

# 100

WESTLAND 1915-2015



**AgustaWestland**

A Finmeccanica Company

# WORLD WAR I: THE BEGINNING

## From Petters Ltd to Westland Aircraft Works

- Established in Yeovil in 1865, JB Petter & Sons expanded their thriving ironmongery and engineering business on various sites in Yeovil, producing 1500 agricultural oil engines per year sold worldwide.
- In 1910 Petters Ltd was founded and a new foundry was established on a site west of Yeovil.
- James Petter's twin sons Percival and Ernest had a flair for engineering and with Ben Jacobs, another talented engineer, designed an early car called the 'Horseless Carriage' and also designed experimental forms of transportation including a flying bicycle.
- In 1915 the Petter brothers made the decision to offer their company's manufacturing resources to the Government to help the war effort and the Admiralty contracted them to build Short 184 seaplanes under licence.
- Thus 'Westland Aircraft Works' was officially formed as a branch of Petters Ltd, beginning one hundred years of aviation history.



## Our People

- Women played an important part in Westland's origins as they did in many other industrial trades at this time.
- The First World War was a catalyst for women's roles in the workplace, which signified part of the vast cultural shift that would take place during the early 20th century.
- Women workers manufactured munitions at the Reckleford site and constructed aircraft at the Westland Aircraft Works.
- Local skills, developed from Yeovil's gloving and engineering industries, were used to build the wooden frames and stitch the fabric coverings of Westland's early aircraft.



THE PETTER BROTHERS OFFERED TO DEVOTE THEIR ENTIRE CAPABILITY TO THE WAR EFFORT, AND WERE PROMPTLY AWARDED A CONTRACT FROM THE ADMIRALTY TO PRODUCE SHORT TYPE 184 SEAPLANES.

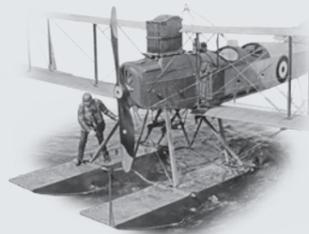
## Westland's first aircraft, Short 184 Seaplane



- Designed by Short Brothers Ltd as a torpedo-carrying seaplane, the Short 184 was the first aircraft to be built at Westland Aircraft Works.
- The aircraft's structure was typical of the period; a wire-braced, wooden box frame with the fuselage and wings covered in fabric.
- Production of the Short 184 began in July 1915. Westland employees visited Short Brothers Ltd in order to produce their own construction drawings.



- The first aircraft was completed in December 1915 and delivered on the 1st January 1916.
- It was dismantled and taken by horse and cart to Yeovil Junction from where it went by rail to the River Hamble for testing.



## Sopwith 1½ Strutter



Westland built 125 of these well-established fighter bomber aircraft under licence for the Royal Naval Air Service and the Royal Flying Corps.

## Airco DH4



Westland was contracted in 1917 to build 175 of this two-seat Airco day bomber.

## Westland N.1B



This was the first Westland-designed aircraft, later abandoned with the adoption of wheeled aircraft for shipborne operation.

## Airco DH9A



400 of these single-engine light bombers were built between 1917 and 1918 by Westland, improving on the design of earlier versions.

## Vickers Vimy

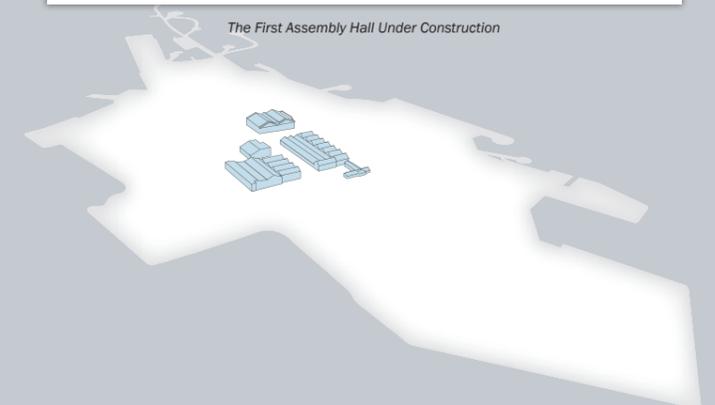


This heavy bomber was in service with the RAF at the end of the First World War and after. A total of 25 of these famous, large twin-engined aircraft were built at Yeovil.

