

**NOVEMBER 2021** 

## A MISSION TO INSPIRE

How the past is firing-up the future







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#### **Consultant Editor**

Nick Wall

#### Design

loungedesign.co.uk

#### Cover main picture:

LAHC/Silksheen Photography **Inset:** Shaun Schofield

#### Publisher

Civil Aviation Authority Aviation House Beehive Ringroad Crawley West Sussex RH6 oYR 0330 022 1500 infoservices@caa.co.uk

#### Find us at:

caa.co.uk

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## Welcome...

...to this special magazine taking a closer look at the role of the CAA in relation to historic aircraft. It's an opportunity to share with you more than just an historical record and account of these aircraft, but also an insight into the regulatory work involved in maintaining and returning these aircraft safely to our skies, including case studies detailing restoration projects underway today, bringing this work to life.

We also had the privilege of working with the Minister for Aviation, Robert Courts on this joint CAA and Department for Transport publication; an opportunity for him to share with you all his personal passion and pride in the aviation heritage of our nation. It's also an opportunity to emphasise the importance this area plays in our General Aviation economy and the inspiration it gives the younger generation to embark on a career in aviation.

We hope you enjoy *Flying Heritage*.

#### Sophie O'Sullivan

Head of General Aviation (GA) & Remotely Piloted Aircraft Systems (RPAS)



## Why history matters

Aviation Minister Robert Courts explains how vital the past is to aviation's future

he description "legend" is overused, but if ever an aircraft deserved that title, it is the Spitfire. Earlier this year, we celebrated the 85th anniversary of RJ Mitchell's masterpiece. This iconic aircraft and hero, alongside the Hurricane of the Battle of Britain – is more than just an aeronautical triumph and a machine of unparalleled beauty. The Spitfire is now a part of our national identity: a flying, living reminder of this country's sternest and finest hour.

And it is because of these very reasons, woven deep in the fabric of our nation, that I excitedly welcome the cautious return of heritage aviation, both in the air and on the ground. We will once again be able to explore museums and heritage sites across Britain and reconnect, up close, with the smell and atmosphere that only vintage aviation can provide. That's everything from the wood and cloth of the trenches, to the 1920s' beautiful biplanes, to Second World War classics such as the Hurricane and Lancaster, through to the Cold Warriors Hunter, Lightning and of course the mighty Vulcan.

Like all of you, I hope not to be just a

honouring our nation's glorious aviation history, but are also vital to inspire the next generation of engineers, pilots, aviation enthusiasts and professionals, as well as supporting local tourism and the creation of jobs. I know many of you share my experience of spending hours reading about the accomplishments of Hurricanes, Spitfires, Mustangs and more, having been air shows as a child and more recently. But it is to the future of aviation that we must now look.







# How the past is inspiring the future

Visiting an airshow or museum is often where it all starts for the next generation of aerospace professionals

ou might wonder what links a Lancaster bomber with, say, an Airbus 380. Certainly they're both among the largest aircraft of their time and were at the cutting edge of aviation when designed, but the real answer is much more than that.

The link between historic aviation and the wider field of the aerospace industry goes much further than simply wowing crowds at airshows or impressing visitors to museums — those who work in the sector, and in general aviation more widely, provide inspiration and pass on crucial skills to the next generation of aviation professionals.

The point about early inspiration was highlighted by Professor John Perkins in his Review of Engineering Skills for the (then) Department of Business, Innovation and Skills in 2013. Although he was't speaking specifically about aviation, he said: "If we are going to secure the flow of talent into engineering, we need to start at the very beginning.

"We need young people who are technically and academically competent, but who are also inspired by the possibilities of engineering. Starting to inspire people at 16 years old is too late; choices are made, and options are closed off well before then. So we need purposeful and effective early intervention to enthuse tomorrow's engineers."

And that's where historic and heritage aviation really does play its part, with it's wide range of airshows and museums around the country it entertains and educates but, particularly, it inspires the young.

It's a point emphasised by Aviation Minister Robert Courts, who says: "I remember being very young and very interested in aviation. My grandfather lived in a little village just outside Cambridge not far from Duxford and he used to take me to Duxford and Mildenhall Air Days, so that East Anglian aviation is something I can remember from my earliest days and it has very much rubbed off on me.

"There's no doubt that aviation is part of the country's DNA. You might think about the Red Arrows or Spitfires and the Battle of Britain from a military aspect, but with the civilian aspect it's equally true when you look at the great airliners of the past with the Comet, the first proper operational jet airliner, developed by de Havilland in Hatfield, Hertfordshire.

"If you ask anyone, certainly in the air force, there's a very high chance they will say they were inspired by the past — they'll say they read about the Battle of Britain, went to airshows, spoke to people who've been pilots or involved in aviation more broadly in the past, so that role of real, sheer inspiration is as alive today as it has always been. Almost everyone who's involved in aviation will have a story to tell about how they became involved in it, and it will vary from person to person.



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'We need purposeful, effective early intervention to enthuse tomorrow's engineers'



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"You might picture pilots, but it's true of everybody else as well, because if you love the machines, and you love what they do and what they stand for, then you won't just be interested in flying them, you'll also be interested in restoring them, making them work and fixing them — it's that role of the past inspiring the future has always been a part of driving people into aviation and it's still the case now.

"To help that take place, access is the most important thing. There's a real importance in people having access to 'grassroots' aviation so that aviation is seen as something everybody can take part in.

