



LOSTOCK LIFE

80

YEARS OF
MANUFACTURING
AT LOSTOCK

MBDA
MISSILE SYSTEMS

Matra BAe Dynamics

Foreword - Manufacturing Director

DR. BERNARD WALDRON MBE

Looking out from the offices of our new, ultra-modern £50 million manufacturing facility, I am inspired and humbled to think that our company has been engaged in the delivery of complex high-value aerospace products in this part of Lancashire since 1937. MBDA has changed its name and location a number of times over eight decades, culminating in our latest and most comprehensive move from Lostock to Cutacre in Bolton in 2017, our 80th anniversary. Since joining the company in 1971 as a craft apprentice, I have witnessed some monumental changes: securing vital contracts, growth and recession, industrial unrest, investment in new capabilities and weapons technology advancement, and most of all engaging with thousands of people who have given their working lives to Lostock and its family culture.

When Sir Geoffrey de Havilland landed his Gypsy Moth on that farmer's field in Lostock, Bolton's main - but dying - industry was cotton. A new factory to build propellers for the war effort provided the jobs and economic boost that people desperately needed. Lostock became the dominant industrial power locally; at its height more than 4,000 people worked here making a huge variety of engineered products, from propellers to projectiles. Throughout its life Lostock has always maintained a strong link to the local community, giving back to the people in its service. Consider our anniversary party in 1987, where more than 6,000 people, employees and their families, celebrated 50 years of manufacturing in Lostock. I can't adequately express how much our people - young and old, apprentice to director - have made MBDA in Bolton and its legacy companies the success it is today.

Now we look to the future. Our new Bolton facility uses truly cutting-edge technology, including manufacturing systems aligned with smart 'Factory of the Future' digitisation. This will improve our performance and productivity while enabling delivery to our customers in a manner which exceeds their expectations. The need to make our production systems more connected via information retrieval and delivery systems on a networked factory floor, is central to our improved operational responsiveness.

Skills have always been important to MBDA to maintain our capabilities in a competitive global market. Our training will continue to be world class, exemplified by many recent engineering and apprentice awards. We cannot afford to stand still, and we have to adapt to new defence and security scenarios, product architectures and technologies in order to stay at the forefront of our business. The recognition of this, and the willingness to adapt to these changes by our people, will be the key to our future success.

Lostock has always had close ties to schools and colleges and, having transitioned to Bolton and re-established our capability, we intend to redouble this vital education effort in order to keep advanced engineering and manufacturing in the minds of local schools and their pupils.

I hope you enjoy this book, a celebration of 80 years of aerospace manufacturing and Lostock's role in it, and I look forward to the next 80 years of MBDA achievements. Happy anniversary Lostock - and welcome to MBDA Bolton.

DR. BERNARD WALDRON MBE
Director of Manufacturing (UK)



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Foreword - Managing Director, MBDA UK

CHRIS ALLAM

As a newcomer to MBDA at the start of 2018, I did not have any first-hand experience of the Lostock site. However, I am aware of the tremendous contribution that Lostock made to MBDA and its predecessor companies over eight decades and how it adapted to meet changes in market requirements.

The Lostock site had two distinct periods during the eight decades of its existence. Geoffrey de Havilland, along with his colleagues and the many other people who were involved in the decision in 1936 to establish a factory in the north-west of England at Lostock to manufacture propellers, would no doubt be surprised to come back now and find out that its second life, as a manufacturer of guided weapons, was far longer than its first. They would no doubt also be surprised how quickly the invention of the jet engine led to the demise of large-scale production of propellers. They would also be astounded to see that their propeller factory at Lostock became a key and strategic part of the UK's Complex Guided Weapons industry, a business sector that didn't even exist when they made their decision to establish a facility in the north-west.

It is difficult to accurately encapsulate all the events and experiences that took place between 1937 and 2017 in this publication and to understand how different life was when the Lostock site opened compared with the opening of the new Bolton site at Logistics North. Probably our first of many Urgent Operational Requirements (UORs) was delivered out of Lostock when the first propellers were manufactured and delivered to the war effort within 9 months, before the building had even been completed.

While the core business activity changed from propellers to missiles, there are other stories to be told, many of which show how life has altered over the years. The product diversification in the 1970s and 1980s (see page 21) seems remarkable now and the numerous sports teams and social activities that flourished in the past show the possibilities ensuing from having a large work force back then.

Lostock was justifiably proud of its apprenticeship scheme, which it had maintained in one form or another since the beginning. Although there was a dip in the 1990s in line with national trends, a reinvigorated scheme was introduced for the modern world in the early years of the twenty-first century which resulted in numerous national and regional awards for both the apprentices and the company, including national recognition for its deployment of many female apprentices across its diverse skill set in both engineering and commercial disciplines.

While it is always sad to say good-bye to an old friend with so many memories, the Lostock site was becoming a bit jaded and no longer fit for purpose. It was time to move on. With the upturn in business in recent years, the modern facilities and practices provide room to breathe at the new Bolton site. MBDA now has a wonderful new location with modern working conditions and capabilities that might have sounded like science-fiction back in 1937. Who knows what stories will be told about the Bolton site in eighty years' time?



CHRIS ALLAM
Managing Director, MBDA UK



Matra BAe Dynamics



Foreword - Head of Engineering and Operations, MBDA

DENIS BALLE

Over many decades the political and customer environments in the defence industry have shifted significantly and will no doubt continue to do so in the years to come. Throughout this period of change as illustrated by this book, our company's roots and our declared "*raison d'être*" continues to hold strong and maintain our company mission: To operate as a trusted partner of the defence community in our home nations, and with their allies.

Celebrating 80 years of aerospace and missile systems Manufacturing in Lostock represents a perfect example of the many impressive and successful transformations and adaptations of our Missiles Systems capabilities both in the UK and across our European domestic countries, always demonstrating the same and permanent commitment to our mission.

Based upon the confidence of the main stakeholders in terms of delivery performance and in MBDA's future, 2017 sees the beginning of a new chapter in the history of the company's Manufacturing domain, with the establishment of a world class Manufacturing facility and associated capabilities at Bolton. Thereby demonstrating MBDA's continued belief that Manufacturing expertise continues to be a competitive advantage for the delivery of highly complex engineering products.

My thanks goes to the many communities behind the drive for change and the adaptation of our Operations capability over the years: The technology and more so the people, both individually and collectively in our respective roles, adapting and developing our MBDA values of innovation, commitment, integrity, passion and team spirit, I am confident we will continue on the journey of Manufacturing Excellence, delivering our commitments and investing in our future.



DENIS BALLE
Group Operations Director



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MBDA
MISSILE SYSTEMS

1930s

In the beginning

'A LARGE DOME-SHAPED FARMER'S FIELD NEAR BOLTON'

Landing his aircraft and co-pilot at that 'dome-shaped farmer's field', Geoffrey de Havilland would have had little notion of the scale of the industrial renaissance that would subsequently take place on the section of land by the Bolton-Horwich road.

As if indicative of the makeshift nature of the meeting and the tentativeness of their plans, a local councillor waved a strip of wallpaper in the air to act as a windsock, guiding intrepid pilot de Havilland in. In fact, leaving aside the councillor's improvisation, the site was no stranger to flying displays: Sir Alan Cobham's hugely popular Flying Circus had visited the area between 1932 and 1935, entertaining locals with barnstorming – a form of entertainment in which stunt pilots performed tricks – and joyriding, giving rides to passengers in aircraft: many people had their first ever experience of a remarkable new 20th century invention thanks to Cobham's aviation display days.

As entertaining as Sir Alan's displays must have been, in the mid-1930s, what Bolton most needed was not displays of the latest technology, but an industry in its own right. The town and the surrounding area desperately needed a new factory: its economy was based almost entirely on the cotton industry, with huge cotton mills, spinning mills and bleaching works, but there was mass unemployment in the sector by the mid-1930s. The town's leaders were working to provide a new opportunity for the area. As the Second World War loomed, the Government had invited the De Havilland aircraft company to erect a factory for mass production of propellers. Bolton Corporation – along with Prestwick Airport – found itself on a shortlist of two. No wonder then that the councillors were very keen that

de Havilland land safely: his visit held the key to a potential regeneration of the area.

VARIABLE PITCH PROPELLERS TAKE OFF

It was the variable pitch propeller – the introduction of constant speed variable pitch propellers became a crucial modification to Spitfire aircraft made by De Havilland before the Battle of Britain – that was to be produced at the planned new factory. For his part, Geoffrey de Havilland had been interested in the development and manufacture of such propellers since 1934, and propellers of this type were

CAPTAIN SIR GEOFFREY DE HAVILLAND

Captain Sir Geoffrey de

Havilland was a British aviation pioneer and aircraft engineer. His Comet aircraft was the first jet airliner to go into production, and his Mosquito is considered the most versatile warplane ever built. De Havilland was the son of the Reverend Charles de Havilland and his first wife Alice Jeanette. After graduating in engineering, de Havilland began his career in automotive engineering, making cars and motorcycles, before devoting the rest of his life to designing, building and flying aircraft.



De Havilland became chief designer at the Aircraft Manufacturing Company (Airco) in Hendon, London. Large numbers of de Havilland designed aircraft were flown in the First World War. Airco was subsequently bought by the BSA Company, which was only interested in using its lines for automotive production. De Havilland raised £20,000 to buy the company's aerospace production equipment to form the De Havilland Aircraft Company in 1920. In 1933 the company moved to Hatfield Aerodrome in Hertfordshire. De Havilland controlled his company until it was bought by Hawker Siddeley in 1960.



DE HAVILLAND



Above: Lostock was viewed as an ideal site for the 'shadow factory' because its remoteness meant it had low risk of being bombed

fitted to the DH Comet racer which had won the England to Australia air race that year. A licence agreement was signed with the American Hamilton Standard Company, and by 1935 variable pitch propeller manufacture had begun at De Havilland's small factory at the Stag Lane Aerodrome, Edgware, on the outskirts of north London.

As opposed to the fixed propellers which had been widely used since the beginning of aviation, variable pitch propellers could take better advantage of the power supplied by an engine. The first variable pitch propellers dated as far back as 1917, but it was the development of electrically and hydraulically adjustable mechanisms in the 1930s which brought their widespread use, starting in the US.

De Havilland was the first company to supply such propellers in Britain, which made them an automatic choice for the Spitfire and the Hurricane. The aim with the De Havilland variable speed propeller 'shadow factory' was to build in a remote area with low bombing risk; ultimately, the 'large dome-shaped farmer's field near Bolton' was viewed as ideal for production of variable pitch propellers for the war effort as a result.

In the battle against Prestwick, Lostock had emerged triumphant.

A *Bolton Evening News* article from 1936 approvingly noted the 'highly skilled work' that would come to the area once the new factory was developed, with men to be given special training for 'Airscrews that will be made at Lostock'. Bolton Municipal Technical College principal Mr J.W. Simpkin visited the fledgling Edgware De Havilland facility to see variable pitch propellers being produced and came away 'impressed by the quality of the product'. 'Each of the various components of the airscrew is machined to close limits, and a high class finish,' the *Bolton Evening News* observed.



CONSTRUCTION STARTS AT LOSTOCK

Construction work on the new Lostock variable pitch propeller factory forged ahead rapidly during 1937. On March 19, the first steel upright was hoisted into place, with the factory frame being erected by June. From June, machinery moved in through the summer and was commissioned. In the summer, work began on the first propeller – before the windows were in. The first propeller from Lostock was delivered in Christmas week, December 1937. The rapid nine-month delivery was entirely due to the onset of war. There were several features built into the factory to ensure it was not visible from the air. For any surveying aircraft, black smoke from the adjacent smoke stacks would obscure the view.

The early machine operators were trained in a shed leased for £7 a week in Garside Street, but arrangements were soon concluded with Mr Simpkin of Bolton Technical College to begin a training scheme for the new industry, with available personnel drawn from mines and mills in the area and the struggling cotton sector. Already, sports and social activity was an important part of factory life. The De Havilland factory trainee football team was formed in January 1937 and reached the final of the Little Hulton Cup competition.

SIR ALAN COBHAM

Sir Alan Cobham was a member of the Royal Flying Corps in World War I and a test pilot for De Havilland. In 1932, he started the National Aviation Day displays – a combination of barnstorming and joyriding. These shows became known as 'Cobham's Flying Circus', and were hugely popular, touring the country. For many, it was their first experience of flying. The shows continued until 1935. Cobham was one of the founding directors of Airspeed Limited, the aircraft manufacturing company started by the famous novelist Nevil Shute.



Clockwise from top: The *Bolton Evening News* was impressed by plans for the new high-tech airscrews; early machine operators congregate at Garside Street; the newly formed De Havilland football team reached the final of the Little Hulton Cup; the 'large dome-shaped farmer's field near Bolton' was no stranger to air displays



By 1939, the factories at Edgware and Lostock had already completed more than 10,000 propellers for 20 different types of aircraft – and by the end of the war this number had increased to 146,000, with another 40,000 having been repaired. After war broke out, legend has it that German bombers were instructed first to bomb Preston Docks, not Lostock. Later the bombers would mistake the village of Lostock Hall near Preston for the factory and heavily bomb Lostock Hall.

During bombing raids, "firecrawlers" would crawl on the Lostock factory roof to ensure no incendiaries were dropped on it. By this point the factory was employing buses en masse to take workers from the factory to the local towns – Leigh, Chorley, and Wigan. This created a big scrum at the factory whistle, with 4,500 people congregating in one place. Many local families had been spared considerable hardship thanks to the pressing need for the new airscrews and the hastily constructed factory that made them.

With the decline of the cotton industry, a new cutting-edge manufacturing sector had emerged in the unlikeliest of spots. Though concealed as best as it could be from the Luftwaffe, Lostock had been put on the map.



Product and Company Timeline 1930-1939

Bolton and the surrounding area had been built on the cotton industry. In the 1920s, 55,000 people were employed in Bolton's cotton mills. But by the mid-1930s these mills were in the mire, with mass unemployment



De Havilland Aircraft Company's interest in variable pitch (VP) propellers grows. A licence agreement is signed with the American Hamilton Standard Company of Connecticut for the manufacture of these propellers in the UK

Propeller manufacture by the De Havilland Aircraft Company begins in a small factory in Stag Lane, Edgware, before being moved to a purpose-built headquarters in Hatfield, Herts. A new shadow factory was to be built in a remote and low bombing risk area

AUGUST 1936

Geoffrey de Havilland and colleague F.T Hearle fly a tiny Gypsy moth plane from Berkshire and land it at 'a dome-shaped farmer's field' at Lostock. The wind direction is indicated by a strip of wallpaper laid on the ground by Councillor James Parkes



1930

1932

1933

1934

1934

1935

1936

1936

COBHAM'S FLYING CIRCUS

The flying demonstration team toured the UK and used a site at Lostock to demonstrate airmanship and aerial stunts



DANCE TRAINS

The 'Dance Trains', aka 'The Specials', are launched in Lancashire. These were a train service running from towns like Bolton and Chorley to Blackpool for a day or night of fun, as the quality of life improved after the early 1930s

OCTOBER 1934

Variable pitch propellers are fitted to the De Havilland DH.88 Comet racer that wins the MacRobertson Trophy Air Race – the London to Melbourne Air Race – in October 1934



As the re-armament programme builds, the Government invites De Havilland Aircraft to erect a shadow factory for large scale propeller production. A site is chosen near the Bolton-Horwich road at Lostock



Construction work on the new factory begins. On March 19 the first steel upright is hoisted into place



AUGUST 1937

The new factory building is nearly completed and work begins on the first propeller – before the windows are installed! This is just five months after the first steels were erected

1936

1937

1937

1937

HIGHLY SKILLED WORK
AIRSCREWS THAT WILL BE MADE
AT LOSTOCK
MEN WILL BE GIVEN SPECIAL
TRAINING



DECEMBER 1936

'Roll up, roll up': HIGHLY SKILLED WORK on offer - *Bolton Evening News* prints article advertising the new Lostock propeller factory's need to recruit workers, and that 'Men will be given special training'

Workers, mainly from the local cotton mills, are trained in aircraft propeller assembly at a makeshift factory on Garside Street, Bolton



JULY 1938

Bolton celebrates its civic centenary. Tillotsons Newspapers hosts a dinner for 120 guests representing Bolton's voluntary, social and charitable organisations.

Guest of honour, Minister for the Co-ordination of Defence Sir Thomas Inskip, pays tribute to the Lostock De Havilland works and is "proud to hear that the men had responded to the armament programme nobly... and were fast becoming skilled operatives"

SEPTEMBER 1939

Britain declares war on Germany. Start of World War II

1938

1938

1939

1939

Lostock's workforce rises to 800 people, from 300 a few months earlier. Up to 1,200 workers were forecast to work at the factory by early 1939

By 1939, the DH factories at Edgware and Lostock had completed more than 10,000 propellers for 20 different types of aircraft. By the end of the war this number had increased to 146,000 with another 40,000 having been repaired



1940s

The War Years “THIS WAS THEIR FINEST HOUR”



DE HAVILLAND TO
DE HAVILLAND AIRSCREW CO

WHY LOCATE THE SITE AT LOSTOCK?