## EVOLUTION OF THE WESTLAND SITE



The First Assembly Hall Under Construction



- A workers' village called 'Westland' (a name chosen by Mrs Percival Petter) was designed but never completed due to the outbreak of the First World War, upon which the site became the Westland Aircraft Works.
- Sir Ernest Petter later described the opening of the site in 1915 in a Petters Newsletter: '...three men walked down to the corner of a field outside Yeovil where there was a small farm hut. One of the three - the author of this little story - opened the door of the hut and solemnly said, "This is the Westland Aircraft Works."' Undoubtedly he had remembered the name Percival's wife had chosen for the proposed workers' village.
- The site expanded as different types of aircraft were built. A new hangar was built to accommodate the construction of Vickers Vimy bombers - at the time, the building had the largest unsupported span in Britain.
- The airfield was prepared in 1918 after ancient farmland had been levelled.

## Oil Engines & Other Products



- Whilst Petters Ltd had cultivated the essential skills needed to launch Westland Aircraft Works, their agricultural oil engine business continued to thrive.
- Petter engines were used to power agricultural machinery all over the world.
- The company also built products such as fireplaces, animal feed crushers and mechanical calculators.
- Queen Victoria had the Nautilus Grate installed in fireplaces at Osborne House and Balmoral Castle.
- After various reorganisations and mergers, Petters Ltd still makes engines today under the ListerPetter name.

1910

Work begins on future 'Westland' site.

1914

First World War is declared.

1915

Westland Aircraft Works founded.



Short 184



Short 186

1916

First Westland-built aircraft delivered.



Sopwith 1½ Strutter



Airco DH-4

1917

14,000 Petter oil engines sold.



Airco DH-9



Airco DH-9A



Westland N.1B



Vickers Vimy

1918

Over 1000 aircraft built in three years to support the war effort.

# THE INTERWAR AND EXPERIMENTAL AGE

## Westland Turns to Civil Enterprises...

- The demand for military aircraft sharply decreased after the war, so Westland began to design civil aircraft.
- Flying was still a dangerous activity, as the war had hastened aircraft development by necessity. Designers and engineers could now focus on improving the safety and airworthiness of their aircraft.
- Civil luxury was sought after in the aircraft of the interwar period, advancing the designs of enclosed cockpits, passenger cabins and pushing aircraft to look sleeker, fly higher and go faster.

## Our People

### The Pilots

#### Captain Arthur Stuart Keep, MC 1891 – 1952

- Arthur Keep joined Westland in 1919 as an Air Ministry Test Pilot after service in the British Army and Royal Flying Corps.
- In 1920 Keep piloted the six-seat Limousine in an Air Ministry competition for civil aircraft. During the flight he entered the cabin to smoke and talk with the passengers, alarming them, but the stability of the aircraft enabled the flight to continue and first prize was won.
- Tragically, Keep lost both legs in the 1924 crash of the cantilever-winged Dreadnought, though his life was saved by company nurse Sister Thomas. The incident led to Westland installing a more powerful wind tunnel to improve aerodynamic accuracy.
- Keep later became Works Manager and ensured Westland came through the lean interwar years.



#### Harald Penrose, OBE 1904 – 1996

- Joined Westland as a Management Trainee, learning to fly with the RAF Volunteer Reserves.
- Penrose was appointed Chief Test Pilot in 1931 and held the position until 1953 through the transition from biplane to jet.
- He received an OBE in 1946 for his wartime test-flying.
- Penrose died in 1996, having completed 5,500 flying hours on 309 aircraft types.



Arthur Davenport, Harald Penrose and Robert Bruce photographed prior to the 1933 Mount Everest Expedition

### The Designer

#### Arthur Davenport, FRAeS 1891 – 1976

- Davenport was recruited from Petters Ltd as Chief Draughtsman.
- He was sent to Sheerness to learn how to make the Short 184 by producing his own drawings and was appointed Chief Designer in 1919.
- Davenport led the collaboration with Cierva during the 1930s, producing the C.29 and CL-20 autogiros, which contributed to the transition to rotary wing aircraft.

### The Manager

#### Robert Bruce, OBE 1869 - 1948

- As a Lieutenant in the Royal Navy Volunteer Reserve (RNVR) with experience of aircraft manufacture, Bruce was serving as an Admiralty inspector at Sopwith Aviation Company when Percy Petter personally requested his release to take up the role of Manager at Westland Aircraft Works.
- Bruce designed and oversaw many original aircraft during his time at Westland.
- Bruce continued as a consultant for some years after retiring as Managing Director in 1934.

