL.20. The C.29 was unsuccessful due to ground resonance and vibration, and was not flown. The CL.20 (C for Cierva and L for Lepère) was a two seat cabin machine powered by the 90 hp Pobjoy Niagara S.

Like many other companies in the industry, Westland built a number of unsuccessful prototypes during the inter-war years. These types are not discussed further in this article:

In addition to its own designs, Westland built all 178 Hawker Hector Army co-operation type as an Audax replacement for the RAF. The company also built 43 Audax. During 1935 Westland Aircraft Works separated from Petters Ltd, becoming Westland Aircraft Ltd on 4 July 1935.

Westland Aircraft Ltd came into being just before the expansion schemes prior to the Second World War. Wartime products such as the Lysander, Spitfire and Seafire, dominate the company's subsequent history, prior to the post-war decision to focus on helicopter production.

Westland's most famous product, the Lysander, was first flown (K6127) at Boscombe Down on 15 June 1936. The type was used for Army co-operation, target towing and (most famously) for special duties (the delivery and collection of SOE personnel to and from occupied Europe). The 1947 edition of *Jane's All the World's Aircraft* indicates Westland production of 1,426 Lysander, suggesting a production total of 1,651 aircraft, including the 225 built in Canada. Seventeen of the UK total were built in the Westland works at Doncaster, which were subsequently used as a repair organisation for Westland built aircraft.



A spirited display by the Lysander preserved at the Shuttleworth Trust, Old Warden.



Westland Whirlwind assembly line

The Westland Whirlwind was a twin engine, four cannon, fighter designed to meet specification F.37/35, and was first flown (L6844) on 11 October 1938, also at Boscombe Down. The Whirlwind was hampered by its under-developed Peregrine engines; production was limited to 114 aircraft plus the two prototypes. Operationally, the aircraft was found to be restricted by relatively poor endurance and performance at altitude, despite it being an excellent, heavily armed gun platform. As a result it was mainly used for convoy escort patrols

The last of Westland's wartime designs was the Welkin, which was intended for use as a high altitude interceptor against

specification F.4/40, having been selected for production in preference to the Vickers Type 432. The Welkin was a large aircraft with 70 ft wing span and an armament of four 20 mm cannon. The first prototype, DG558/G, was first flown at Yeovil on 1 November 1942. A total of 101 Welkin production aircraft were built, but the type never entered service, with most aircraft being delivered to storage and eventually scrapped. The last twenty-six Welkin were delivered without engines. A single Welkin II night fighter prototype PF370 was built, being flown on 23 October 1944. Work on the pressure cabin for the Welkin led to the formation of Normalair Ltd, this company being registered on 15 March 1946.

Westland's wartime contracts included the construction of 685 Spitfire (Mk IB, VB and VC), and eighteen Fairey Barracuda. Westland was also the major manufacturer of the Seafire. The total



Supermarine Seafire (foreground) and Westland Welkin (background)

Seafire production figures were made up of fourteen prototypes, 538 Spitfire conversions, and 2,094 new-build aircraft. Of these, Westland was responsible for 1,376 new build aircraft and 110 Spitfire VC conversions to Seafire IIC.



The imposing Westland Wyvern strike aircraft

The last Westland fixed wing design was the troublesome Wyvern. This impressive, not to say imposing, naval strike aircraft suffered a protracted seven years of development involving sixteen prototypes. Wyvern development testing was carried out at Merryfield as well as at Yeovil. The production aircraft served with the Fleet Air Arm for only four years. Wyvern production (including prototypes and pre-series aircraft) comprised a total of 127 aircraft.

The troubled development of the Wyvern marked a period of transition for Westland; initial license production of Sikorsky helicopters followed an agreement concluded on 10 January 1947.

During the immediate post-war period, Westland decided to enter the field of helicopter manufacture, initially on the basis of the licence production, and subsequent development, of established Sikorsky products. The main Westland helicopter products that were flown during the period prior to the reorganisation of the industry in 1960 are listed below:



Westland Dragonfly (left) and Widgeon (right)

Westland Dragonfly: The Sikorsky S-51 produced as WS-51 Dragonfly, powered by Alvis Leonides or Pratt & Whitney Wasp Junior. 133 were built, plus six supplied by Sikorsky as part of the licence agreement. The first WS-51 G-AKTW flew on 5 October 1948.