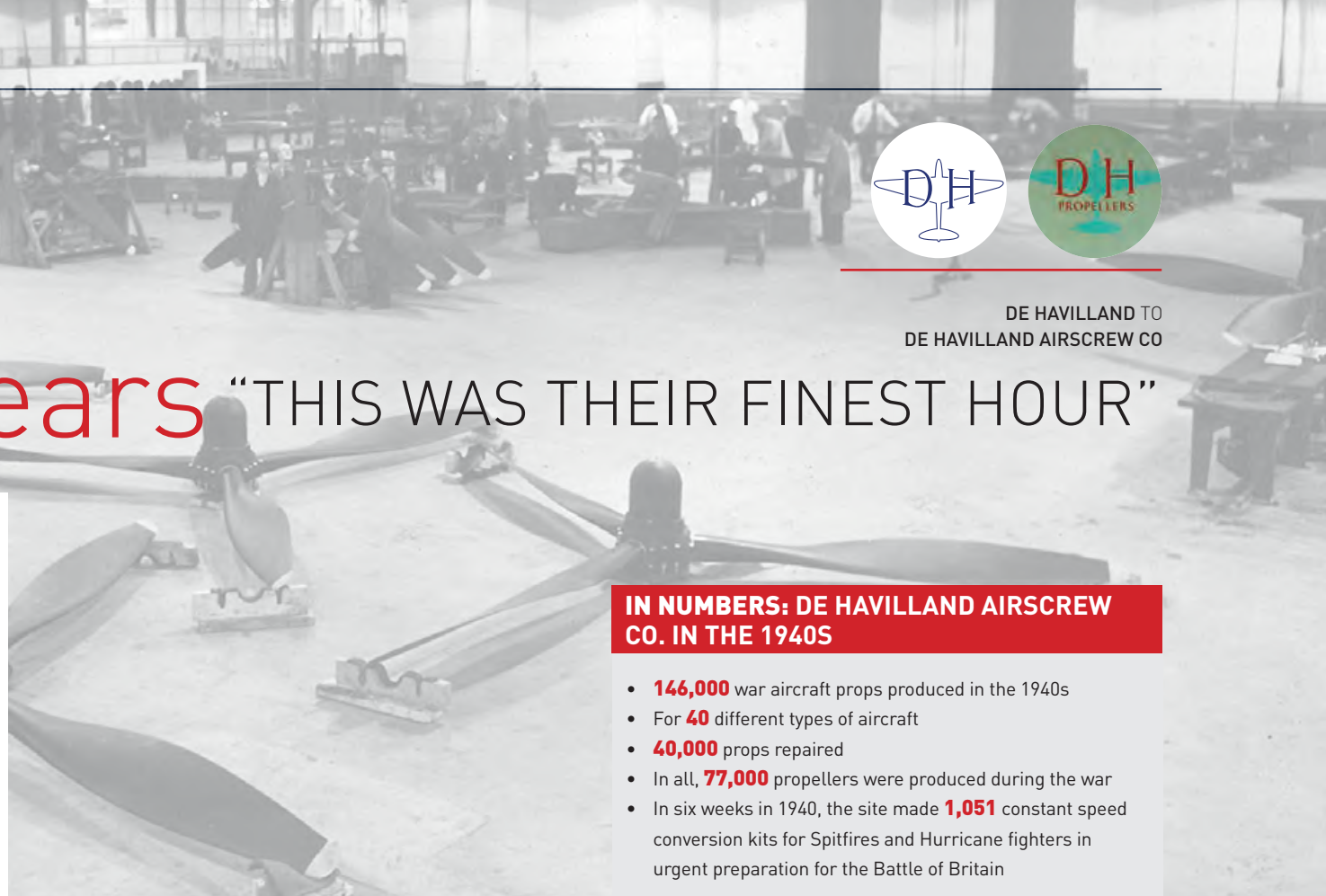
A question often asked is why a vital wartime asset, De Havilland Airscrew, located at Lostock. Neville Butler, an apprentice in 1949, who went on to achieve 42 years of company service, provides the answer: “With rumblings of unrest in Europe in the mid-thirties and the possibility of war, the Government talked to Geoffrey De Havilland, as they didn’t want him to have all his production sites at one place, and they suggested that he relocate.”

The site as it is now was selected because it was in a valley. In the early ‘30s, every industry and household was coal-fuelled, creating smoke and smog. With the site in a valley, the smog settled and hid it - rendering it unseen by enemy aircraft.

Bernie Waldron, an apprentice in 1971 and now with more than 40 years of service, adds that Lostock benefited from its close proximity to Bolton, and its heritage as a mill town, which was serviced heavily by female labour. “When the site was established what was very evident was this massive resource that was at its disposal, because the cotton trade was declining, and these highly skilled women could be brought in.

“Had it not been for the female contribution during the war effort, then Lostock would not have got the reputation it had for its manufacture of propellers.”

Seventy years later, it is hard to underestimate the importance of the role that the De Havilland Airscrew



IN NUMBERS: DE HAVILLAND AIRSCREW CO. IN THE 1940S

- **146,000** war aircraft props produced in the 1940s
- For **40** different types of aircraft
- **40,000** props repaired
- In all, **77,000** propellers were produced during the war
- In six weeks in 1940, the site made **1,051** constant speed conversion kits for Spitfires and Hurricane fighters in urgent preparation for the Battle of Britain



Above: An aerial shot of Lostock by the Luftwaffe

capability in a dog fight. Most or many of the German Luftwaffe’s fighters had variable pitch propellers fitted, making them a superior aircraft. The need to convert the British fighter squadrons to variable pitch propellers to match the Luftwaffe was to be a critical factor in winning air superiority – and it was the Lostock workforce that was called to arms.

The far superior constant speed, variable pitch propellers, designed by Hamilton Airscrew, were manufactured under licence by De Havilland for the UK and much of the Commonwealth. Lostock produced

thousands of sets of these more advanced props and converted them in the field at RAF stations across the country. It was during this time that the Air Ministry adopted the word ‘propeller’ in place of ‘airscrew’.



factory in Lostock played in World War Two, and specifically the strategically important Battle of Britain. At the outbreak of war in 1939, the RAF’s fighter aircraft – Hawker Hurricanes and Spitfires – were mainly fitted with fixed pitch propellers. This technology severely limited their manoeuvrability and their

EXTRAORDINARY VOLUMES

During World War II, the Lostock factory worked night and day manufacturing and repairing propellers and ancillary equipment necessary for the war effort. The Propeller Division’s war effort included the manufacture of propellers for more than 40 different types of aircraft. By the end of the war, the main manufacturing thrust focused on propellers for Lancasters, Halifaxes,

THE BATTLE OF BRITAIN

In 1940, Lostock's engineers fitted Spitfire and Hurricane fighter aircraft with constant speed, variable pitch propellers. It allowed British and Allied pilots to compete with and often outmanoeuvre the Luftwaffe, securing victory in the air.

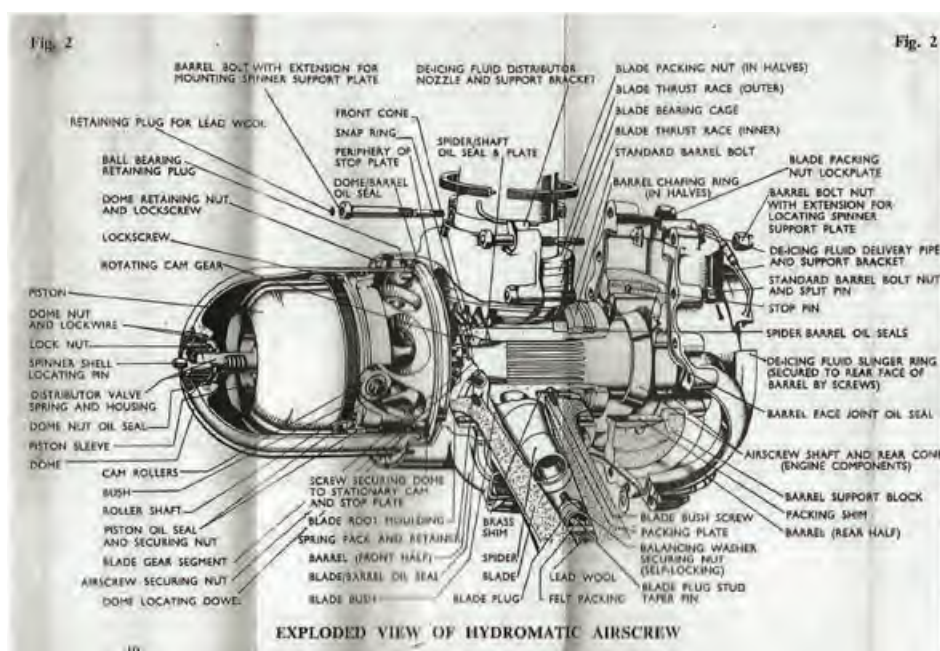
Mosquitoes and Hornets. Propeller production had reached its peak at the time of the Allied Forces re-entry into Europe, and in one month shortly before D-Day, 5,059 new and repaired propellers left the De Havilland factories – a staggering 170 propellers every 24 hours.

In total 146,000 propellers were made by De Havilland during the War years, and 40,708 damaged propellers were repaired and sent back into action.

PROTECTION FROM THE LUFTWAFFE

Lostock was protected during the war by a battery of 4.5 inch anti-aircraft guns situated to the left of Alexandra Road (looking from the factory), and 'smudge pots' along Chorley New Road. When ignited, these emitted thick black smoke which, with the prevailing wind, could blanket the entire works.

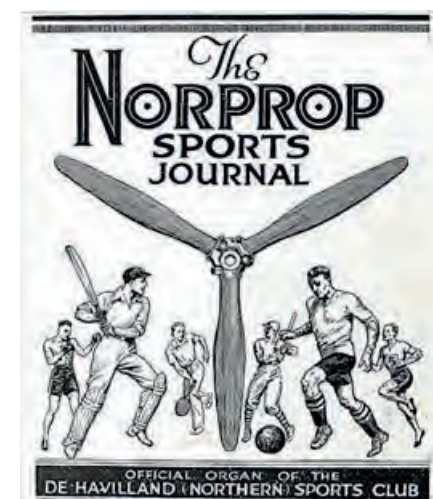
The factory Home Guard, an armed volunteer force, was ably led by Mr H Morton (Maj. Rtd) and 'firewatchers' prowled the catwalks on the roof seeking incendiary bombs to disarm. It was reported that, "every night during the war a fleet of lorries and technicians took vital blade forgings to dispersal units so that should the factory be hit during an air raid, a reserve of blade forgings would be readily available".



Above: The De Havilland company built and repaired thousands and thousands of propellers during the war years. The image details the complex mechanics of the hydromatic airscrew



Above: Even in wartime workers needed recreation. Here one of several Lostock football teams in 1940



The *Norprop Sports Journal*, Lostock's first magazine, was established in the 1940s

Fortunately, no air raid came near enough to imperil the works, despite the fact that the location and significance of the factory was known to Germany as aerial photographs, dated 1941 and captured from the German Luftwaffe files, confirmed after the war. The bomb that landed nearest to the factory hit land opposite the Rumworth Hotel on Wigan Road where it wrecked two houses.

CALL OF DUTY INTERRUPTS WAKES WEEKS

The Wakes Weeks holiday tradition developed in industrialised North West England in the 19th and 20th centuries. Typically a whole town would take one week's summer holiday, often in Blackpool or Southport, synchronised with other towns so that not everyone would vacate simultaneously, allowing business to function. In

Bolton these were taken in either the last week in June or first week in July, with Wigan taking their break in July.

By mid-1942, propeller production at the Lostock factory had been running almost continuously for three years, but was stopped for one week so that the factory machinery could be overhauled. It was a necessity imposed by the exceptional conditions of wartime, and the town scheduled its Wakes Week to match this works period. On the Tuesday of that week, however, an unexpected

urgent demand for 32 extra Spitfire propellers was received, to help break the Siege of Malta. With the entire production staff on holiday this created a major problem, but police aid was enlisted in the search for staff. A car and loudspeaker were deployed to Blackpool, driving up and down the front broadcasting an urgent call for any De Havilland people who might be within earshot.

The response was immediate and the propellers were delivered.

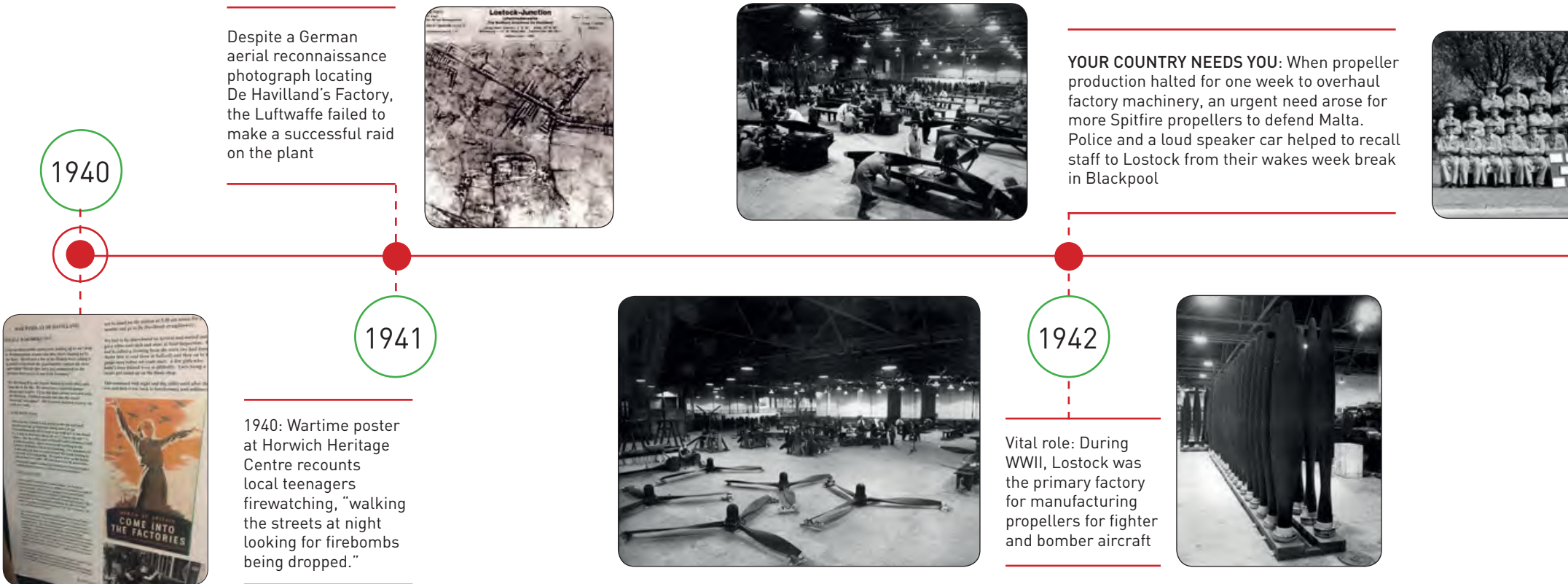
LIFE IN LOSTOCK IN THE 1940s

Life and work in Lostock was naturally dominated by WWII and post-war austerity. Like the rest of the country, employees were determined to keep calm and carry on, exemplified when Lostock launched its first Family Days summer event in 1941.

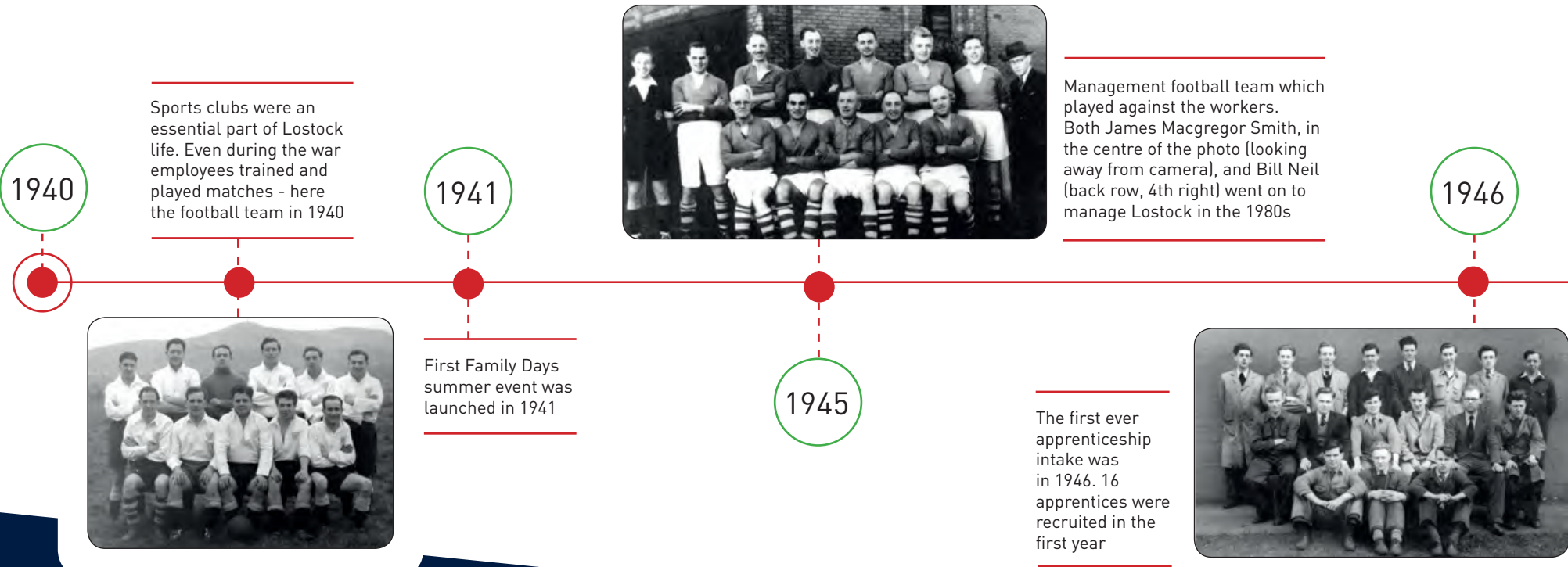
In 1949 William 'Bill' Neill arrived at Lostock after nine years as an engineer at Scottish Aviation. A "Lostock legend", from 1949 to 1980 Bill served three stints at the factory, including as plant manager of Hawker Siddeley from July 1973 to 1980. These were punctuated by jobs at De havilland in Chester from 1953 to 1955, Platts Brothers from 1958 to 1966, at Kearney & Trecker and as a consultant from 1970 to 1973. A popular, hard-working Scotsman, he was awarded an MBE by King George VI for his work on modifications to the B-29 Liberators, B-17 Fortress and C-47 Dakotas. He also wrote two autobiographies, and a third book that was never published.

At the end of the decade, the Government had turned its attention to a new aerial technology to defend the nation – guided missiles. While the jet engine had been invented, and had enormous potential, its British inventor Frank Whittle was unable to interest officials in it, who deemed it high risk and expensive. Guided weapon systems were the future – and the Government needed help from an experienced engineering company.