## First Over Everest



- In 1933 a Westland aircraft became the first to fly over Mount Everest.
- The Houston Mount Everest Expedition aimed to prove that a British aircraft with a British crew could fly over the highest point on earth and use the opportunity to contribute to scientific knowledge by photographing inaccessible and dangerous terrain.
- Two aircraft, PV.3 Houston-Westland and PV.6 Houston-Wallace, were essentially extensively modified Wapitis, altered to cope with the severe conditions.
- The Expedition consisted of Auxiliary Air Force pilots Douglas Douglas-Hamilton, Lord Clydesdale and Flight Lieutenant David McIntyre, with observers Colonel L V S Blacker and S R Bonnett (cinematographer with the Gaumont British News).
- The first flight successfully achieved the summit and a second flight, against orders, achieved the Expedition's scientific goals.



The aircraft was named Houston-Westland to honour Lady Lucy Houston who financed the expedition

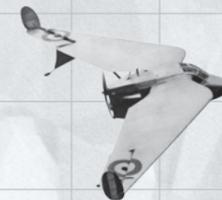
UNKNOWN TO THE EXPEDITION LEADER, PILOTS CLYDESDALE AND MCINTYRE FLEW A SECOND MISSION TO RETAKE PHOTOGRAPHS LOST DUE TO A FAULTY CAMERA

### Westland Widgeon



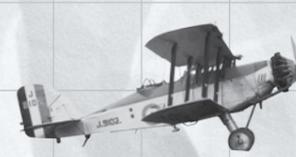
This was the first parasol-wing monoplane built by Westland, and proved popular amongst affluent private owners, achieving success on the sporting scene.

### Westland Pterodactyl



The Pterodactyl was a uniquely tailless monoplane with a distinctive wing shape. An example of a Pterodactyl 1A is now preserved in the Science Museum in London.

### Westland Wapiti

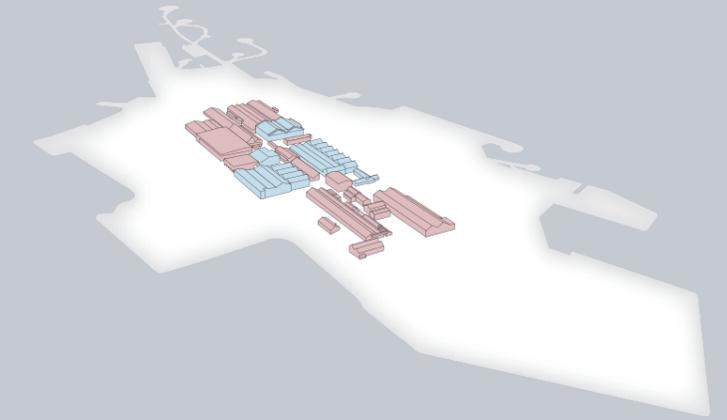


558 of these biplanes were built predominantly for the RAF. The large orders heralded an era of prosperity for Westland and saw the company through the difficult interwar period.

## EVOLUTION OF THE WESTLAND SITE



Petters Ltd and Westland Aircraft Works



- From 1935 Westland Aircraft Ltd took over workshops previously occupied by Petters Ltd.
- A new boiler house and wing shop were constructed, the Wing Doping Shop was modernised and the Rib Department expanded.
- The main assembly hall was built in 1938 to accommodate the construction of Lysanders and Whirlwind fighters. It is still in use today as Building 115, known as the In-Service Support & Flight Facility.

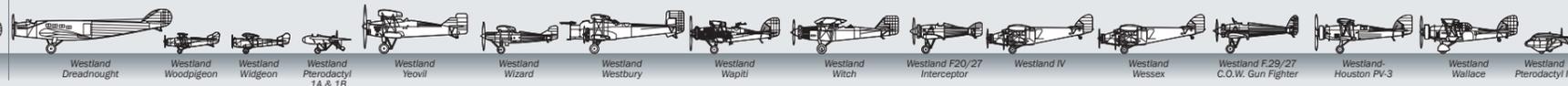
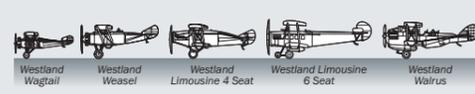
## Pianolas & Other Products



- Westland also manufactured products such as milk churns, pianolas and lightbulbs, diversifying their product range during the uncertain interwar years and using their engineering skill base to stay in business when aircraft orders were scarce.