Widgeon: A civil derivative of the Dragonfly with revised cabin arrangements. The Widgeon made use of a Whirlwind rotor head to provide an extended centre of gravity range. The prototype G-ALIK was first flown on 23 August 1955, 15 were built, three of which were conversions from the WS-51 Dragonfly.

Whirlwind: A licence-built Sikorsky S-55 produced with various engines, including Leonides Major piston engine and Gnome gas turbine. The first Westland built WS-55 G-AMJT was flown in November 1952. Some 296 Whirlwind were built for the UK armed services in nine different marks, the most important versions being the HAS.7 (129), and HAR.10 (68). A total of sixty-eight civil WS-55 were built in three versions, with additional conversions of ex-military machines. Total production exceeded 400 machines. The last RAF Whirlwind was retired from service on 30 November 1981.



Westland Whirlwind displaying at Cranfield, Beds



Wessex HC2 XT603 seen visiting Farnborough

Wessex: The Wessex was derived from the Sikorsky S-58 and converted to turbine power with either a single Napier Gazelle, or two Gnome turbo-shafts. The Sikorsky built S-58 (HSS-1N) pattern aircraft XL722 was re-engined with Napier Gazelle and flown on 17 May 1957. The Westland-built pre-production prototype XL727 first flew on 20 June 1958. 382 Wessex were built, the most important versions being the Mk 1 (128), Mk 2 (74) and Mk5 (101). The first coupled-Gnome Wessex was flown on 18 January 1962.

In 1960, there was complete rationalisation across the aircraft industry, leading to the formation of Hawker Siddeley Aviation and the British Aircraft Corporation. The mergers extended to the helicopter sector and resulted in Westland becoming the sole British helicopter manufacturer, taking over the rotorcraft interests of Saunders Roe, Bristol and Fairey Aviation.

Saunders-Roe Ltd was purchased by Westland in 1959. On 23 March 1960, the Bristol Helicopter Division was acquired, followed on 2 May 1960 by the aviation interests of Fairey. Westland Helicopters Ltd was formed when the company reorganised on 1 October 1966,

The post-merger products of the company are summarised below, starting with the Scout and Wasp, which originated with Saunders-Roe.



Westland Scout (left) and Wasp (right)

Scout: The Scout was a general purpose light helicopter for the Army which was derived, like the Wasp, from the Saunders-Roe P.531. The Scout prototypes were G-APVL and G-APVM. The Westland-built, Nimbus powered, G-APVL (later XP166) was flown on 9 August 1959, followed by Gnome powered G-APVM (later XR493) on 3 May 1960. The first pre-production Scout AH.1 XP165 was flown at White Waltham on 4 August 1960. Eight development aircraft and 141 production machines were built at Hayes for UK service, with limited additional aircraft exported.

Wasp: The Wasp is a naval small ship observation and anti-submarine helicopter developed from Saunders-Roe P.531. The first P.531 prototype G-APNU was flown at Eastleigh, Hants on 20 July 1958. The naval development aircraft were XN332, XN333 and XN334. The first Wasp HAS1 XS463 was flown at White Waltham on 28 October 1962. The two pre-production aircraft (XS463 and XS476) were followed by ninety-eight production machines built for the Royal Navy at Hayes, with aircraft exported to Brazil, The Netherlands, New Zealand, South Africa and Indonesia.



Westland Sea King (Left) and Commando (Right)

Sea King: The Sea King continued very successfully, the Westland history of licence production and further development of Sikorsky designs. The type is an anti-submarine, search and rescue, troop transport and early warning helicopter adapted from the Sikorsky SH-3. A pattern aircraft, XV370, was imported from Sikorsky, followed by four aircraft in component form. XV370 was first flown from Avonmouth Docks on 8 September 1967, following its shipment from the USA.

Westland production began with XV642, first flown on 7 May 1969. Throughout its Westland production run, the Sea King has been substantially developed and grown in capability and maximum all up weight. Some 328 examples of all marks have been built; many for export customers that include Australia, Belgium, Egypt, Germany, India, Norway, Pakistan, and Qatar. The first Commando troop transport variant G-17-1 flew on 12 September 1973; about eighty have been built, half of which have been exported. Production came to an end in 1966.

The 1970s saw a successful collaboration with the French on the Lynx, Puma and Gazelle helicopters, all of which were to enter UK service.