Product Timeline 1940-1949



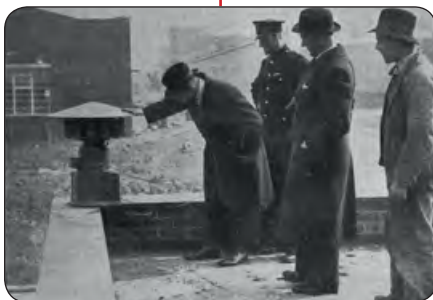
Company Timeline 1940-1949



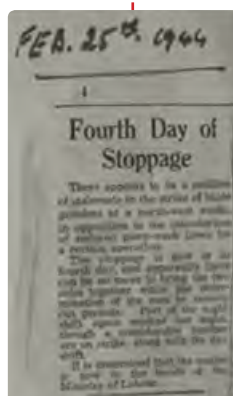


1943

Examination of an
air raid warning
siren at Lostock



1944



Lostock's blade
grinders, a
crucial part of the
workforce, went on
strike over reduced
piece work times



Lostock made
components including
propellers for the
Spitfire fighter
throughout the 1940s

1946



1948

Air Vice-Marshall Bennett
required two propellers very
urgently for the Berlin air lift.
Lostock obtained, assembled,
balanced, pressure tested
and delivered the new
propellers to Heathrow,
210 miles away, in 19 hours



New social club
for employees
was established

1947

Lostock tested propellers.
Four blades are being excited
simultaneously in what is known
as a "reactionless mode".
Taken from 1948 DH Gazette



1948



The Old Training
School in the
late 1940s

1949

Lostock Ladies'
Hockey Team were
3rd in the Bolton
League in 1949



1949

1950s



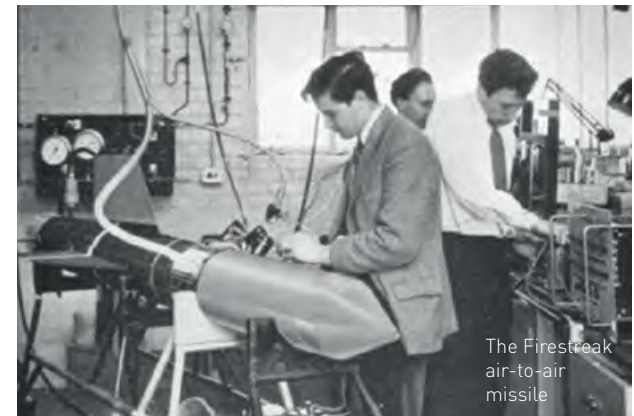
From propellers to projectiles

In the post-war 1950s rapid technological change, and the unfettered freedom of commerce to design, make and sell products, drove engineering industries forward.

By the mid-1950s, Lostock was the largest manufacturing facility of its type in the United Kingdom – some believed in Europe – with 5,000 workers and as many as 1,200 of the latest machine tools on site. The footprint of the facility was by now 120,000 m². This was an important decade for Lostock, as the company moved fully into missile technology for the first time with the development of Firestreak, the UK's first air-to-air guided missile. And there was another notable first: the '50s was the decade in which Lostock produced many components for the iconic De Havilland Comet, the world's first jetliner.



Above: Lostock's facility was one of the biggest machine shops in Europe in the mid-1950s



The Firestreak air-to-air missile



Above: Lostock produced components for the De Havilland Comet, arguably Britain's most famous aircraft of the 1950s and 1960s

NEW FACTORIES AND THE FIRST MISSILE

As the decade began, the core of De Havilland's business remained propeller manufacture. The now in decline Lancashire cotton industry's loss was Lostock's gain as a converted cotton mill at Lakefield was converted into a facility for propeller repair and overhaul. Also indicative of a modernising industry was the opening in 1951 of a new De Havilland Propellers factory for "detailed assembly of electronic components", seven miles away in Farnworth.

The development of a new missile was accelerated in 1949 when the Ministry of Defence sent a letter to aerospace companies appealing for help for a "guided missile development project". According to Lostock folklore, the letter implored De Havilland: "For the defence of King and country, please give us your support". Such an appeal to patriotism was hard to ignore and the Firestreak missile programme – kept top secret for several months – duly began at Hatfield and Lostock.

The Government's rationale for developing missiles was to

develop improved, guided systems that were more accurate than existing weapons. With the commercialisation of the jet engine, propeller-powered aircraft would become less popular, but pouring public funding into jet engine development was viewed at the time as expensive. There was a sense at the MoD that while jet aircraft were exciting, creating heroes of test pilots, they were too risky to back fully. Guided weapons represented a different, less risky opportunity.

But jet engines were becoming more prevalent, on both the new De Havilland DH 106 Comet passenger aircraft, and for military aircraft too. The shift to jet engine technology was also affecting living arrangements for the Lostock workforce. The *Bolton Evening News* carried details of a fierce debate at Bolton Council in December 1951 over whether the council should agree to build 100 new houses for key workers involved in jet engine testing at Lostock.



As demand for the Comet airliner, powered by De Havilland Ghost turbojet engines, rose, Lostock was tasked with building more components. Up to 2,500 items of the Comet's structure were eventually manufactured here, the most recognisable being the airliner's huge undercarriage legs. In a sign of the increasing diversity of its manufacturing capability, Lostock was also involved in manufacturing an early 100kW wind turbine generator.

In an article on the new wind turbine, the *News Chronicle* noted in March 1952, "On Britain's hills, where once the sails of windmills turned, power generators like this may soon be bringing relief to Britain's coal problem." The generator – featuring hollow propeller blades – was built in conjunction with Enfield Cables and was based on an 8kW version of the same machine that had been successfully tested in France.

Meanwhile, news of the development of the new Firestreak missile leaked out. In March 1952, under the attention-grabbing headline “Britain has new secret weapon”, the *Daily Express* reported that the De Havilland Aircraft Company was working on “a new type of passive heat seeking air to air missile”. Further confirmation of the new direction Lostock was taking came from assistant plant manager Bill Neill, one of Lostock’s most successful managers. He also recognised early on that skills developed on this programme could be transferred to civil aviation work. On March 28 1952, an article by Neill was placed in *The Times*, headlined: “GUIDED WEAPONS PROJECTS”. Neill went on to say: “I am now permitted to disclose that for some time we have been most actively engaged in projects of the utmost importance in the field of guided weapons.

“This work has been undertaken in response to the vital needs of defence, but I would like to emphasise that one can observe technical developments taking shape which will have a value in aviation as a whole.

“Advancing rapidly as it is, this new side of our business is making good progress and you will appreciate that this company is undertaking a responsibility which may well become of fundamental importance.”

Bill Neill’s words proved prescient. Guided weapons had arrived at Lostock – and were here to stay.

SPORTS AND SOCIAL CLUB GROWS

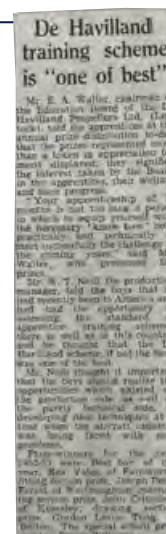
Sports and social activities in the 1950s, buoyed by Lostock’s expanding workforce, really took off. Fortnightly Saturday dances were well-attended in the early part of the decade, while there were also boxing and darts

tournaments. There was even a Lostock dramatic society, which was able to enter a scene from *Count your Blessings* by Roland Jeans and the one-act play *Musical Evening* by Gordon Glennon in the Flintshire Drama Festival in March 1952. De Havilland’s internal magazine at the time approvingly noted: “It was the first time the society had entered a contest of this nature and they acquitted themselves well.” Other sports and social activities at the time included cricket and rifle shooting.

In 1955, the Sports and Social club was fully refurbished. By 1957 the sports fields were well-established, with football, rugby and cricket fields marked out. There were also two shale tennis courts and a bowling green. The factory even produced its own sports club magazine, *The Norprop Sports Journal – The official organ for the De Havilland Northern Sports Club*. The club grew and grew further, covering all conventional sports and also lawn bowls, table tennis, the Lancastrian game of ‘piggy’, a wine and beer club that brewed and fermented its own wine and beer, orienteering, drama – and more. Lostock employees even grew their own prize-winning vegetables.

FIRING UP FOR THE FUTURE

Throughout the 1950s, apprentices played a crucial part in Lostock’s expansion. David Pye was in the 1955 apprentice intake, and ended up working in the heat treatment department under mentor Walter Simms, who



Above: 1955 - 1956 Apprentice Intake. David Pye is back row, fifth from left

was a foreman. Aged 75, David was still working in heat treatment and metallurgy here, and says Lostock gave him an “amazing career”. In a *Bolton Evening News* article of 2015, Pye recalls: “DeHappyland, as we all called it, was a business of Sir Geoffrey de Havilland at Hatfield. We all thought it would last forever, but it didn’t,” he says.

Indeed, De Havilland’s internal magazine indicated the changes that were taking place in the early 1950s. “For guided weapons, we have been fortunate in building up a strong team of highly qualified and keen people.” In a clear demonstration of the advanced technologies the company was now working with, Lostock was now testing jet engines. Silencers or ‘de-tuners’ for military jet planes were installed, with the testing beds for Ghost engines for military jet planes. A reporter from the *Bolton Evening News* had to listen intently to hear the noise of engines on these test beds. Lostock had been granted permission to test the new jet engines only if their noise was nullified so as not to disturb the local community.

De Havilland’s new guided weapon, Firestreak, meanwhile, became Britain’s first operational air-to-air missile in 1957. Featuring infra-red guidance, Firestreak was the first such weapon to enter active service with the RAF and Fleet Air Arm, equipping the Gloster Javelin, English Electric Lightning and De Havilland Sea Vixen aircraft. It was a rear-aspect, fire and forget pursuit weapon, with a field of attack of 20 degrees either side of the target.

The successful entry into service of Firestreak marked a step change for De Havilland, in which the new factory at Farnworth proved to be critical. It provided most of the electronics manufacturing capability for the new missile, employing women from the cotton mills and tailoring trade in new jobs. And Firestreak was soon followed in the late 1950s by the development of Redtop, another infra-red seeking missile that required extensive knowledge and skills in infra-red, optics, and gimbal manufacture.

As the 1950s drew to a close, Lostock had its sights set firmly on the future of warfare: by 1959, the company was preparing to be acquired by the Hawker Siddeley group.



Left: Lostock’s early wind turbine, suggesting wind was an end to coal



The combined management teams of Lostock and Chester. This photo was taken at their second meeting this season which ended in yet another victory for the Chester cricketers, their respective scores being Chester 133, Lostock 80. Left to right—top row, F. Berry (Umpire), L. F. Fairchild, D. McConnell, H. Mollart, A. Stevens, H. D. Matthews, R. J. Armstrong, W. T. Neill, C. H. Rowse, C. J. Andrews, B. Rimmer (Umpire); middle row, O. Pyle, W. Pereira, J. C. Corby, J. McG. Smith (Captain—Lostock), J. A. Mackenzie (Captain—Chester), C. Mills, J. Hanslip, R. T. Francis; front row, E. R. H. White, W. Short, W. R. Johnson, F. E. Brown, J. Critchley, R. J. T. Holland.

Product Timeline 1950-1959

1951

Repair and overhaul of damaged propellers becomes a primary activity at Lostock



1953

FIRESTREAK

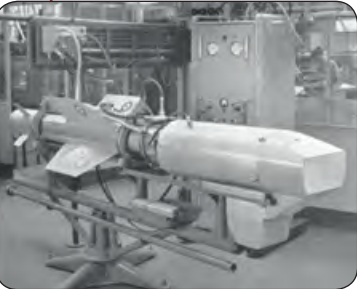
Development of Firestreak, Lostock's first missile, begins. Britain's first operational air-to-air missile with infra-red guidance. It enters service with the RAF and Fleet Air Arm of the Royal Navy on Lightning, Javelin and Sea Vixen



BLUE STEEL

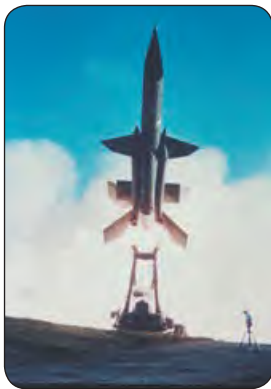
Work on Blue Steel begins. Strategic air-to-surface stand off missile

1954



BLOODHOUND

Bloodhound Mark I enters service with RAF



Company Timeline 1950-1959

De Havilland Propellers ceased being an independent business in 1958 when it reverted to being part of the De Havilland Aircraft Company. Lostock became part of the Hawker Siddeley Group in 1960.

Donald McConnell becomes General Manager

1951



1951

The secret is out: Lostock's future purpose, a closely guarded secret for several months, is made public by general manager Don McConnell in an article in *The Times*. The path for guided weapons manufacture was set



Lostock's first trade apprentice, K. Hesketh, completes his training

1952

Lostock manufactures 2,500 components for the De Havilland Comet. The *Bolton Evening News* reports these include major nose cone assemblies



1952

MAY 1952

Commercial launch of the De Havilland Comet. A year after entering service the famous aircraft suffers structural failures and is completely redesigned



1952

AUGUST 1952

The DH Comet jet airliner makes a fly past over Lostock. Some of the factory's 2,400 employees "come out to take a look at the world-beating machine that they helped to make"



1952

OCTOBER 1952

DH appeals that rents paid by its employees for Corporation housing (council housing) in Bolton should be at the same lower rate paid by other council house tenants. Bolton Housing Committee rejects the appeal



1952

Work starts on making and assembling undercarriages for the DH Comet



1954



1956

Equal opportunities: Male and female employees in equal measure at assembly stations at the Farnworth site, mid-1950s

By the late 1950s Lostock had the biggest machine shop in Europe. Estimates vary but it is likely the factory had more than 1,000 individual machine tools at its peak



1957

RED TOP

1957: Development of Red Top missile begins



1957

SWINGFIRE

Design, development and production programmes start on anti-tank weapon Swingfire, based on work originally completed by Fairey Engineering

1958



MAY 1953

Bolton Wanderers FC visits De Havilland Aircraft Company in Hatfield, on the eve of their FA Cup Final match with Blackpool FC



1953



1953

Stanley Harper, second left, on a work trip to Blackpool. He served at DeH from 1941-50 and 1951-55 and met his future wife, née Jean Gibson, at Lostock



Sir Geoffrey de Havilland meets the Duke of Edinburgh beside a DH aircraft

1955



1956

Bus crisis! As employee numbers swell, the challenge is to provide enough buses to ferry workers to the factory. The deficit is more than 20 buses by July 1956

The first member of the Repair Unit staff to attain 20 years' service with the company is Alfred Coleman



1957

1959

The apprentice training school grows bigger and bigger. In 1959 the annual intake was 132 apprentices, one of the highest in the country at the time

1960s



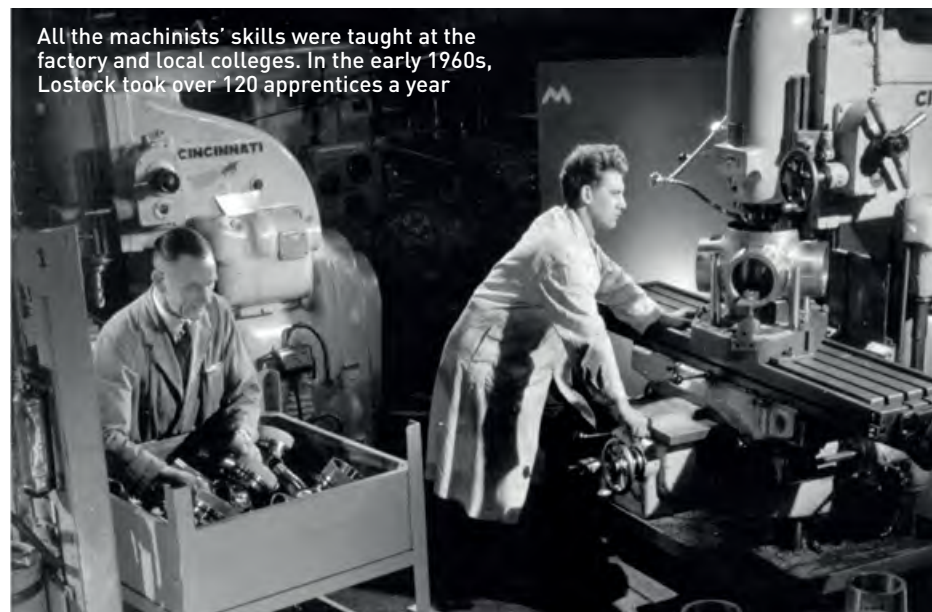
HAWKER SIDDELEY

DE HAVILLAND PROPELLERS
CHANGES TO
HAWKER SIDDELEY DYNAMICS

“If it’s difficult to make, send it to Lostock”



During the 1960s Lostock became the biggest machine shop in the UK, possibly in Europe



All the machinists' skills were taught at the factory and local colleges. In the early 1960s, Lostock took over 120 apprentices a year

Large independent aircraft companies that had expanded post-war realised that they would be more competitive if they combined resources, factories, technologies and expertise. Hawker Siddeley Aircraft was already well-established as a major manufacturer of aircraft when it merged with De Havilland Aircraft Company and Blackburn Aircraft Company in 1960.



Stan Lines managed Lostock from 1958. When it became Hawker Siddeley he was promoted to Northern Group Production Director

In 1963 the Hawker Siddeley Group formed a new company to take responsibility for all missile, aerospace and aircraft equipment interests. Lostock became Hawker Siddeley Dynamics Ltd, and this created a manufacturing powerhouse. Lostock continued to manufacture propellers, but the focus was shifting to guided missiles, with the success of Firestreak encouraging the MoD to invest further in this technology.

THE BIGGEST MACHINE SHOP IN EUROPE

During the 1960s, Lostock established a reputation for manufacturing excellence and was acknowledged as the biggest machine shop in Europe. One account in the 1960s records “nearly 1,200 machine tools under one roof”, while a *Financial Times* article, dated July 19 1960, reported that Lostock had about 1,500 machine tools. The operation serviced many of the equipment needs of all three UK armed forces. Reports also routinely referred to Lostock as the largest “jobbing” engineering machine shop in the UK.

Neville Butler recalls the first time he came on site as “just overpowering”. “The size of the site and the size of the machine shop especially was really something that had to be seen to be believed.” John Wilson, at Lostock from 1962 to the present day, recalls “being walked across to the machine shop, shaking in my boots with all of the machines and the

noise and stuff like that”. Others, like Bernie Waldron (1971 - present) and Gareth Humphreys (1975 to 2016) remember the legendary Burma Road. This was the main employee entrance and route down the machine shop – and “as soon as you walked through you could see the whole length of the Burma Road, except you couldn’t, because it was covered in a mist of coolant. So the further down the road you looked, and it was over a quarter of a mile long, you actually lost perspective as if a fog was coming in. As you walked in, you walked into the fog, and I remember distinctly going home in the early days as an apprentice, and my mother actually saying to me, ‘go and get a bath, you smell!’”