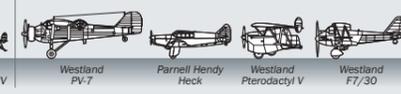
## 1923

As early as 1923, Westland Aircraft Works was approached by Cierva to collaborate on a rotary wing design.



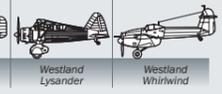
## 1933

A Westland aircraft is the first to fly over Mount Everest.



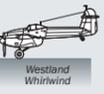
## 1935

Westland Aircraft Ltd was formed, breaking away from Petters Ltd.



## 1938

Main Assembly Hall is built to construct Whirlwind fighters and Lysanders.



# WORLD WAR II: WARTIME PRODUCTION

## Westland's Wartime Production

- During World War II, Westland and its dispersal sites were wholly concerned with aircraft production, unlike the previous war in which munitions had also been manufactured.
- The Supermarine factory at Southampton was destroyed by the Luftwaffe in 1940, crippling production of the Spitfire. Westland became a major centre for Spitfire and Seafire manufacture and repair, with over 2000 of these aircraft passing along the production lines and many more being repaired.
- The majority of staff effort focused on the production and development of the Seafire, although work continued on the Westland Whirlwind, Lysander and Welkin.

## Our People

### The Home Guard



- Westland had its own company of the Home Guard within the 3rd (Yeovil) Somerset Battalion.
- Made up from volunteer employees, the 'Local Defence Volunteers' were given uniforms and weapons. They patrolled the local area for signs of enemy activity and protected the airfield.
- On 6th June 1944, D-Day, the Westland Home Guard were ordered to turn up to work in full battle dress. Employees must have been slightly concerned to see hand grenades and light machine guns brought into the offices!

### W.E.W. 'Teddy' Petter, CBE 1908 - 1968

- Teddy Petter, the son of Sir Ernest, was appointed Technical Director in 1935.
- He designed two of Westland's most famous aircraft, the Lysander and the Whirlwind.
- He also went on to lead the design team of the English Electric Canberra when he took up the post of Chief Engineer with that company. He also went on to design the English Electric Lightning, a supersonic jet fighter which was the first aircraft in RAF Service capable of sustained supersonic flight.



## The Westland Lysander: Vive la Résistance!



THE LYSANDER WAS THE LARGEST AND LONGEST RUNNING PRODUCTION PROGRAMME FOR ANY FIXED WING WESTLAND DESIGNED AIRCRAFT

- The Westland Lysander was perhaps most famous for its short take-off and landing capabilities, which were put to use by Nos. 138, 161 and 357 Special Duties Squadrons. The Special Operations Executive used the Lysander for the high risk drop and retrieval of agents or stranded Allied aircrew in France.
- The French Résistance would make a prearranged signal to the Lysander if it was safe to land.
- Operations were conducted near a full moon with the Lysanders painted matt black.

## The Aircraft of World War II

### Spitfire



- Westland Whirlwind: Developed as Britain's first heavily-armed fighter, the Whirlwind was designed for maximum speed, efficiency and manoeuvrability. The 'Pride of Yeovil' was a Westland Whirlwind fighter, paid for by the people of Yeovil in a scheme similar to that of war bonds. Serial number P7056, it saw service with the RAF in 263 and 137 Squadrons.
- Supermarine Spitfire: Westland produced 685 of these iconic aircraft after the Supermarine factory was bombed.
- Supermarine Seafire: The naval variant of the Spitfire. Westland became the prime contractor with design authority for all Seafires with Merlin engines, and also the design of the wing-folding mechanism. 1372 of these aircraft were built by Westland.
- Westland Wyvern: Design of the last fixed wing aircraft by Westland started in April 1944. With contra-rotating propellers, the Wyvern was a carrier-based aircraft designed as a strike fighter. It served with the Royal Navy until 1958.

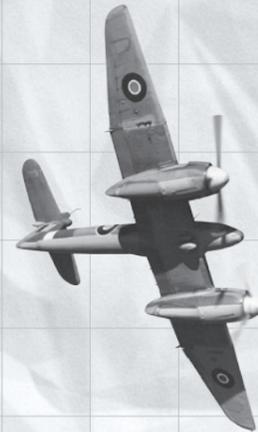
### Seafire



- The first Westland-built Spitfire flew in July 1941 and production continued as part of the company's main wartime activity.