The agile Lynx in its Army (left) and Navy (right) configurations

Lynx: the Westland Lynx was developed as a highly manoeuvrable replacement for the Scout and Wasp. It introduced new technologies, including a semi-rigid rotor head that benefitted from the skills of the Fairey concern in dynamic analysis, together with a low profile gearbox using conformal gears and an elegant integrated flight control arrangement benefitting from the designs originating with Raoul Hafner at Bristols. The Army and naval variants share common dynamic systems, and many airframe components. The Lynx was produced in collaboration with Aerospatiale (70% Westland, 30% Aerospatiale), and the first of thirteen development aircraft flew on 21 March 1971. A total of more than 380 had been sold by mid-1995, the type being particularly successful in the small ship role. Export customers have included Brazil, Portugal, South Korea, West Germany, Nigeria, The Netherlands, Denmark, France, Norway, Qatar and Argentina.



The unsuccessful Lynx 3

Lynx developments included the single Gem 60 powered Lynx 3 ZE477 (first flown on 14 June 1984), which failed to enter production. The Super Lynx featured a glass cockpit and introduced the CTS800 engine. The current production Wildcat represents further significant development along the same lines (see below).

Gazelle: The Gazelle was developed from the Sud Aviation SA340 and is readily identified by its use of a fenestron tailrotor integrated within the fin structure. Used in the military training, communications and observation role, UK aircraft were built by Westland as part of the Anglo-French helicopter agreement. 262 were built for all three of the UK Armed Services, with a limited number of civil machines. The main user was the Army with 197 Gazelle AH.1.



A Royal Navy Gazelle photographed on the airfield at Yeovil



RAF Puma HC Mk 1 ZA938

Puma: The SA330 Puma medium transport helicopter was, designed by Sud Aviation / Aerospatiale. As part of the Anglo-French helicopter agreement, Westland built Puma components and assembled 48 aircraft for the RAF at Hayes. These aircraft were moved by road to Yeovil for flight testing. The first production Puma HC Mk 1 XW198 flew for the first time on 25 November 1970. The Puma was extremely successful well over 600 being built in France. The type was subsequently developed into the Eurocopter Super Puma and Cougar, which have been sold world-wide in both civil and military roles.

Westland 30: The Westland WG30 achieved limited success in the civil transport helicopter market, with a design based upon use of the Lynx dynamic system. Forty aircraft were built, the prototype G-BGHF flying on 10 April 1979. The prototype was followed by an additional development aircraft, twelve WG30 Srs 100, twenty-four uprated Srs 100-60, a single GE CT7-powered Srs 200 G-ELEC, and a single prototype of the heavier Srs 300, which featured a five bladed main rotor.



Westland 30 N13WG photographed at Yeovil



Royal Air Force Merlin HC.3A ZJ994

EH101 Merlin: The Merlin is a three engine anti-submarine and military and civil transport helicopter developed jointly with Agusta of Italy. The prototype EH101 first flew at Yeovil on 9 October 1987. Production commitments to date include a total of nine prototypes, forty-four Royal Navy Merlin, twenty-two Merlin HC.3 RAF utility transports (plus six HC.3A procured from Denmark), sixteen for Italy (with eight options), and fifteen Cormorant search and rescue aircraft for Canada. The first production Merlin ZH821 flew on 7 December 1995.

In September 2001, it was announced that Denmark had also selected the EH101 to meet its requirements for SAR and troop transport, ordering fourteen aircraft. This order was

followed in December 2001 by the announcement of a further twelve aircraft ordered by Portugal for use in SAR and fishery protection roles. In January 2002, the Italian government exercised four of their options, with their requirement standing at eight ASV, four AEW, four Utility, and four amphibious support, with four further options remaining. Norway has ordered 16 for search and rescue duties, with a further six options. The type was selected as the US Presidential transport helicopter, this order being subsequently cancelled.

The Westland Lynx demonstrator G-LYNX was used to break the world helicopter speed record on 11 August 1986, achieving a speed of 249.09 mph. This remarkable speed was achieved using BERP blades, Gem 60 engines, and reduced area rearward-facing exhausts to give a degree of residual jet thrust, which allowed the full thermodynamic performance of the engines to be exploited, without exceeding the main gearbox torque limits. The airframe was subjected to careful drag reduction measures, a larger low set tailplane was fitted and local strengthening of the tail cone was required.



G-Lynx photographed during the speed record flight



An AH-64D Apache at Middle Wallop

WAH-64 Apache: The company's next production design is an anglicised Boeing Apache - the WAH-64 - with RTM322 engines and other adaptations, sixty-seven having been ordered on 13 July 1995 to meet the British Army attack helicopter requirement.