Machine operators routinely wore white operator coats as standard – an indication of an era when shopfloor engineering was held in very high esteem. The apprentice intake in the early 1960s was more than 100 a year. When local historian David Kaye began his apprenticeship in 1959, the company took 132 apprentices.

TECHNOLOGICAL CHANGES

Production technology was advancing. In 1960 Lostock introduced a computer and punched card installation to control manufacturing procedures. Large-scale “jobbing” engineering (or discrete manufacturing) did not readily lend itself to many of the standard or volume production control



Red Top missile on EE Lightning

methods used in industry, but the card system – an early form of production scheduling – was devised. It ensured that the greatest and best use was made of about 1,500 machine tools and, additionally, “shortens manufacturing cycles by as much as 30 per cent,” *The Financial Times* reported.

THE BEGINNINGS OF PRODUCT DIVERSITY

The company wanted to increase its capacity and product range and moved an engine division from Hatfield to Lostock in the early 1960s, but this was short-lived. The building that housed this engine division, South Site, became Matra BAe Dynamics in 1996, becoming MBD, then finally MBDA in 2001. Eventually Lostock became so versatile as a large-scale engineering shop the phrase was coined, ‘If it’s difficult to make, send it to Lostock’, a notion that became part of company folklore.

A HARD DAYS’S FUN

The sports clubs, always a vital part of life in Lostock, were further developed in the 1960s. At one point Lostock’s Sports and Social Club had 37 sections. All the regular summer and winter sports plus some more obscure clubs and groups were catered for, and the presentations and awards – often

at county level – flowed. Boxing, croquet, drama, dancing, long distance running, model railway building – it weaved the people into the fabric of the company and underlined the community ethos of the Lancastrian working men’s clubs. In the 1960s Lostock continued to produce its own dedicated magazine for the sports clubs, called *The Norprop*, an abbreviation for propellers for the Northern Division, and was featured regularly in the company magazine, *Enterprise*.

The company periodically attracted the attention of television. In 1963, about 250 employees of all three local factories provided the audience when a ‘telerecording’ was made of the popular *Miss Sing Along* programme for ABC television in the assembly shop at Lostock. The *Bolton Evening News* reported: “After a technical rehearsal in the afternoon, the audience was admitted at 7pm but the actual recording, for transmission on Sunday, Nov. 11, was made about two hours later, against a background of propellers, undercarriages and test rigs.”

Each year Family Days seemed to up the ante of the variety of entertainment on offer. At the Family Day in June 1965, “ice creams and rides were free” and the event was for everyone, “not only the wives, sweethearts, sons and daughters of workers, but anyone who wanted to go”, said one local report. Entertainment included a trapeze artist, ‘push ball’ contests, Punch and Judy, archery, a children’s circus, a ‘personality girl’ competition and wrestling. The *Bolton Evening News* reported: “In the push-ball contest, Arthur’s Aristocrats, Randfield’s Raiders, Billington’s Bashers and Walter’s Waites heaved and strained against the huge ball which generally seemed to get the better of things.”



Lostock regularly featured in the *Bolton Evening News*. Here winning a new contract and ending a strike

PRINCIPAL PRODUCTS MADE AT LOSTOCK IN THE 1960S

• 1960 – RED TOP

Red Top was the third domestic British air-to-air missile to enter service, following the De Havilland Firestreak and limited-service Fairey Fireflash.

Red Top was originally a simpler, upgraded version of the earlier Firestreak air-to-air missile, but the changes were comprehensive. In the aftermath of the 1957 Defence White Paper, Red Top was initially seen to be a stopgap measure only until the Bloodhound Mk. II SAM came into service.

• 1964 – MARTELL

In 1964, the United Kingdom and France entered into an agreement for the joint development and production of MARTEL, or *Missile, Anti-Radar and Television*. Production contracts were placed in 1968.

ALSO IN THE 1960s:

1960: Thunderbird entered service with the British Army. It was a medium to high level air defence missile with semi-active radar guidance, manufactured at Lostock.

1961: Sea Slug enters service and was used to equip the Royal Navy’s County Class Destroyers.

Howard Cadman (1954 to 1991) remembers family days as “fantastic”. “In those days we had a sports field, close to where de Havilland landed his plane in 1936. The family days catered for all, both adults and children. We had wrestling outdoors, professional wrestlers used to come. This factory is in the heartland of sport as you know, not just football, but rugby, rugby league. We had guys who played professionally for Warrington, for Wigan, they’d turn out in the 7-a-side rugby. The competition was intense: it was like we were at war at times. It meant so much to a department to win something, it’s like bragging rights. That was the sports side of it – fantastic.”

MARTEL – THE NEXT GENERATION

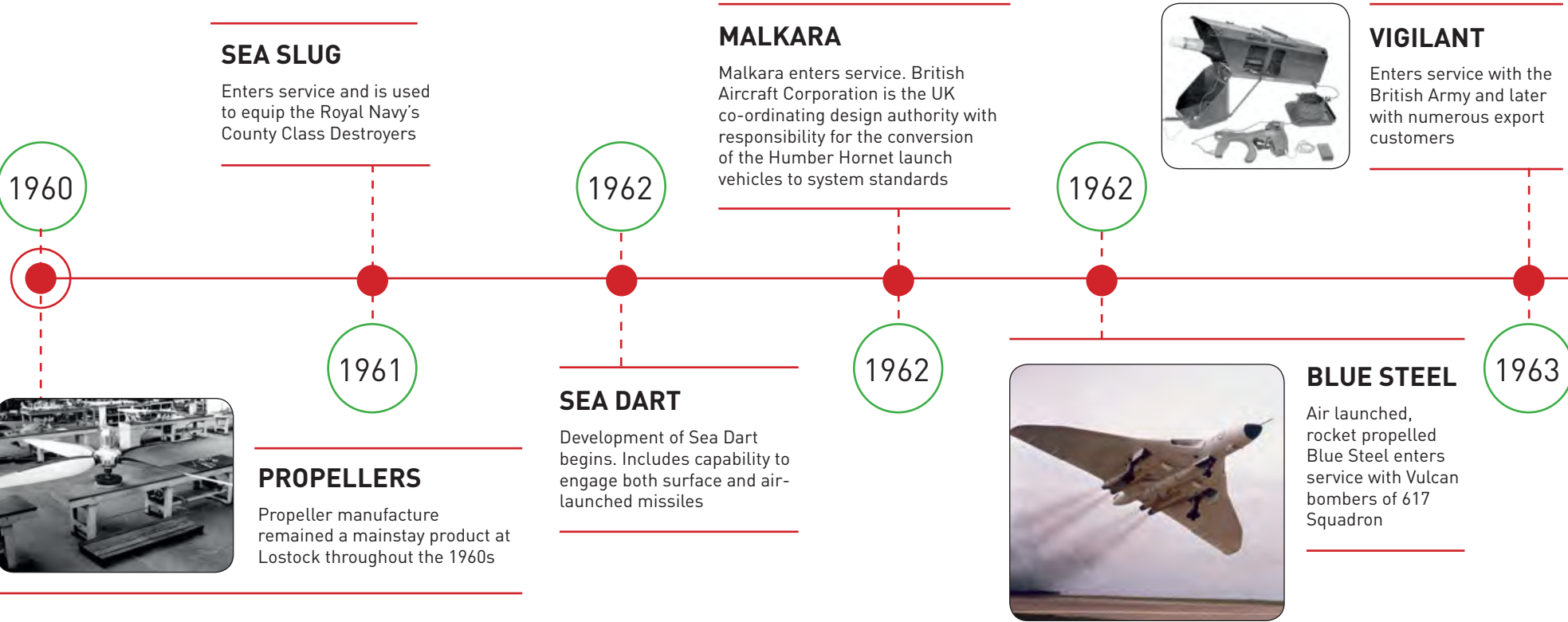
In 1968, Hawker Siddeley Dynamics Divisions and the “Ministry of Technology” signed a contract for production of television-controlled MARTEL air-to-ground missiles. The MARTEL missile had been developed jointly by HSD and S.A. Engins Matra in France, since 1964. Two versions of the missile would enter service with British forces. The TV version had a television camera mounted on the nose. The camera picture was transmitted to the launching aircraft and reproduced on a monitor screen in front of the operator, who steered the missile on to the target with a joystick. Also in 1966, Lostock helped reconstruct a propeller to be used in a surviving Spitfire from the Battle of Britain for the eponymous 1969 film. “There is probably nowhere else in Britain where this job would be a practical proposition,” noted George Nash, superintendent of the propeller repair department.



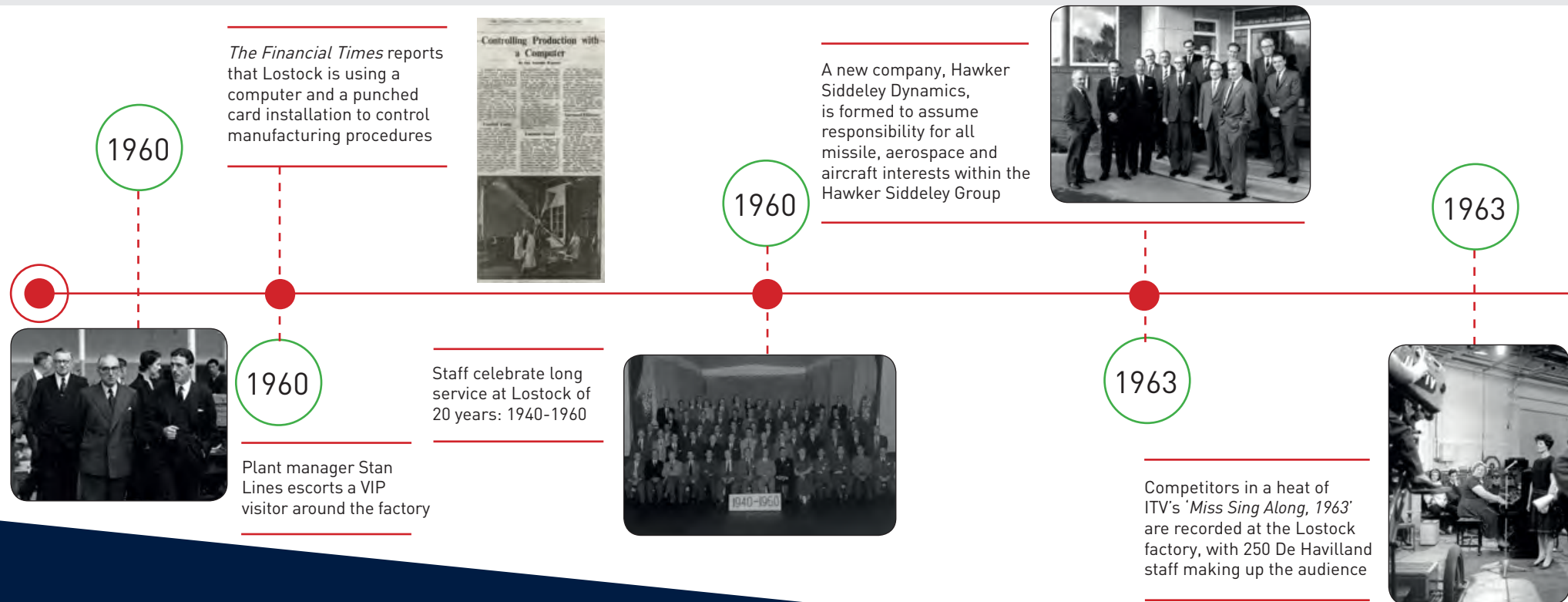
Above and right: Dance competitions and sports were part of the fabric of Lostock since the 1960s



Product Timeline 1960-1969



Company Timeline 1960-1969



1963

RED TOP & MARTEL

Red Top enters service. Red Top is seen as the successor to Firestreak in air-to-air armament. Also UK and France enter into agreement to develop MARTEL

1964



1965

THUNDERBIRD

Thunderbird is supplied to defence forces of export

1966



1966

THUNDERBIRD 2

Second generation Thunderbird 2 enters service

1966

Lostock wins contract to build TV-controlled version of MARTEL tactical strike missile

1968

SEAWOLF

Development begins on surface-to-air missile system Seawolf

1969



1969

SWINGFIRE

Swingfire system enters service with the British Army

1969

MARTEL

MARTEL system enters service. Product of an Anglo-French joint development programme. Hawker Siddeley Dynamics has prime responsibility for the T.V. guided variant and Matra for the anti-radiation variant

1965



1965

A strike by workers halts production at Lostock

1966



1966

Lostock hosts family fun day featuring trapeze artists, archery, wrestling... and free ice cream

1966



1966

More than 50 members of Hawker Siddeley management and the rugby section visit Figeac, France, accompanied by the Mayor and Mayoress of Bolton, to cement civic, industrial and sporting ties

1966



1966

Mayor visits French town

1967



1967



1967

Prize giving at the popular bowls club in 1969.

1969

A propeller for one of the original Battle of Britain Spitfires is returned to Lostock for repair. Lostock is also asked to refurbish a Hurricane propeller for a film about the battle

1970_s

Missiles, medical kits and mechanical men

The 1970s was a pivotal decade in Lostock's history. It saw huge product diversification for one of the UK's biggest and most versatile factories. It began with entry into service of the Rapier weapons system, and ended with early stage collaboration with Germany to develop a superior short range missile, ASRAAM. In the interim, Sea Dart entered service, notably on *HMS Bristol*, and development work began on the Skyflash and Sea Skua missiles.

Sea Skua went on to serve with the navies of six countries, including Kuwait and Korea, and was combat proven in the Falklands War and the First Gulf War.

BRITISH AEROSPACE

On 29 April 1977, the Aircraft and Shipbuilding Industries Act saw the nationalisation of Hawker Siddeley Aviation and the Hawker Siddeley Dynamics Divisions (HSD), which were merged with British Aircraft Corporation to create a new entity – British Aerospace.

Gerald Kaufman MP, then Minister of State at the Department of Industry, visited Lostock in 1976 as part of a national tour of aerospace companies, consulting with unions and HSD management on the structure of the new organisation. At the time, Kaufman told them that the new company would need to "earn its keep". The Act had a stormy passage through Parliament and saw three rejections by the House of Lords, before finally becoming law.



'MECHANICAL MEN' AND CIGARETTE MACHINES

The 1970s showcased the talent and expertise at Lostock. A journalist visiting in October 1970 hailed the "mechanical men" the factory was producing and remarked approvingly that they were being exported to US and Soviet Union



HAWKER SIDDELEY DYNAMICS CHANGES TO
BRITISH AEROSPACE DYNAMICS GROUP



factories to manufacture cars. These early examples of factory automation – Versatran automatic handling machines – were among several new production technologies being deployed in Lostock operations, including numerically controlled (NC) machine tools and electron beam welding.

The *Bolton Evening News* noted that "the Lostock factory is a very different place from that established by the De Havilland company to make aircraft propellers and components". In fact, Lostock had produced a bewildering array of products by this period [see box opposite], including ships' compasses and cigarette machines. The Linescan thermographic camera was produced from 1973 to 1993 and had several variants. It was one of the first thermographic devices mounted on a low flying aircraft and flew so low that it could look into hangars to find evidence of enemy collateral.

HSD still made propellers and other equipment for hovercraft and aircraft, including the Concorde. It also made components for the HS 121 Trident, a short to medium range three-engine jet airliner, as well as guided weapons. Thirty-five orders from China for the Trident helped sustain more than 800 jobs in the machine shop at Lostock, which produced the plane's undercarriage and associated controls, and air conditioning system.

SKYFLASH AND SEA DART TAKE OFF

In 1976, there was cause for celebration as Lostock won a contract to integrate the Skyflash missile with the Swedish Airforce's Saab Viggen all-weather fighter. Skyflash – a medium range semi-active radar homing air-

to-air missile – was also carried by RAF F-4 Phantoms from 1978 and Tornado fighters in the 1980s. Bill Neill hailed the Swedish deal as “the greatest thing that has happened to Lostock for five years”. Gareth Humphreys, who on completing his apprenticeship worked on Skyflash missiles, commented that it was the Mk 2 missile that produced a “revolutionary” snap start power supply. “On the original snap start missiles,” he says, “you pressed the button and it would take seven seconds for the gyros to wind up, but on the Mk2 missiles it was more or less instantaneous – solid state as we call it today. And that was a big, big revolution in those days.”

In 1976, Sea Dart – a surface-to-air missile designed to replace the Sea Slug – was widely deployed on the Type 82 destroyer, beginning with *HMS Sheffield*. Sea Dart was also fitted to the Invincible-class aircraft carriers.

Sea Skua, a short range air-to-surface missile designed to be launched from a helicopter, initially developed from May 1972 was first launched in November 1979. The missile was a success during the Falklands War, scoring a very high hit rate, and proved its longevity: it was last fired in early 2017 by the Royal Navy and will be replaced by MBDA's Sea Venom system.

DECADE NEARS END, JOBS CREATED

In October 1978, the *Bolton Evening News* reported that up to 200 technical jobs were created in Bolton town centre following the purchase of the old Norweb building in Spa Road by British Aerospace Dynamics. Even then, there was evidence that the division had to be sharp and lean to justify the operation to its new parent, British Aerospace. Andrew Duxbury, the new unit's manager, said the plan was to build up to nearly 200 people as quickly as possible.

SPORTS, SOCIAL AND A MODEL RAILWAY

In the 1970s, Family Days continued and employees, their relatives and friends enjoyed gala days at the Hawker Siddeley Dynamics works, including one year, slapstick comedy by two clowns from a travelling circus. The weekend-long festival included the regular award of the popular Miss Lostock prize. In 1978, Lostock engineers were also busy creating a miniature railway (see clipping).

Looking to the future: Lostock adopted digital technology early. By 1978, its microelectronics unit was printing miniature electronics circuits onto a ceramic base to create 'mynapaks', or the miniaturised pieces of circuitry providing the brains for the latest generation of guided weapons – a



Above left: The new Skyflash air-to-air missile, developed from 1972, mounted on an aircraft

Above right: Lotus Elan Plus 2 engines were made in the 1970s, and much more

facility said to be one of the most advanced in Europe.

Bernie Waldron believes that the advent of guided weapons gave the company the opportunity to develop electronics capability. “We were already very competent in terms of our skill base for mechanics and mechanical engineering,” says Waldron, “but less so in the world of electronics. We’re talking about electronics in the technical sense here, at the transistor level. We were also quite forward-thinking, in so much as establishing the value of the application of printed circuit boards and, as a consequence of that, the need to be more

vertically integrated. We invested quite heavily in our own development set-up for the manufacture of un-populated PCBs [printed circuit boards].”