DURING PEAK PRODUCTION 20 AIRCRAFT A WEEK WERE BEING PRODUCED.

## Westland Whirlwind



The Whirlwind was a twin engine fighter with minimal frontal area, a slender fuselage and streamlined nacelles for maximum speed, efficiency and manoeuvrability.

## Westland Welkin

As the war progressed, attacks from high altitude bombers became a major problem. To combat this Specification F 4/40 was drawn up calling for a suitable fighter, capable of operating up to 40,000ft.



## Fairey Barracuda



Westland was expected to take a major role in the production of Barracudas, however the total was reduced from an initial order of 250 to 18 as the Spitfire and Seafire production lines took priority.

## Westland Wyvern

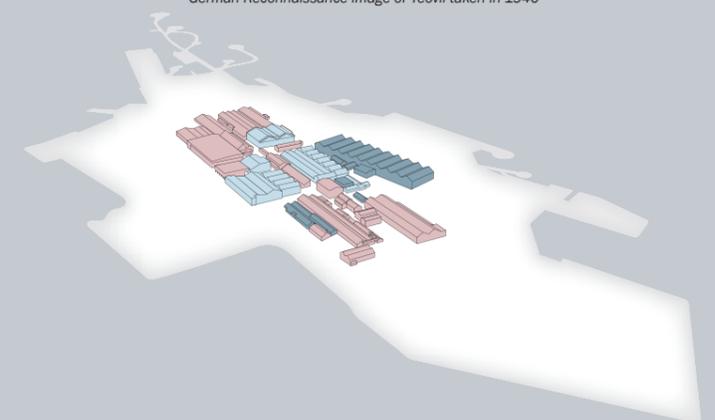


This was the last fixed wing aeroplane to be produced by Westland before the transition to Rotorcraft.

## EVOLUTION OF THE WESTLAND SITE



German Reconnaissance image of Yeovil taken in 1940



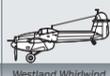
- The factory was camouflaged by painting windows and doors on the buildings and putting chimney pots on the roofs. False hedges were painted on the airfield with oil to make the site appear as though it was a residential, rural area. This aimed to confuse enemy bombers, and thus the site avoided any major bomb damage during the war.

## Pressurised Cockpit

- Capitalising on the design expertise created to support the development of the Welkin, a high altitude fighter, Westland founded Normalair in 1946 to supply specialist oxygen and pressurisation equipment to the international aerospace industry.

1938

The Whirlwind fighter was the first RAF aircraft armed with cannon.



Westland Whirlwind

1940

The first contract was received for 300 Spitfires.



Supermarine Spitfire



Supermarine Seafire

1941

1652 Lysanders had been built, totalling the largest production figure of a single Westland aircraft.



Westland Lysander

King George VI visited the Westland factory to inspect production.

1942

The Westland Welkin is put into production, designed to fight at high altitude with a pressurised cockpit.



Westland Welkin

1944

Design began on the Wyvern, Westland's last fixed-wing aircraft.



Westland Wyvern

1945

May 7th is declared VE Day.

# FROM FIXED WING TO HELICOPTERS

## Westland Enters the Helicopter Industry

- In 1946 the Westland Board made the decision to focus entirely on helicopters.
- That bold decision was not taken lightly. Much research was undertaken into the rotary wing field by Penrose, Davenport and Managing Director Eric Mensforth.
- Westland initially produced Sikorsky designs under licence, benefiting from the US technological lead instead of following the fledgling industry in Britain, but soon developed in-house design expertise due to the anglicisation and modification of US designs.
- Later, the British aerospace industry was encouraged to rationalise by Government policy and Westland acquired the aircraft manufacturing interests of Fairey Aviation Ltd and the helicopter divisions of the Bristol Aeroplane Co and Saunders-Roe.



Sir Eric Mensforth

## Our People

### 'The Westland Affair' 1984 - 1986

- 'The Westland Affair' made headlines in the 1980s when the company experienced financial difficulties.
- Despite assurances from the Government that Westland was an important company, no public funds were made available. An injection of capital from the private sector was essential for Westland's survival.
- The Westland Board favoured a bid from United Technologies (Sikorsky Division) and Fiat which was supported by Prime Minister Margaret Thatcher. However, Secretary of State for Defence Michael Heseltine wanted Westland to merge with a European consortium.
- Westland accepted the United Technologies and Fiat bid and the financial reconstruction which followed secured Westland's future as a manufacturer. However, the Westland Affair had permanently fractured the Cabinet.