The first eight were initially flown at Mesa, Arizona, the remainder being assembled from kits by WHL. The first Boeing assembled aircraft was delivered in April 2000, with the first Westland assembled machine, ZJ172, being flown for the first time on 18 July 2000.

Twelve Apache are allocated to each of four squadrons, with the remaining nineteen allocated either to training or as attrition reserve. The Apache AH. Mk 1 achieved its Release to Service (with nine aircraft operational) on 16 January 2001 and has seen extensive operational service in Afghanistan.

Following the 'Westland Affair' of 1985 / 86, Sikorsky took a shareholding in the company. Attempts to market the Sikorsky Black Hawk as the WS-70 were unsuccessful. WHL acquired a WS-70 demonstrator ZG468/G-RRTM, which was first flown on 1 April 1987, it being reported as having been sold to Bahrain in the spring of 1996.

In addition to the helicopter activities outlined above, the company is an important supplier of aerospace components to the industry at large. Westland Aerospace has manufacturing facilities at Yeovil and Cowes. The Yeovil group has manufactured Saab 2000 rear fuselage structures and propulsion system packages (consisting of nacelle, engine mounting and internal fittings), and engine nacelles for the Saab 340B, Bombardier Dash 8 (more than 400 ship sets), Dornier 328 and Jetstream 41.

GKN plc purchased Westland in 1994 to create GKN Westland Helicopters Ltd. In April 1998, it was announced that GKN plc and Finmeccanica SpA of Italy had signed a memorandum of understanding to negotiate arrangements for the combination of their helicopter interests, GKN Westland Helicopter Limited and Agusta. At the 2000 SBAC Show, the company announced management arrangements for the merged company, to be known as AgustaWestland. The merged company became operational



on 21 February 2001. On 26 May 2004, GKN announced the sale of its 50% share in AgustaWestland to Finmeccanica, the company then becoming 100% Italian-owned.

The combination of these two companies was perhaps a natural consequence of their collaboration and division of workshare on the EH101 / Merlin programme. It also mirrored the consolidation elsewhere in Europe, with Aerospatiale and MBB combining their helicopter interests to form Eurocopter.

AgustaWestland has a 32% share in the successful NH90 programme

Agusta brought a significant civil product portfolio arising from its highly successful Agusta 109 family. It also brought a share in the European NH90 programme, which had been a key component in deliberations around the Westland Affair. In 1986, Westland was an active participant in the NH90 programme with a very active participation in its Feasibility and Pre-Definition Study. (The author was a member of the NH90 Configuration Team). Somewhat ironically, Westland had a very significant influence on the NH90 design, prior to the UK Government withdrawing from the programme after the Westland Affair. AgustaWestland now has a 32% share in the NH90 programme.

With Agusta's extensive experience in the civil market, AgustaWestland developed a family of attractive commercial machines, the AW139, the smaller AW169, and the larger AW149 and AW189. These aircraft have sold well in corporate, offshore and search and rescue roles. The AW149 is aimed at military users, with the AW189 being its civil equivalent.



The attractive AW139 and AW189 civil helicopters

In the military field, the company is currently developing the AW159 Wildcat. This is an improved version of the T-800-powered Westland Super Lynx and has been ordered as a Lynx replacement by both the Royal Navy and the Army Air Corps. The first aircraft flew in November 2009 and a total of some 66 aircraft are on order for the UK services. Eight additional aircraft are to be supplied to the South Korean Navy.



The AW159 Wildcat is coming off the Yeovil production line. This aircraft was photographed on the approach to nearby RNAS Yeovilton.

The Wildcat, whilst resembling a Lynx with a new diamond cross-section tail cone and a WG-30-style tailplane and fins, is extensively redesigned with a new gearbox, revised nose structure, new tail rotor, improved avionics and cockpit displays and many other changes. The exhausts of the twin LHTEC CTS-800 engines are directed upward to reduce the aircraft's infra-red signature.

Westland has the distinction of being the oldest aerospace company that is still producing aircraft on its original factory site. It has brought employment, high technical skills and prosperity to the Yeovil area. Its centenary is well worthy of celebration!

Acknowledgement: *The black and white photographs used in this article up to and including the Westland Widgeon are copyright AgustaWestland. Permission for their use is gratefully acknowledged. Remaining photographs are Copyright Ron Smith.*