Waldron says the most challenging electronic board that Lostock made in those days was for Sea Eagle, the mother board for the trajectory control unit. He adds: “Following that we needed to think about how to manufacture cards and how cards were populated with components, which technology to use, dual in-lines to standalone components, extensive variety of hard-wired components, and so on.

“It was a significant investment in the technology of the day, and we were at the forefront of the manufacturing technology.”



MORE THAN MISSILES AND PROPS: LOSTOCK'S capability grows

Further product diversification in the 1970s: Some of the products manufactured at Lostock during the 1970s and into the 1980s included:

- Components for armoured cars
- Air compressors
- Cigarette machine production, including inspection devices and packaging machinery
- Control equipment for marine propulsion
- Engines for the Lotus Elan Plus 2, Lotus Elite and Jensen Healey sports cars
- Helicopter gearboxes
- Hovercraft components
- Machine tool controls
- Marine components and navigational equipment
- Medical equipment such as pacemakers
- Mining equipment
- Mechanical handling equipment
- Process machinery
- Paper making equipment
- Diesel engines
- Railway equipment
- Ships compasses for SG Brown
- Shoe manufacturing equipment
- Mechanical and electro-mechanical clutches
- Solenoid valves
- Vibration equipment
- Vending machines
- Rotary actuators
- Linescan – a range of small, lightweight, high performance infra-red camera systems
- Fuel systems

WEAPON SYSTEMS MADE AT LOSTOCK IN THE 1970S

Sea Dart – an all round anti-aircraft, anti-missile, anti-ship missile. This missile had nine successful engagements in combat, including six aircraft, two helicopters and a missile.

Sea Slug – a surface-to-air missile designed by Armstrong Whitworth, which became part of the Hawker Siddeley group.

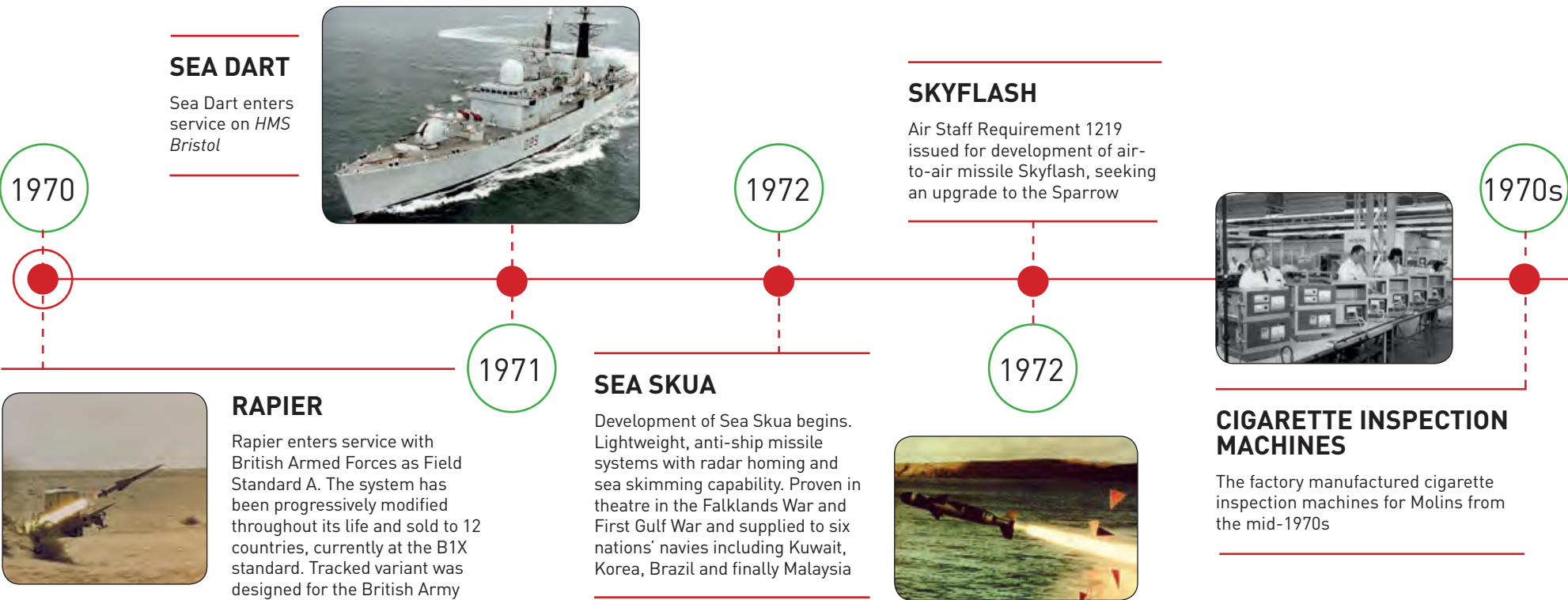
Skyflash – a medium range semi-active radar homing air-to-air missile. Skyflash was developed from the end of the 1960s. It was derived from the US AIM-7 Sparrow missile.

Seawolf – Developed by British Aircraft Corporation since 1967, company becomes BAe Dynamics in 1977. Seawolf enters Royal Navy service in 1979.

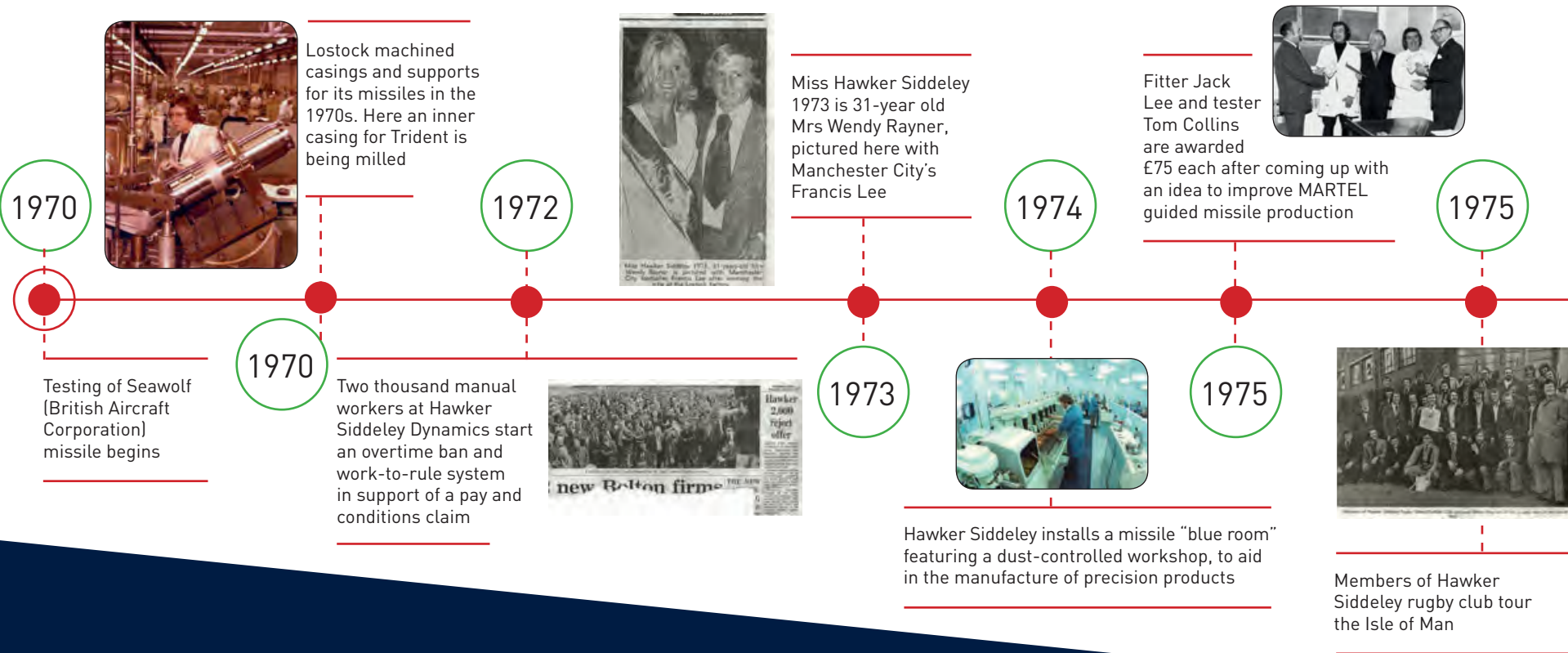


Model railway enthusiasts created a multi-gauge mini railway

Product Timeline 1970-1979



Company Timeline 1970-1979



1974

SG BROWN SHIPS COMPASSES

S.G. Brown was sold to Hawker Siddeley in 1960. Manufacture of its gyroscopes stepped up in the 1970s

MILAN

British Aerospace gets involved with Milan, anti-tank system. Begins manufacturing under licence from Euromissile

1976



Skyflash missile enters service on the F-4 Phantom II

1978



1979

SPARROW

A Lostock production team assembled the 500th Sparrow missile in 1979



1979

SEA EAGLE

Development starts on Sea Eagle, an air-to-surface anti-ship missile with active radar homing inertial navigation

SEAWOLF

Seawolf enters service with the Royal Navy on HMS Broadsword. Missiles are fired from a six-barrel loader and loaded manually

1979



1975

Apprentice awards have taken place every year since 1948 – this image was number 28 and hosted by Commodore LS Bryson with Bernard Waldron in the centre holding a trophy



The Central Electricity Generating Board uses a 'heat spy' built by Hawker Siddeley to detect lost heat from power stations

1976



Shipborne trials of the VL Seawolf missile begin on a modified Leander class frigate

Nationalisation: On 29 April 1977, the Aircraft and Shipbuilding Industries Act sees the nationalisation of Hawker Siddeley Aviation and Hawker Siddeley Dynamics Divisions, which are merged with British Aircraft Corporation to create British Aerospace



1977

The Lostock Cricket Club celebrates 40 years of nearly continuous play in 1977



1977

1979

W.T. 'Bill' Neill, Lostock director, is rewarded with an OBE. It is the second major honour for Neill, who received the MBE in 1946 for his work on modifications to aircraft such as the B-22 Liberator and B-17 Flying Fortresses



Sandra Bailey from the data processing department is selected as Miss Darts World Personality Girl for November. Sandra plays for the 'Pam's People' team in the Inter-Section Darts Competition

1979



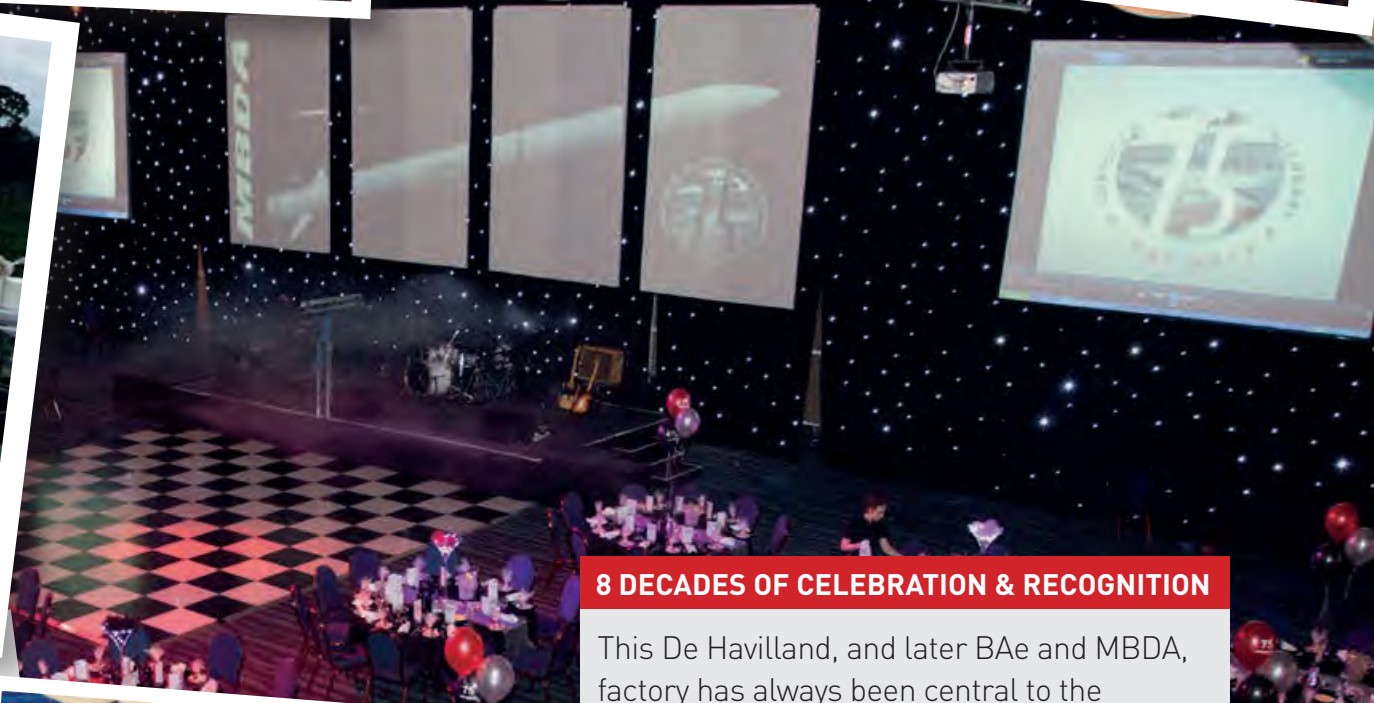
WORK HARD, PLAY HARD:

80-years of awards and celebrations





**GOLDEN JUBILEE
CELEBRATION**
14th August,
7.45 p.m till Midnight,
on the Sports Field.
Lasers/Fireworks
Cheap Drinks
Steel Band
Lostock Video
30/40's Music
Disco
Jazz
Barbecue
Applications for Tickets to Keith Gretton
by the 5th August



8 DECADES OF CELEBRATION & RECOGNITION

This De Havilland, and later BAe and MBDA, factory has always been central to the community of the Bolton region. The company gave to the people, and they gave their service in return. To recognise its employees, Lostock gave big parties for its 50th, 60th, 70th and 75th birthdays. It regularly recognised long service, with awards going to employees who had given 20 and 40-years service. Lostock's 1987 Golden Jubilee party was the toast of Lancashire for years - 6,000 guests celebrated 50-years of manufacturing!



1980s



The company remains **BRITISH AEROSPACE**
DYNAMICS through the 1980s

Community spirit – and consolidation

LOSTOCK EXPLOITS NEW TECHNOLOGIES

The 1980s were a tough decade for the UK defence industry. It began with the 1981 Defence Review, the main aim of which was to reduce spending on defence, as the early 1980s recession hit the economy hard.

The Royal Navy was worst hit by the Review. It proposed selling the new aircraft carrier, *HMS Invincible*, to Australia, and extensive cuts to Royal Navy personnel, including a reduction in manpower of between 8,000 and 10,000.

These difficult times for the defence industry did not leave Lostock unscathed. The main impact was the cancellation of the Skyflash 2 medium range air-to-air missile intended for the RAF. Four managing directors ran Lostock over the decade, reflecting a difficult period for the company. Employment at Lostock also fell from about 4,500 in 1979 to about 990 in 1990.

However there were also many bright spots. The Sea Eagle programme – a medium weight sea-skimming anti-ship missile – got the go-ahead, to the relief of workers and management at the factory. The missile, dubbed “Britain’s first thinking missile”, entered service in 1985 and went on to be used by the RAF, Royal Navy, the Royal Saudi Air Force and the Indian Navy. The majority of the machining, assembly and environmental work for the Sea Eagle was carried out at Lostock.



Don Dewin was Managing Director from 1988 to 1993, overseeing a big reduction in headcount

In November 1982 Lostock’s new £2.5 million training centre also opened its doors. In fact, in this period, despite



Handover of the final Sea Dart production missile to the UK MoD, 1989

the recession, British Aerospace had more than 3,000 engineering trainees in service across the country, the Bolton Evening News reported. There were no less than 400 apprentices at Lostock at this time, and the plant continued to rely on the ingenuity of staff to improve its day-to-day manufacturing operations. This was demonstrated by the winner of the 1980 Suggestion of the Year Award, Billy Walch, an electrical fitter in the repair department on the mezzanine floor. Walch devised a method for protecting exposed wires on a small, intricate missile assembly unit by using encapsulation. He won £500 for his ingenuity.

During the 1980s, Lostock expanded its product range, manufacturing six-blade ATP propellers as well as weapons platforms including Skyflash, Sea Eagle and ALARM. The six-blade propellers were for the British Aerospace ATP – Advanced Turboprop Airliner – introduced in that decade as a short range, low noise, fuel-efficient turboprop aircraft. By the time the ATP entered the market the segment was already well served by aircraft such as the De Havilland Canada Dash 8, ATR 42 and ATR 72. Just 64 British Aerospace ATPs were built as a result.

Meanwhile, a key non-aerospace and defence product was Linescan 2000. A ground-based targeting system, it was manufactured from concept to delivery in record time. In 1985 British Aerospace granted a manufacturing licence for Linescan to Vinten. A variant, a high resolution film camera called Linescan 401, was also manufactured here. In the same year, Lostock won the ALARM contract. ALARM, or air-launched anti-radiation missile, faced competition from the US HARM missile – high-speed anti-radiation – which it was suggested could be made in the UK by Lucas Aerospace. To the relief of Lostock, ALARM, which was developed by British Aerospace at a cost of more than £3 million, won the contract.

Lostock Life noted the advantages of the ALARM system:

“It is less costly than its competitor; it is lighter, so could be carried by launch aircraft; it has fewer integration problems (which means it can be more easily fitted to the RAF’s existing aircraft); and it has excellent export potential.”

The *Bolton Evening News* reported in July 1983 that the Cabinet had been split on which missile to choose, with

Prime Minister Margaret Thatcher and Defence Secretary Michael Heseltine backing ALARM, while Chancellor Nigel Lawson and Foreign Secretary Sir Geoffrey Howe backed the American missile system.

Environmental testing capability: A much higher volume of environmental testing of weapons systems happened in the 1980s, with the development of screened chambers for functional testing under extreme temperature and vibration to ensure that missiles had been built correctly. These systems had been developed for Skyflash and used subsequently for other systems. Wind tunnel qualification testing of the ATP six-blade propellers had demonstrated that they reduced noise to a minimum, saved fuel and eliminated vibration.