### Sir Eric Mensforth

- During the mid and late 1950s, Mensforth established helicopter development and production on a continuous, substantial scale in Britain. He was a significant contributor to Westland's change from fixed to rotary wing aircraft.



COLLABORATION WITH THE FRENCH COMPANY AEROSPATIALE, TO PRODUCE THREE NEW DESIGNS: PUMA, GAZELLE AND LYNX.

### G-LYNX Takes the World Speed Record



- The Lynx was developed as part of an Anglo-French agreement with Aérospatiale. This collaboration also produced the Gazelle and Puma helicopters, but design authority for the Lynx rested solely with Westland.
- In 1986 a specially modified Lynx, serial G-LYNX, took the Helicopter World Speed Record with a speed of 249.10 mph/ 400.87 km/h. This record remains unbroken despite several attempts.

### The G-LYNX Restoration



- An enthused team of apprentices was formed to start the restoration of G-LYNX to coincide with the 25th Anniversary of setting the record and the 40th anniversary of the Lynx prototype's first flight.
- On 8 July 2011, the restored G-LYNX was unveiled to the company work force at Yeovil at a special employee event.
- The final touch was the carefully positioned cigarette and adjacent match on the centre console in honour of test pilot Trevor Eggington.

### Westland Dragonfly



The first Westland helicopter was anglicised from the American Sikorsky S-51 design. It first flew on 5th October 1948, piloted by Alan Bristow.

### Westland Sea King



Famous for its role in search and rescue, the iconic Sea King was developed from the Sikorsky design in response to the need for a long-range submarine hunter/killer aircraft.

### Westland-Agusta-Bell 47 Sioux



Westland produced 250 of these aircraft, under licence from Agusta, for the British Army, RAF and a few for civilian customers.

### Westland Lynx

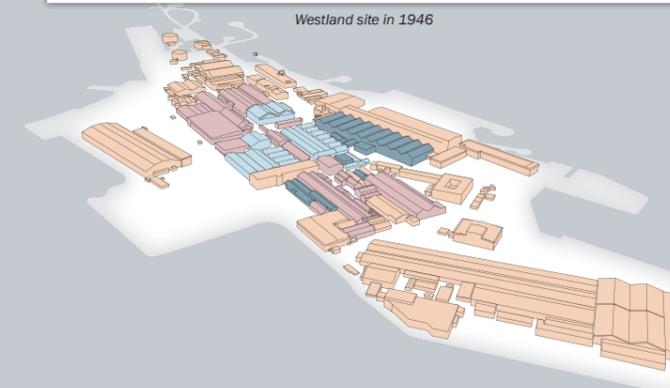


The Lynx first flew in 1971. The maritime variant was designed from the outset to operate from small ships. It has become one of the world's most recognised helicopters.

## EVOLUTION OF THE WESTLAND SITE



Westland site in 1946



- After World War II the factory was working to capacity. The main assembly area was Building 115A and Building 134A (the Vimy Hangar) was also the main engineering office area.
- With production now focused on helicopters, the company's offices and boardroom were located in Building 114 and new design offices were completed by 1960. Building 107A, which now houses the AW159 line, was known as Experimental Engineering. Westland opened London's first Heliport in 1959

### BERP Blades

- The British Experimental Rotor Programme (BERP) is a collaboration between the company and the UK Government research establishments.
- BERP I provided the composite Sea King main rotor blade which was the first mass produced composite blade designed and built in the UK.
- The BERP II and III programmes developed the blade that is a familiar and distinctive feature of both Lynx and EH101. This blade was fitted to Lynx for the successful campaign to capture the absolute world speed record for helicopters.
- BERP IV provides a further enhancement to hover performance and has been the blade of choice for use by the RAF Merlin fleet in hot and high operations.