JOURNEY TO WORLD CLASS

When Lostock was named as the manufacturing centre for British Aerospace Dynamics in 1989, it heralded a major process change. Firstly Dynamics rationalised the real estate from five sites to three. The factory implemented sweeping plans to become “world class”, through several substantial measures, including the divestment of non-core businesses, increasing employee involvement, having flexible working practices, the ownership of quality by every employee and the consolidation of a safe and healthy working environment.

Rationalisation of Dynamics

Seismic changes that raised Lostock’s operational excellence in the 1980s included:

- **Became the first British Aerospace Company to fully introduce Lean Manufacturing Techniques.**
- **Organisational structure was flattened from 8 to 4 levels.**
- **Each level was hand-picked from top to bottom to promote an environment of mutual trust.**
- **Traditional jobs like charge hands, foremen and superintendents were replaced by Team Leaders and Group Managers.**
- **Team briefings and “Cascade” were introduced.**
- **The famous Kawasaki Production System employing kanban and two-bin system was introduced. Integrated Production teams were introduced and Continuous Improvement Activity groups established.**
- **Supply chain management introduced.**
- **Trade union cooperation improved through involvement in the decision making process.**

SPORTS AND SOCIAL IN THE 1980S

The Lostock Players, the factory’s own amateur dramatics society, reformed in 1985. Their first production was *Cat Among the Pigeons* by English playwright Duncan Greenwood. Members of the Sports and Social Club also showed a keen adventurous streak, joining an expedition to scale part of Mount Kenchenjunga in the Himalayas, after first training on Mount Snowdon.



Miss Lostock was an important part of Lostock culture through the 1970s into the 1990s. Debbie Whittle took the crown in June 1986

Despite some tough times in the 1980s, Lostock continued to nurture excellent community spirit. Doreen Sharples, the company’s official archivist, kept an impressive record of company events at the BAe library. Her successor, Lostock archivist Mick Crossley, as the Manchester Young Citizen of the Year, met Her Majesty The Queen at the opening of the G-MEX centre, presenting her with flowers after the official plaque opening.

Long-serving members of staff continued to be honoured, with Gordon Bibby, the foreman for Skyflash assembly, collecting a gold watch in 1985 for 20-years service. By now, employees were routinely being awarded Mappin & Webb watches for 20-years service and carriage clocks for 40-years service. In fact, in 1981, Freda Gerrard became the first Lostock lady to join the prestigious 40-years service club.

50 YEARS OF MANUFACTURING

The factory reached a huge milestone in 1987 when Lostock marked **50 years of continuous engineering and manufacturing activity at the factory**. Remarkably, under four different company names, manufacturing had taken place here non-stop over the past five decades. Lostock celebrated in style, the Sports and Social Club putting on a huge bash for employees. More than 6,000 staff, former employees and their families enjoyed beer priced at the original, inflation-adjusted 1937 2p a pint, five vast marquees, laser light shows, and discos. It was almost certainly the biggest celebration that Lostock, possibly the Bolton region, has ever hosted.

In 1989, the decision was made to shut down the British Aerospace Design Centre at Spa Road in Bolton’s town centre. Engineers from the factory were deployed to Lostock to work on guided weapons. A BAe spokesperson told the *Bolton Evening News* that while the move would not create more jobs, it would mean that existing employment at the factory was safeguarded. Lostock was now a technologically advanced facility, demonstrated by securing the British Standard 9766 for production of complex eight-layer, flexi-rigid printed circuit boards (PCBs), making BAe Dynamics



The Golden Jubilee celebration in August 1987 was Lostock’s biggest ever party. 6,000 staff, family & friends celebrated its 50th birthday

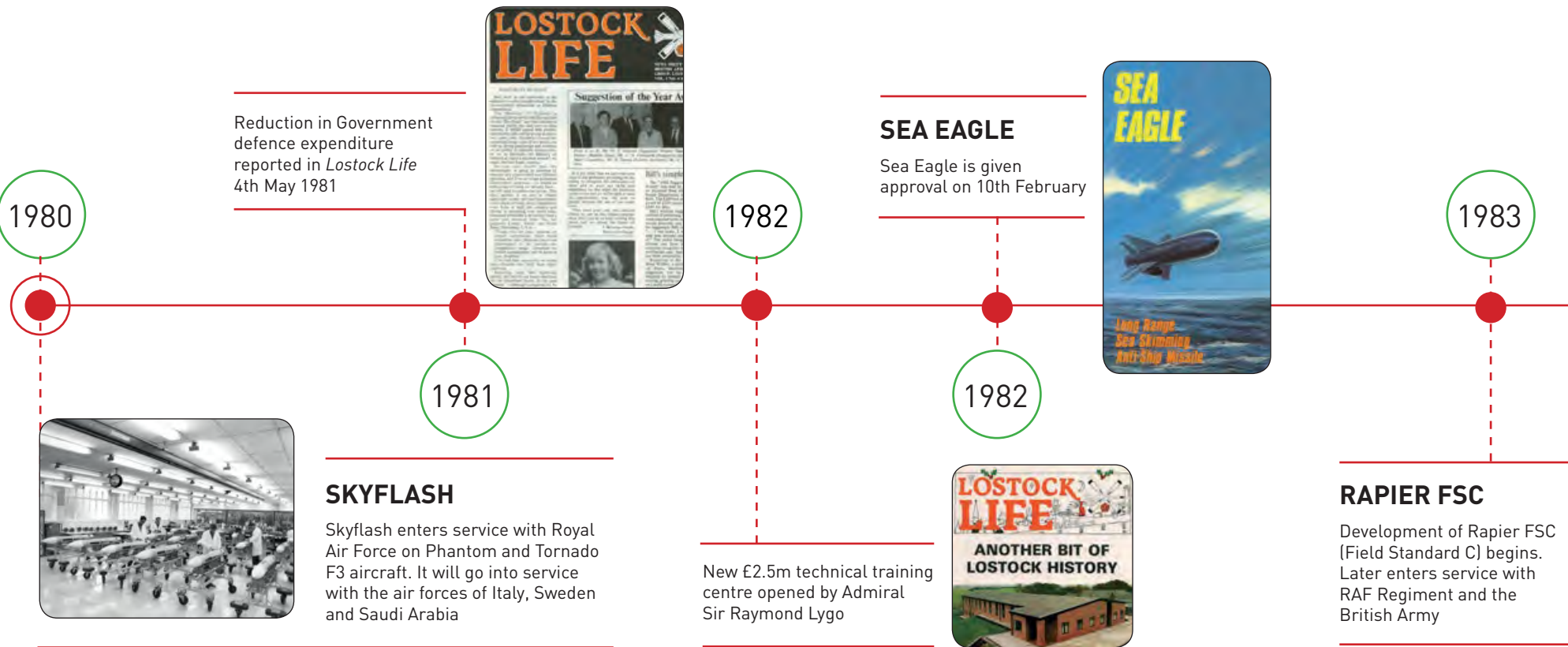
the only British company to hold the standard. At this time, eight layer PCBs were produced by Lostock for customers including Fairey Hydraulics and Lucas Aerospace. In order to attain the BS standard, regular independent audits of the Lostock PCB facilities were made.

The troubled decade ended with jobs cuts at Lostock and industrial unrest as the workforce came to terms with rationalisation in the defence industry. Meanwhile, ASRAAM short range infra-red homing air-to-air missile programme, a development between British Aerospace and Germany, stalled. In fact, Germany abandoned the ASRAAM programme after examining the latest Soviet designs and concluding that a missile with greater manoeuvrability was needed. The British proceeded on their own, but the missile would not be introduced into RAF service until 1998.

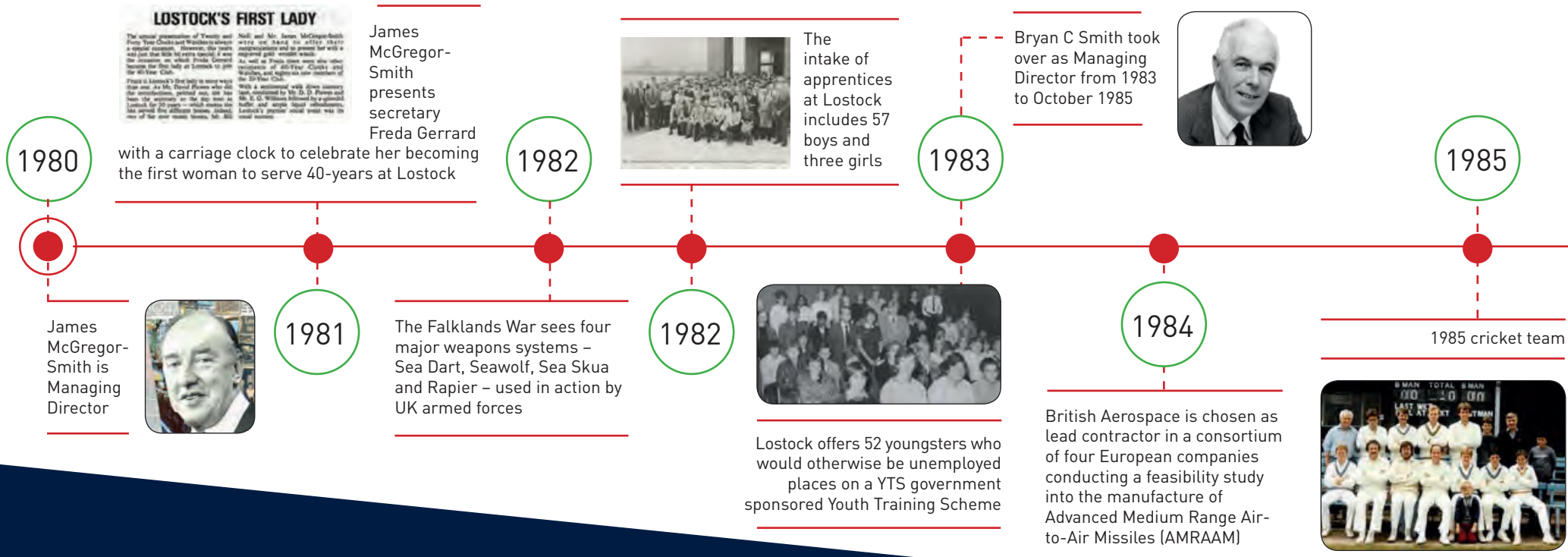
In October 1989, the *Bolton Evening News* reported that British Aerospace was “doing everything it could” to avoid compulsory redundancies at Lostock. Workers were told that 350 jobs would be shed over a 12-month period. This led to the prospect of strike action. Bolton MP Tom Sackville blasted union officials for stirring up trouble, accusing them of union militancy. The Evening News reported him as saying: “I must point out... the absurdity of your supporting this action at a time when the aerospace industry is increasingly vulnerable to foreign competition.”

The decade closed, then, with the positivity of a solid order book but the factory troubled by rumblings with the unions, and the threat of redundancies hanging over staff. More happily, the investments made earlier in the decade for staff training continued to pay off. In this decade, BAe Dynamics Lostock had become the first British Aerospace company to fully implement Lean Manufacturing techniques. It was reported that “young people at British Aerospace [Lostock] were continuing to excel academically, professionally and personally, which means the firm can look forward to a bright future”. The company had weathered a tough decade – and manufacturing at a leaner, more capable Lostock was set to continue for many more years.

Product Timeline 1980-1989



Company Timeline 1980-1989





ALARM

Development begins of air launched anti-radiation missile - ALARM. It features passive radar guidance

SEA EAGLE

Enters service on RAF Buccaneers and Sea Harriers. It was carried by Tornado GR1 aircraft until 2000



Lostock manufactured landing gear for the Nimrod programme. It was eventually cancelled by the MoD

1983

Celebrating manufacture of the 1,000th Skyflash missile



1984



Lostock receives order for Sea Eagle missiles from the Indian Navy

1985

1985

1986



First flight of aircraft powered by the British Aerospace ATP, or Advanced Turbo-Prop, Hawker Siddeley's final propeller programme

1988

1989

Lostock named as the main manufacturing centre for British Aerospace Dynamics

Carol Jones, a material specialist and lab technician in the Plastics Development Department, is awarded her BSc following three years of day release study



1985



"Best ever" factory open day celebrates a "superb" Miss Lostock contest where Debbie Whittle triumphs

1986

Lostock employee Mick Crossley, Manchester's young citizen of 1986, greets HM The Queen's at the opening of the Manchester G-MEX Centre



Eric Farnworth is Managing Director



1986



Don Dewin becomes Managing Director, the fourth MD of the 1980s

1988

The Aircraft Equipment Department is approached by the Battle of Britain Memorial team to overhaul four propellers on the Lancaster Bomber



1989

Lostock Life, the factory's in-house magazine, ceases publication. It ran through some of the 1970s and up to 1989

1989

1985



A piece of hot steel swarf flies from a lathe and welds itself to apprentice Glen Winnard's safety spectacles. The incident is chronicled in *Lostock Life*, the company newspaper

1986

1990_s



Matra BAe Dynamics

BRITISH AEROSPACE DYNAMICS
CHANGES TO MATRA BAe DYNAMICS

A pan-European company evolves

The Tornado Flying Controls team proudly display their product range. Even in the mid-1990s Lostock manufactured far more than weapons systems



The 1990s were a challenging decade for Lostock and her employees, with their spirit and her future tested by the realities of a shrinking UK defence budget. The days of 'DeHappyland' were just fond memories. By the end of the decade, BAe Dynamics had merged with the missile element of Matra Defense of France to create Matra BAe Dynamics. Both parent companies had been faced with a common dilemma and, encouraged by both national governments and a common programme – Storm Shadow – the new company was born. Lostock had become international: a UK manufacturing asset in Europe's largest missile manufacturer.

STORM SHADOW: A VERY MODERN MISSILE

British Aerospace Dynamics, in partnership with Matra Defense, was selected by the UK Ministry of Defence in July 1996 to design, develop and produce Storm Shadow to meet requirements for a conventionally armed stand-off missile.

Storm Shadow was chosen after rigorous evaluation against intense international competition. It uses technologies derived from the Matra Apache A anti-runway weapon and was developed in parallel with the Apache EG, a missile designed to meet similar requirements in the French Air Force.

Storm Shadow is used for long-range precision attacks, at day and in the night and in adverse weather, and against high value static and stationary targets. The missile has a large launch envelope, from low to medium altitudes,

offering considerable flexibility. Storm Shadow also enjoys a 'fire and forget' capability, minimising pilot workload.

Following launch, the missile descends to a very low altitude for its transit flight to the target. The inertial navigation is updated continuously throughout this phase of flight by both GPS and TERPROM terrain reference navigation, providing very good accuracy, redundancy and resistance to countermeasures.

In the final approach to the target, the seeker is activated and the missile will commence a terminal 'pop up' manoeuvre to enable the high resolution infra-red seeker to view the scene and achieve the optimum dive angle for warhead effectiveness. Automatic target recognition algorithms match the scene and refine the aim point to achieve very high terminal accuracy.

The missile has a long range capability and can be carried by the RAF Tornado GR4, Italian Tornado IDS, Saab Gripen, and Eurofighter Typhoon.



Lostock Managing Directors of the 1990s:
From left: Geoff Butterworth, Tom Mather, Steve Debonnaire and Terry Standing

The 1990s were a decade of highs and lows. BAe Dynamics and then MBD secured crucial domestic orders for Sea Eagle and Storm Shadow. Significant manufacturing milestones were achieved on programmes such as Rapier, ALARM and Sea Dart. But the highs were punctuated by regular job losses as the company downsized and battled fierce and intense international competition in the domestic market, and falling worldwide defence budgets. As local MP Tom Sackville (Bolton West) told the *Bolton News*, "There is no point in us competing with the French and then being beaten by the US."

Despite the successful deployment of Lostock-produced missiles in the First Gulf War, additional orders were not placed and, in March 1991, 620 voluntary redundancies, mainly in manufacturing but some in support and administration jobs, were announced – effectively reducing the workforce by 25 per cent.

Long-serving employee John Wilson was part of the selection process on more than one occasion. He says: "It was a pretty tough time. But I thought people managed it very well. You spoke to people, and they understood what the issues were. "We are all intelligent



Technicians put on a fabulous show for the roll-out of Rapier 2000

people and they could see what was happening in the outside world.”

Barry Knowles, a senior trade union official with more than 40 years’ service, adds: “For the future, and all the work we went on to do, we had to suffer the redundancies. We had to survive.” Barry says there was considerable solidarity at Lostock. “We got through those times by working together and doing what we had to do, changing working practices. And now we’re reaping the benefits.”

There was also good news. Amid the shock of the magnitude of defence cuts, the MoD announced that a new advanced short range air-to-air missile (ASRAAM) would replace the RAF’s Sidewinder, securing the remaining jobs at Lostock well into the 1990s. By 1992, the programme had the green light as a joint venture with Hughes Aircraft of the US. Eighty per cent of the contract was to be carried out in Britain at both Dynamics plants in Stevenage and Lostock, and at the Hughes factory in Glenrothes, Fife.

Bernie Waldron stresses that despite all the issues of future workload, the site developed some important missiles at this time. He says: “Lostock was moving into more volume-based products like Rapier, Jernas and ASRAAM. As a direct consequence of its migration from Stevenage, Rapier became a product that we transferred, enhanced the skill set, learned about the functionality of the product, and then built on that opportunity with the introduction of Rapier Mk2.”



Far left: The Kawasaki Production System and other lean practices were introduced to help Lostock improve its competitiveness during a challenging decade, where “lean” became the mantra for manufacturing companies.
Left: Team that built the First Guided Firing ASRAAM at Lostock

Rapier and Jernas taught Lostock an awful lot about complexity, Waldron adds, particularly in terms of ground equipment. “ASRAAM was an even greater opportunity, because we had to learn to do things differently. We planned our ability to build ASRAAMs at a rate in excess of 100 a month, five years before we actually had to do it – and we did it.”

LOSTOCK GOES LEAN

To keep competitive, management sought to introduce best practice from other industries. In the early 1990s under Don Dewin, consultancy Price Waterhouse were hired to implement the Kawasaki Production System, or KPS, and the concept of Integrated Production Teams. “Each supervisor, team leader, engineer, plant operator, the logistics manager – all the roles within the IPT teams would meet at 8.45am every morning to discuss that day’s problems,” says Mick Crossley. It was a new way of working and introduced lean tools and productivity accountability to the manufacturing teams, for the better. The Lostock Manufacturing Execution System moved from being a ‘push-based’ solution, where the challenge was keeping the machine busy, to a ‘pull-based’ one – no consumption, no production.

Other ideas to increase productivity, such as concurrent engineering and balanced scorecards, themselves within Balanced Manufacturing Strategies, were introduced under then plant manager, Geoff Butterworth, and his successor, Tom Mather. In a sign of how difficult times were, the factory had five different bosses through the 1990s: Don Dewin, Geoff Butterworth, Tom Mather, Steve Debonnaire and Terry Standing.

In 1995 the last of the main works area that was used for Lostock’s original machine tools was cleared for the final time to make space for the roll-out of the Rapier weapon



Lostock Family Days became a legendary part of summers in the Bolton area, growing to a peak in the 1990s



No pot luck: Lostock’s Neil Williams beats six-times snooker World Champion Steve Davis

system, a joint event with the British Army. “All our technicians put on a fabulous show to herald the start of Rapier 2000,” says Mick Crossley.

END OF THE LINE FOR WEST BLOCK

By now, time had caught up with the biggest employer in Bolton and the pride of the North West defence industry. West Block closed in 1997, along with the huge adjoining car park. All operations moved to the smaller, revamped South Site building that had housed the original De Havilland engine company in the

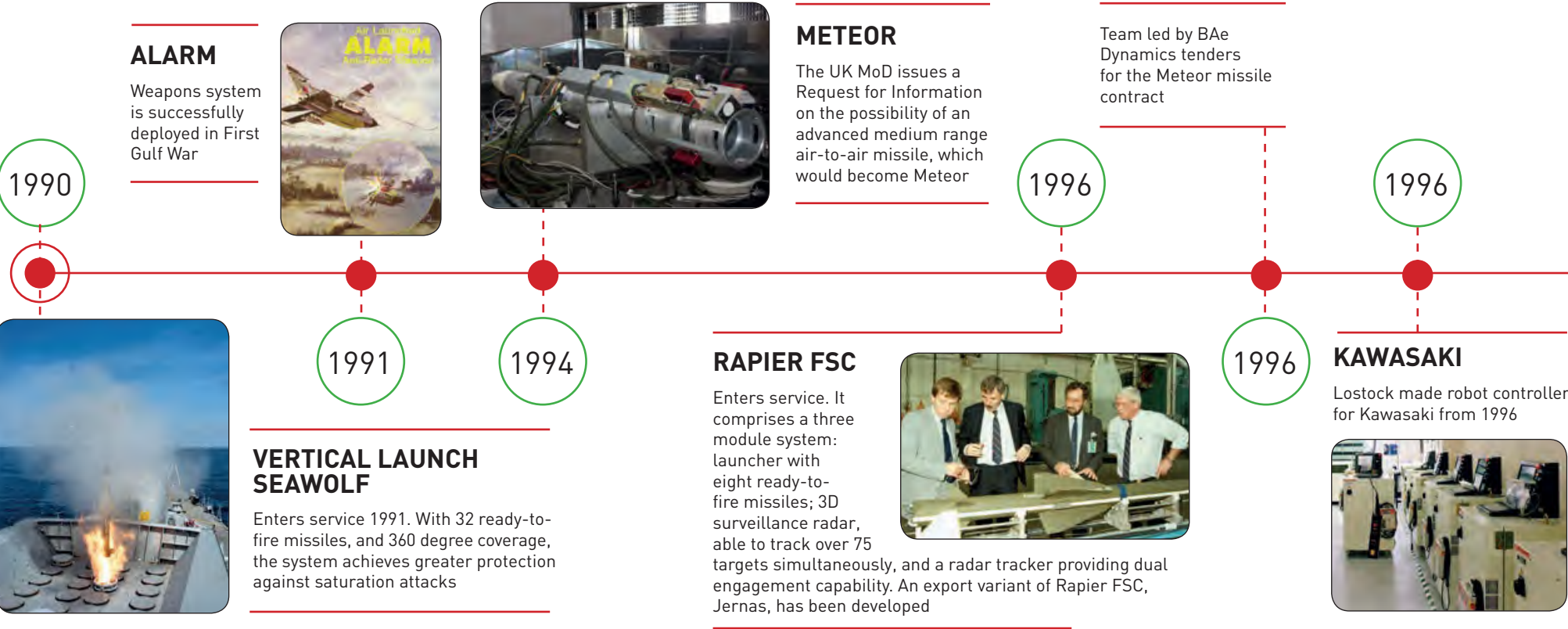
early 1960s. Modifications were made to this building in 1996 for the new missile assembly operations.

SPORTS AND SOCIAL

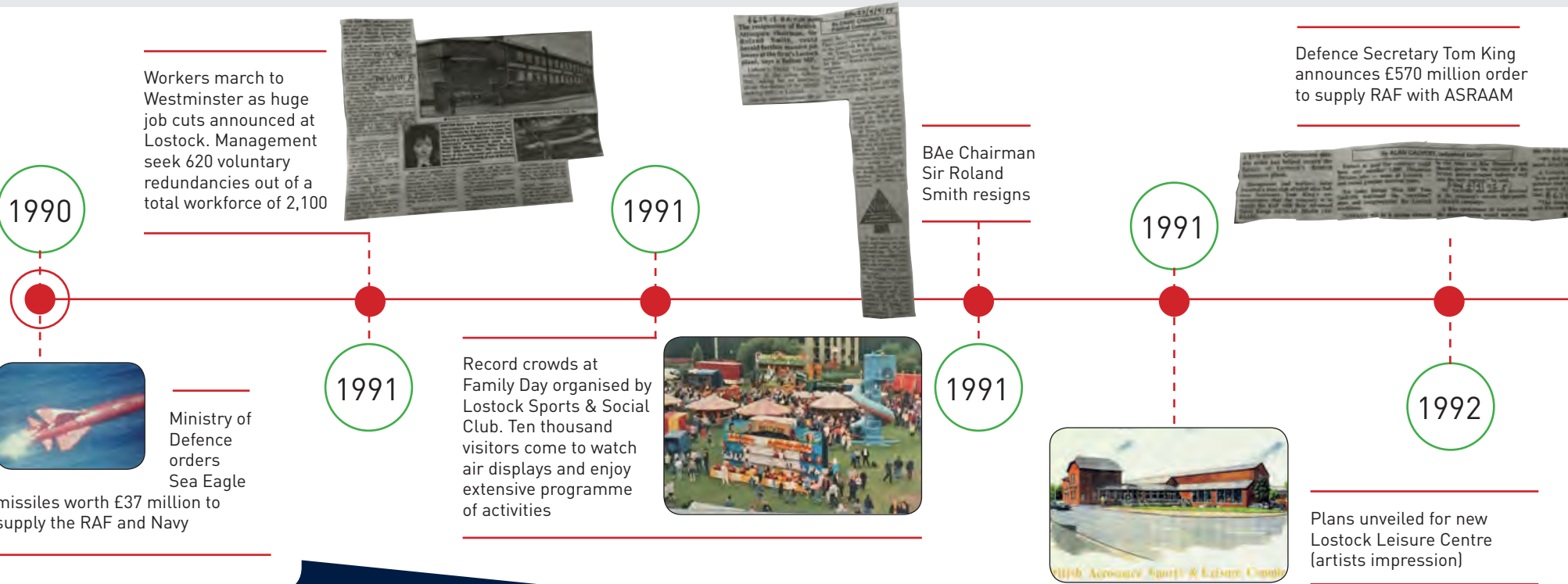
The Lostock Charity Challenge teams were launched in the 1990s and continue running to the present day, raising tens of thousands of pounds for local and national charities. And in 1995 Lostock employee Neil Williams beat snooker legend Steve Davis at his own game! The Red Arrows display team returned to Lostock in June 1996. By now, what had parochially been called ‘Family Days’ had become the rather grander ‘The Bolton Air Show and Gala Day’. Other aviation attractions in 1996 included the Pitts Sky Dancer stunt plane, the Miles M 14A Magister, the Czechoslovakian L-39 Albatross jet fighter, the De Havilland Dragon Rapid, and more.

The final Site Open Day took place in 1999. But a Lostock tradition spanning six decades was not consigned to history because in September 2017 MBDA launched its first Bolton site Open Day.

Product Timeline 1990-1999



Company Timeline 1990-1999



1997

ASRAAM

The Royal Australian Air Force orders ASRAAM air-to-air missiles to equip their F/A-18 aircraft. Intended to replace the AIM-9 Sidewinder missile on RAF fighter and attack aircraft



1999

METEOR

Paris Air Show, French Defence Minister expresses France's interest in joining the Meteor project consortium



1999

STORM SHADOW

£610m contract signed with the UK Government in January 1997 for developing and producing Storm Shadow. It arms the RAF's Tornado GR4, Harrier GR7 and Eurofighter



1998

VERTICAL LAUNCH SEAWOLF

Contract awards for Block 2 variant of Vertical Launch Seawolf

1999

SEA SKUA TEAM

BAe Dynamics made the short-range air-to-surface missile from 1977 to 1999 then MBDA continued its manufacture

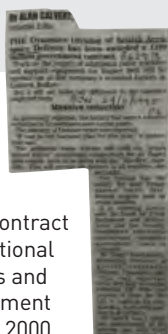


Sports & Social Club launches plan to build sports centre and buy local pub, re-named The Barnstormers



1993

Lostock is awarded a £100 million government contract to supply additional radar trackers and support equipment for the Rapier 2000



Matra BAe Dynamics holds a special ceremony to mark the opening of a new £1.5 million administration block and the 60th anniversary of the original De Havilland factory



1996

1998

1992



Geoff Butterworth takes over as Director and General Manager

1995

"Interesting": Uplift section employee Neil Williams beats snooker legend Steve Davis at his own game having won a regional heat at Snooker City Club, Farnworth



Roger Freeman, the Minister for Defence Procurement, visits the roll-out of the new Rapier 2000 missile system



1997



A fly-by by a Tornado GR1 fighter jet is part of the activities at the 1998 Bolton Air Show

2000 to 2017

Matra BAe Dynamics **MBDA**
MISSILE SYSTEMS

MATRA BAe DYNAMICS
CHANGES TO MBDA

Operation Ellamy and a new start in Bolton

As the new millennium dawned, MBDA as we know it today began to take shape. The consolidation of Europe's missile companies had begun in earnest in 1996 with the merger of Matra Defence and BAe Dynamics. Further large-scale consolidation now took place in December 2001 as France's Aérospatiale-Matra Missiles, part of EADS, the missile division of integrated defence electronics company, Anglo-Italian Alenia Marconi Systems, and Matra BAe Dynamics, merged to form a new, pan-European defence giant. They were joined in 2006 by LFK, a unit of EADS Defence and Security Systems, which went on to become MBDA Germany.

These moves made MBDA the first truly integrated defence company in Europe, and the only European firm able to provide missiles and missile systems for each branch of the armed forces: land, sea and air. In 2015, the company was working with more than 90 armed forces worldwide, had more than 10,000 employees, and took orders worth €5.2 billion. A global giant had been created.

LOSTOCK MOVES WITH THE TIMES

Lostock remained a crucial facility among this expanded group of MBDA factories, which now included operations in Italy, France, Germany, Spain and the US. Bolton-born Bernard Waldron, was appointed Lostock General Manager in April 2001. Waldron, then



Lostock General Manager
from 2001, Bernard Waldron



Members of the production team celebrate completing the 1000th ASRAAM missile in 2003

aged 45, had true Lostock pedigree: he began his career at the site as a 15-year old craft apprentice in 1971. On taking over at Lostock, and in the wake of missile industry consolidation, he told the *Bolton News* that the formation of the new MBDA was "a great opportunity for Lostock and the UK manufacturing business". Waldron would go on to receive his MBE from Her Majesty The Queen in 2006.

The site was soon boosted by the decision to equip the RAF Typhoon with Meteor, a new air-to-air missile, in December 2002 in a deal worth £1.2 billion, sustaining more than 400 jobs at Lostock. The Meteor decision was taken after a major lobbying campaign by the company, unions and local MPs Ruth Kelly, David Crausby, Brian Iddon and Lindsay Hoyle. The campaign came in the face of pressure from former US president Bill Clinton on behalf of an alternative system planned by the Raytheon company, the *Bolton News* reported. Thousands of Meteors were required for the RAF's Typhoon aircraft and – in a sign of MBDA's European focus – those for the air forces of Germany, Spain and Italy. Although the signing of the contract to supply the Meteor for the Typhoon had been delayed, development work on the missile at Lostock had continued, meaning the plant was primed to supply the new weapon.

Indicating MBDA UK's technology capability, production of the ASRAAM air-to-air missile started at Lostock. At the beginning of 2002, Lostock had begun its first deliveries of ASRAAM, which was initially fitted to RAF Tornado F3 aircraft. The missile was the first infra-red seeking, air-to-

air weapon developed in the UK incorporating software-controlled technology to defeat targets in extreme conditions. ASRAAM was designed to home in on the infrared signature of the target using complex software image processing techniques.

Indeed, the ASRAAM programme was significant for a number of reasons – not least that the missile was designed to be manufactured at Lostock from day one, and a bespoke manufacturing architecture was designed, with dedicated facilities. During the development of the missile the machine shop at Lostock had closed, and the subcontracting of the missile's mechanical items had to be managed in its entirety for the first time. Rates of manufacture of the ASRAAM were also a challenge compared to Lostock's usual production methods.

MBDA: A MULTINATIONAL GROUP



Changes in the global defence industry meant that by the 2000s, MBDA was present in six European countries.

ASRAAM required a bespoke manufacturing architecture with dedicated building facilities



Testing electronics on Meteor production line



SPORTS LEGACY ADJUSTS: RUGBY & FOOTBALL FADE, CRICKET SURVIVES

In 1996 the old site on Lostock Lane, occupying 37 acres, was sold off. MBDA moved to a much smaller new building to the south of the old site. The football fields, and the bowls and cricket clubs, were given a three-year stay of execution, rent free, on the understanding that the clubs would maintain the grounds themselves. "Football, rugby and bowls withered and died, but cricket survived – somehow – and for 10 years, as in the early days of De Havilland, we begged, borrowed and pleaded for the cricket ground to keep us playing and in the league," says former Sports and Social Club cricket captain and former Hawker Siddeley apprentice, David Kaye. Other Lostock traditions were coming to an end with the last veteran's dinner, hosted by Bernie Waldron, held in 2007.

But in areas other than sport, Lostock was demonstrating considerable prowess. The factory racked up award after award and its apprenticeship programme produced some of the best and brightest apprentices in the UK. In February 2005, the Specialist Schools Trust, the lead body in the Government's programme for the UK's 1,950 specialist secondary schools, awarded its Rolls-Royce Award, one of only 14 national awards, to Lostock in recognition for work that the company had undertaken with pupils from Mount St Joseph School in Farnworth in engineering and manufacturing.

In June 2007, in further recognition of Lostock's partnerships with schools, MBDA UK won the prestigious Institution of Mechanical Engineers Manufacturing Excellence award for 'Best Partnership Between Business and Education'. The company was recognised for the depth and breadth of its educational activities across all levels of the education system. MBDA went on to receive this award for five consecutive years.

Star apprentice Jade Aspinall won the Semta Skills Awards Apprentice of the Year title in 2014 and the Best of British Engineering award



And Lostock's apprenticeship programme produced many outstanding apprentices in this period. MBDA procurement officer Bethan Sherbourne won Higher National Apprentice of the Year in 2012. Apprentice Jade Aspinall won several national and manufacturing excellence awards, winning the inaugural Semta Skills Awards Apprentice of the Year title in 2014 and the Best of British Engineering. Jade also won the Institute of Engineering and Technology's Apprentice of the Year award later that year.

Also in 2014, MBDA beat off strong opposition to win the Large Employer of the Year title at the North West National Apprenticeship Awards ceremony in Manchester. Two of its apprentices, Anna Schlautmann and Samantha Ball, were crowned Advanced Apprentice of the Year and Higher Apprentice of the Year respectively.

LOSTOCK – A SHINING EXAMPLE

In 2007-2009, the financial crisis hit industry hard. Politicians and the public began to take a renewed interest in manufacturing amid the bail-out of the banking system by Gordon Brown's government, and growing concerns over the state of the financial services sector. The award-winning Lostock site played host to scores of visits from dignitaries and VIPs keen to see British advanced engineering and manufacturing at its best.

Baroness Taylor of Bolton, the Minister for International Defence and Security, returned to the site in March 2008. The Rt Hon Sir Vince Cable, then the Business and Skills secretary, visited in January 2013. Iain Duncan-Smith, Secretary of State for Work and Pensions, visited in January 2014. And Harriett Baldwin MP, Parliamentary Under-Secretary at the MoD, paid Lostock a visit in August 2016 to announce a new ASRAAM contract. That intense interest in MBDA as a shining example of British manufacturing was still apparent in 2017, when during campaigning for the general election, Prime Minister Theresa May visited the new Bolton site. MBDA management now also undertook a major move. By 2010, Lostock had been manufacturing at the South Site for 14 years. As missile

contracts were secured, the factory was clearly configured in a sub-optimal way for the workload it needed to deliver. Bernie Waldron, Manufacturing Director, recognised the limitations of the Lostock site and undertook an extensive programme of work to prepare a business proposal for a new UK manufacturing facility. Hence the 'Genesis' project, as it was subsequently named, was born.

In consultation with MBDA in France and Italy, MBDA UK made the decision to move the factory lock, stock, and barrel to a new purpose-built factory. A site in Cutacre, Bolton, was selected because of its space and access to good roads. While management was relieved that after many years of "making it work" at Lostock, finally they could design and build a facility from scratch, where they could challenge methods, practices, processes and culture of not only the c. 400 staff who transferred but also the significant number of new staff to be housed in Bolton.