WESTLAND ACQUIRED BRISTOL HELICOPTERS, FAIREY AVIATION AND SAUNDERS-ROE TO BECOME WESTLAND HELICOPTERS WHEN THE BRITISH AIRCRAFT INDUSTRY WAS RATIONALISED

1934

Westland experimented with a rotary wing concept in co-operation with Cierva



1948

Work begins on future Westland site



1960

British Aircraft Industry was rationalised



1961

Westland Helicopters Ltd formed

1962

The first Anglo-Italian collaboration



1967

Westland build Sea King under licence from Sikorsky



1970

Anglo-French Helicopter Collaboration



1986

G-Lynx takes World Speed Record



# LEADING THE FUTURE

## Everything we do, we do with Passion...

- Westland merged with Italian company Agusta in 2001. As part of the Finmeccanica Group since 2004, AgustaWestland is a global leader in rotorcraft.
- From Petters Ltd to AgustaWestland; from hand-drawn blueprints to 3D CATIA design; our centenary year celebrates a history of innovation.
- With ten industrial plants in four countries and Customer Support Centres on five continents, AgustaWestland has a truly international outlook.

## London 2012 Olympics



- An AW139 performed a spectacular feat when it flew through Tower Bridge, en route to delivering the Queen by parachute to the London 2012 Olympics opening ceremony. An AW101 dropped the celebratory confetti during the entrance of the athletes.

# SKYFALL

## 007

- Sought after for their cutting edge technology, style and versatility, the AW101 and AW159 Wildcat featured in SKYFALL, the 23rd James Bond adventure.



## Our People

### AWASA

- AWASA: The AgustaWestland Apprentice & Student Association is made up from the apprentices, undergraduates and graduates in Yeovil. Every year AWASA raises significant funds for charitable causes in humorous and imaginative ways.



### Four Countries, One Team:

- Over 13,000 AgustaWestland employees are spread across the UK, Italy, Poland and the US.



## AW101

The AW101 is the latest generation helicopter evolved from the collaboration between Westland and Agusta in the 1980s which produced the EH101. A world leader in its class, it is currently in service in diverse roles from SAR to VVIP Transport with customers around the world.



## AW Family: The AW139, AW169 and AW189



The AW Family of new generation helicopters share common design philosophies including safety, the cockpit, maintenance and product support. These allow pilots and maintainers to transition more quickly from one aircraft type to another. The AW189 is the first civil aircraft to be built onsite in Yeovil since 1987.

## AW609 TiltRotor

The AW609 combines the versatility of a helicopter with the speed of a turbo-prop aircraft. It is the world's first commercial tiltrotor and performed demonstration flights to potential customers in 2014. It is on track to receive civil certification in 2017.



## AW159

A new twin-engine helicopter, built upon the heritage of the Lynx, the AW159 is AgustaWestland's first fully digitally designed helicopter. The first aircraft to be handed over in 2015 was an AW159 to the UK Ministry of Defence. Designated an AW159 Wildcat, this marked an incredible milestone of one hundred years of partnership between Westland and the Ministry of Defence.



## EVOLUTION OF THE WESTLAND SITE



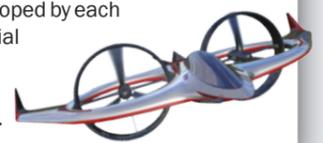
Westland site in 2012



- The Yeovil site continues to be AgustaWestland's main UK base of operations, 100 years on from its inception as the Westland Aircraft Works.
- All Ministry of Defence staff were relocated to the newly christened Centenary House in October 2014, marking one hundred years of partnership. Designated Building 100 in honour of Westland's centenary year, it has stunning views across the airfield.
- A Finmeccanica mark was laid into the ground outside Building 231. Large enough to be visible from the air, the mark is part of both the Finmeccanica and AgustaWestland logos and is a reminder of our unique joint heritage.

## Project Zero

- This innovative all-electric tiltrotor technology demonstrator is a collaborative project led by AgustaWestland, other Finmeccanica companies and international partners. The technologies developed by each partner are being fed into different industrial sectors, adding value to each. Project Zero has won numerous awards for innovation including the RAeS Team Gold Medal for 2014.



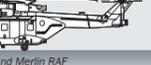
1987

1987 First flight of the EH101



1994

GKN launched a successful takeover of Westland



2001

AgustaWestland is formed



2004

Finmeccanica acquires GKN's 50% stake in AgustaWestland



2010

Decision to develop Civil rotorcraft activities at Yeovil

2012

AgustaWestland feature in Olympic Opening Ceremony



2015

Significant acceleration of the development of new products to exploit market opportunities





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