Weapons systems made at Lostock continued to play a critical role in theatre, with the Dual Mode Brimstone missile rapidly developed for the British campaigns in Afghanistan and Libya in 2010 and 2011 a particular success. "The manufacture and delivery of the Dual Mode Brimstone is probably one of our biggest successes in the past 10 years," states Lostock historian Mick Crossley. The factory, which now had just over 300 staff, doubled its output to deliver the Dual Mode Brimstone, which was used by the RAF in NATO's operation to support the UN over Libya. In excess of 500 Dual Mode Brimstones had rolled

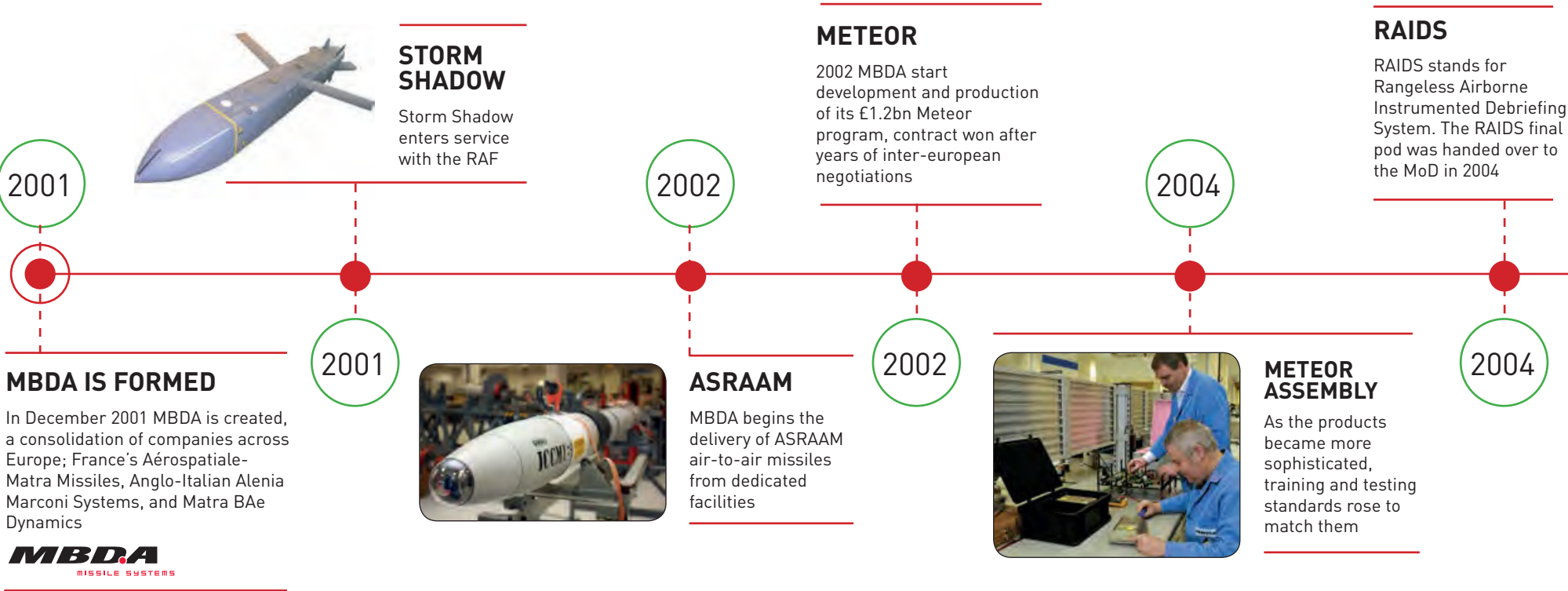


Marking the delivery of the first Brimstone with a Dual Mode seeker in 2011

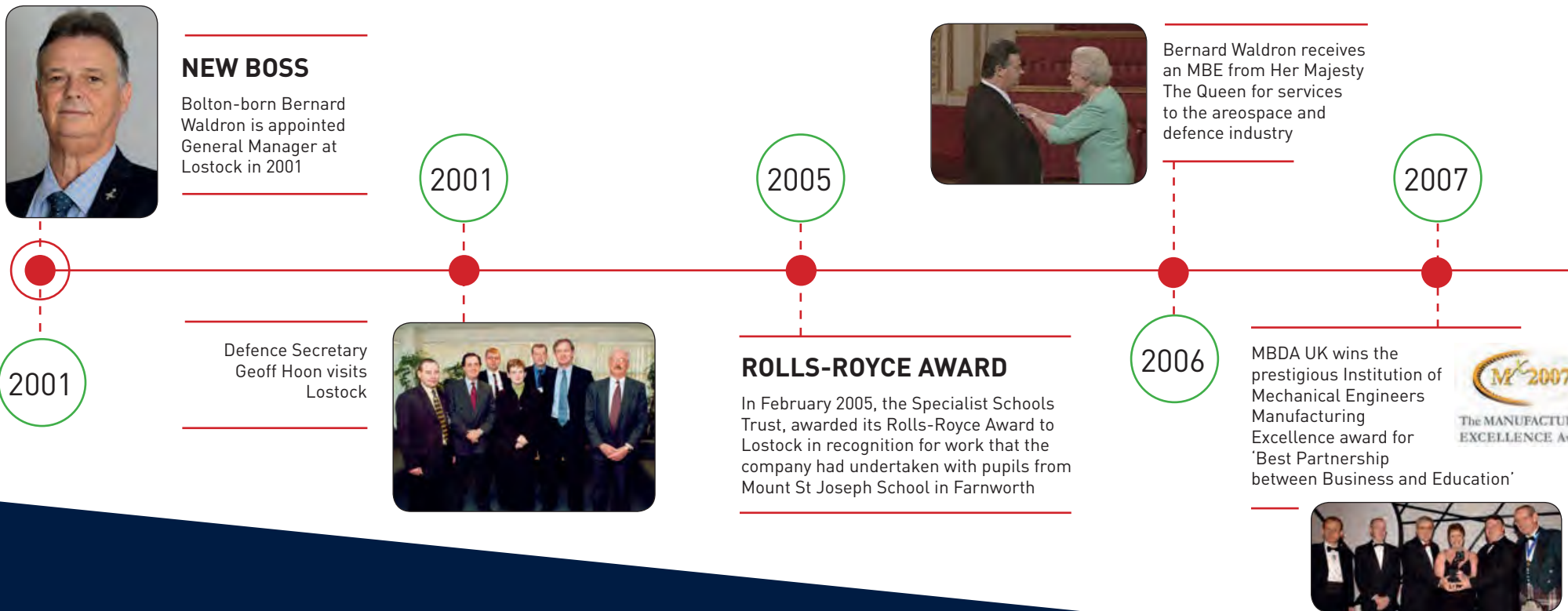
off the production line to be delivered to the MoD by early 2012. The Government praised the efforts of Lostock staff for the success of the weapon, along with MBDA's Storm Shadow. Minister for Defence, Equipment, Support and Technology Peter Luff told workers: "The use of these missiles alongside the RAF's other air-to-surface weapons was of real importance to the success of the operation to liberate the country [Libya]."

The new European giant MBDA was proving itself in international theatre – and Lostock was playing a critical role. However, now was time for its next and perhaps biggest challenge in decades – a lock, stock and barrel move of manufacturing to the new £50m site at Cutacre in Bolton.

Product Timeline 2000-2017



Company Timeline 2000-2017



2004

BRIMSTONE

Brimstone enters military service. This is later described as one of Lostock's greatest technical achievements



2007

BRIMSTONE

MBDA deliver first Dual Mode Brimstone which has enhanced laser guidance technology



CAMM

CAMM (Common Anti-air Modular Missile) production for Sea Ceptor begins at Bolton

2016

SEA DART

The final refurbished Sea Dart missile, after 32 years of production and maintenance



2005



RAPIER

2007 marks the end of the Rapier contract

2011



2017

A new ASRAAM contract is announced by Harriett Baldwin MP, Parliamentary Under-Secretary at the MoD, in August

MBDA wins the Environment Award at the local Bolton & Bury Business Awards. MBDA UK also wins the prestigious Green Apple, Gold Award at national level, sponsored by the Green Organisation

2010



Decision is taken to relocate the Lostock site to new purpose-built site at Cutacre in Bolton, at a cost of nearly £50m

2012

UK Manufacturing Strategy begins to assess new site options



2013

Lostock hosts several VIPs in the Noughties, showcasing British advanced engineering and manufacturing at a time of political difficulty in the UK. Pictured is, the then Business Secretary, Sir Vince Cable

MBDA is included as a new entry into the prestigious *Sunday Times* 30 Best Big Companies to Work For

2017



2017



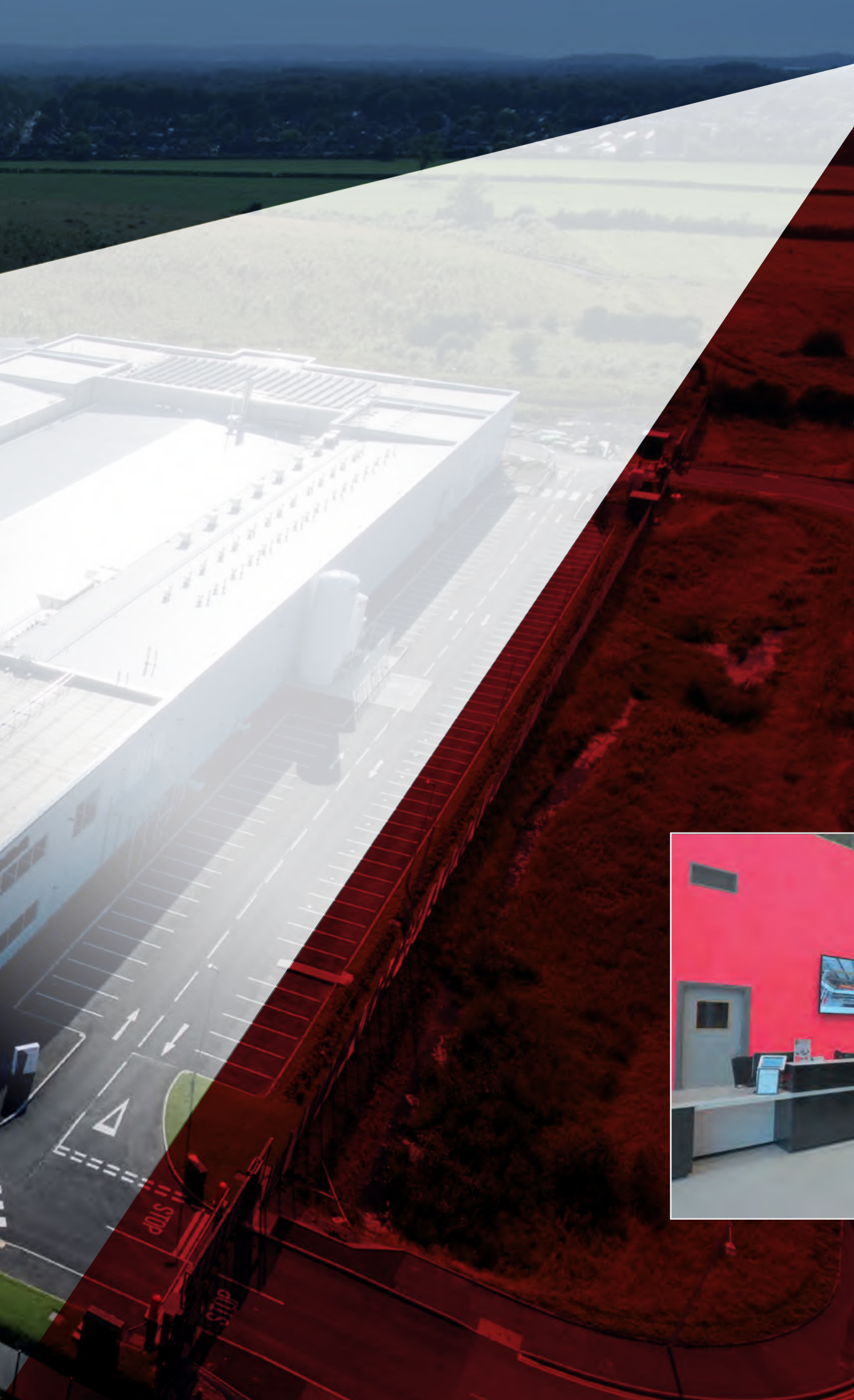
August 2017: Relocation to Bolton completed. All manufacturing operations and employees from Lostock site now installed at Lea Field Way, Bolton

MBDA UK

The Future

THE NEW MBDA BOLTON FACTORY

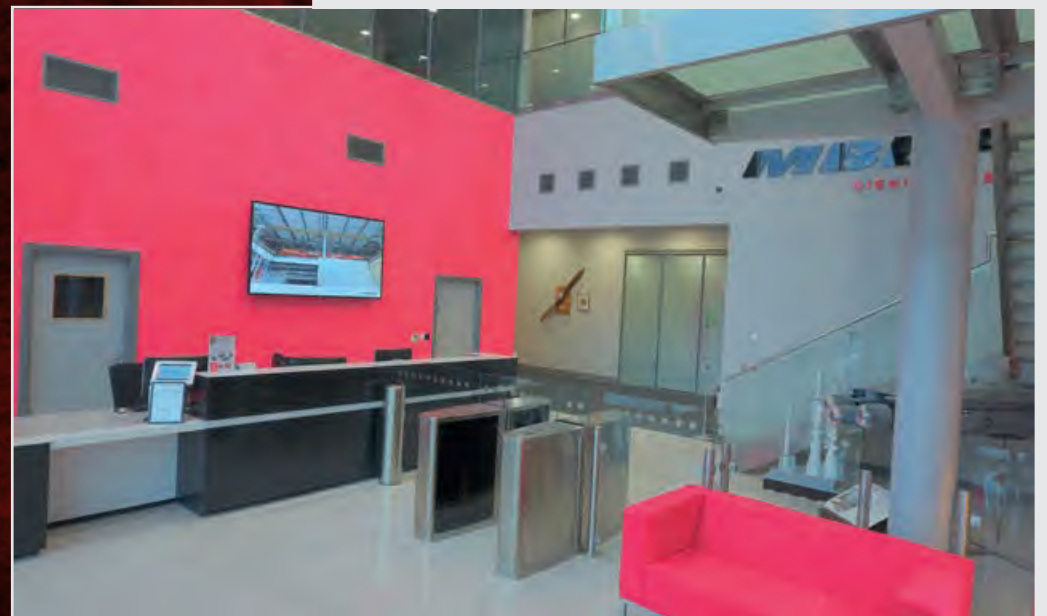
- Total investment of **£50 million** - Building, infrastructure and capital investment
- The facility features connectivity for **smart manufacturing** ("**Industry 4.0**") throughout the building
- The new site has been described as the "**jewel in the crown**" of the company by MBDA Chief Executive Antoine Bouvier
- **Future-proofed factory**: Enhanced connectivity has delivered comprehensive network solutions throughout
- MBDA has a **digital transformation programme** that will run for at least the next five years



FROM LOSTOCK TO BOLTON: GENESIS

The last 220 of Lostock's employees were transferred to the new £50m Bolton factory in August 2017. Needing to expand, improve manufacturing flow lines and implement new digital technology, the business case for the new factory was conceived in 2011. MBDA Bolton, on the site of the former Cutacre open cast mine, is part of a wider company plan to accommodate rising staff numbers and an increasing workload as demand for MBDA's weapons systems increases.

"The site was chosen because of its suitability from an investment and skills retention perspective," says John Cadman, Genesis Project Executive. "Some initial resistance to the move melted away, and MBDA's workforce accepted the need for change – as they had often done in the past." The site's capabilities outstrip those of Lostock, the building is fitted with many technologies to serve the demands of modern weapons systems assembly, and is also future-proofed with features including "smart factory" technology incorporating better data connectivity. This includes advanced temperature and humidity control, special anti-static flooring, plus a state-of-the-art clean room for precision microelectronic assembly and test work, alongside new imager optics capabilities.



The reception at the brand new Bolton site, which declared full operational capability in October 2017

Company Roll of Honour

This is not a comprehensive list of all MBDA and Lostock’s awards and excludes many of the awards won by individuals over this period.

 1994

- **MANAGEMENT TODAY BEST FACTORY Awards** Most Improved Factory

 2003

- **IET Accreditation**

 2005

- **SKILLS FOR WORK Award**

 2006

- **ROLLS ROYCE AWARD** for Engineering Manufacture
- **LSC BEST APPRENTICE AWARD**, Greater Manchester West
- **MX NATIONAL RUNNERS UP** for Best Partnerships with Education

 2007

- **MX NATIONAL WINNERS** for Best Partnerships with Education
- **BEST COMPANY FOR TRAINING APPRENTICES** in the North West of England

 2008

- **NORTH WEST AEROSPACE AWARDS Winner**

 2009

- **BEST COMPANY FOR TRAINING APPRENTICES** in the North West of England

 2010

- **ENVIRONMENTAL BEST PRACTICE**
- **BEST COMPANY FOR TRAINING APPRENTICES** in the North West of England
- **BEST COMPANY FOR TRAINING APPRENTICES** in the East of England

- **MX NATIONAL WINNERS** for Best Partnerships with Education

 2011

- **MX NATIONAL WINNERS** for Best Partnerships with Education
- **BEST COMPANY FOR TRAINING APPRENTICES** in the North West of England
- **UK COMPANY FOR TRAINING APPRENTICES** National Runners Up
- **TOP ONE HUNDRED COMPANY** for Apprentice Training

 2012

- **BEST COMPANY FOR TRAINING APPRENTICES** in the North West of England
- **UK COMPANY FOR TRAINING APPRENTICES** National Runners Up
- **MX NATIONAL WINNER** for Best Partnership with Education
- **MX NATIONAL WINNER** for People Effectiveness
- **UK COMPANY FOR TRAINING APPRENTICES** National Runners Up
- **MX NATIONAL WINNERS** for Best Partnerships with Education
- **MX NATIONAL WINNERS** for People and Skills
- **TOP ONE HUNDRED COMPANY** for Apprentice Training

 2013

- **MX NORTHWEST WINNERS** for Best Partnerships with Education
- **MX NORTHWEST WINNERS** for People and Skills

- **TOP ONE HUNDRED COMPANY** for Apprentice Training

 2014

- **NATIONAL AWARD** by Skills Funding Agency Best Large Company in the North West of England for Training Apprentices
- **NATIONAL AWARD** by Skills Funding Agency Best Large Company in the UK for Training Apprentices
- **TOP 100 COMPANIES LIST** of Best Companies in the UK for Apprentices

 2015

- **INVESTORS IN PEOPLE TOP 100 COMPANY** for Apprentice Training

 2016

- **COMMITMENT TO PARTNERSHIP WORKING** and Promoting Learning and Skills at Work

 2017

- **SUNDAY TIMES** 30 Best Companies to Work For





MBDA would like to thank these people for helping produce this book:

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