"Now that might be from an inspiration perspective that you go and visit a local museum, it might be that you go to a local airshow, that's from a historic aviation perspective, but you also need to make sure that we have access to the GA airfields so that people can go to a local airfield. They may fly in aircraft, they may look at them, they may maintain them, they may even want to go and build them, they may be involved with the running of the airfield itself, but it needs to be something everyone has a real day-to-day accessibility to grass roots aviation.

"We talk about making the UK the best place in the world for general aviation, that's what we mean by it because there won't be a next generation of commercial or military pilots if there isn't 'grassroots' aviation.

"So access to it is absolutely key — that's access to it on an every day basis; that it's seen as something that's there for everybody from whatever walk of life.

"I'm conscious that when we go to an airshow and see something flying, we need to think too of the importance of the mechanics, the ground crew, the air traffic control—there's the whole ecosystem that goes behind the one act that a member of the public sees, which is flying. There are hours and hours of prep, skills and expertise behind that.

"For me, and I know this will be the case for others, there is something absolutely magical about walking into a hangar and smelling that smell; that mixture of oil, grease, aviation fuel, and then that little something extra that when you go nearer — and particularly it's the case with historic aircraft — there's that unquantifiable, magical atmosphere that surrounds every aircraft hangar and I am hugely inspired by that and I know

many others feel the same.

"What I want is for that hangar to be open to them. I want this to be for anybody to think 'that is something I can go into, I could go down to my local hangar and get involved with a light aircraft and then graduate up to being involved in the next generation of Jet Zero (zero emissions) aircraft'.

"It all starts with someone being young and thinking that looks amazing and then checking it out and going 'Yeah, there's something special going on here'.

To help spur that spirit he points out that the Department for Transport is working hard to champion both general aviation and the UK's aviation heritage.

"There are a number of things we are doing within the Department," he says. "Things like working to safeguard airfields is a major part so that we have that space, and raising awareness amongst local authorities and local politicians of the importance of GA and what it brings. That it has huge economic benefits of around £4bn to the UK economy and 40,000 jobs, so there's underlining the economic importance of that as well; underlining the fact that this is where aviation begins is critically important.

"The work that the CAA do as part of the airfield advisory team and the GA unit is absolutely key in this, because this is day-to-day underpinning of the foundations of this critically important sector.

"What I'm keen to do now that I am able to get out and about as part of the formal role is to see some of the things I can and really get into the detail and understand what the issues are that affect the sector.

"I'm also keen to get involved in some of the things from a non-flying perspective. One of the things that Lincolnshire is really key about is skills. Those skills may be used in restoring 'Just Jane' to flying condition, but equally they are transferable to go and work in either GA more widely or the commercial sector."

So whether it's because of a Lancaster, an Airbus A380, some other aircraft or flying display, UK aviation is providing the inspiration and opportunities for the next generation to want to become involved in making the UK the best place in the world for aviation to be a flourishing, wealth-generating and job-producing sector of the economy.

# Lancs for the memory

We spoke with Andrew Panton, Accountable Manager of the Lancaster Restoration Company, and the General Manager of the Lincolnshire Aviation Heritage Centre.

he Lincolnshire Aviation Heritage Centre was established by my grandfather and great uncle, Fred and Harold Panton in memory of their brother Christopher Panton who flew as a Flight Engineer on Halifax bombers during WW2 but was lost on the Nuremburg raid on 30/31st March 1944. The Centre is a living memorial with a taxying Lancaster and Mosquito aircraft offering taxy rides during the Spring to Autumn months. We have now started the project of restoring Avro Lancaster NX611 to an airworthy condition."

"The Centre is an entirely family run business with the memory of Christopher and Bomber Command at its heart. The project to restore NX611 is the ultimate tribute that we can pay to Bomber Command and completing the project would be in honour of both the Command and the achievements of Fred and Harold Panton. My interest in aviation was inspired by the family involvement with the Centre and watching the Lancaster come to life over the years. I decided to join the Centre when leaving education and continue the work of my grandfather and great uncle."

#### WHAT IS THE HISTORY BEHIND THE RESTORATION PROJECT YOU ARE UNDERTAKING?

"The Lincolnshire Aviation Heritage Centre opened in 1989 by Fred and Harold Panton as a memorial to Christopher Panton and RAF Bomber Command during WW2. We took delivery of Avro Lancaster NX611 in 1988 with a view to her sitting static as the centrepiece to the museum but the plan soon changed



as the aircraft was inspected by an ex-BBMF engineer to assess the possibility of restoring her to an engine running condition. Between 1990 and 1994 all four engines were restored to a ground running condition and we advanced to taxying the aircraft. Over the years Fred and Harold were asked many times whether NX611 would fly again and back in 2009 they decided to make the push towards restoring NX611 to airworthy condition. The first steps made were the restoring of four airworthy engines ands a parts search all around the world. In 2016 we started the main structural work with a full paint strip and survey of the airframe enabling us to plan the work ahead of us ready to approach the CAA with the project."



#### WHY IS IT IMPORTANT TO YOU? WHAT DO YOU HOPE TO ACHIEVE FROM THIS?

"This is all far more than 'just a job' it is a family tribute to our relative and his comrades. There can be no price or barrier put on that. We will be working through the whole aircraft restoring it to airworthy condition over the coming winters. The project is split into packages of work to be done each year in order for us to taxy the Lancaster during the summer and restore her during the winter. To eventually end with a fully airworthy Lancaster would be an incredible achievement for our family and supporters. An original Lancaster on an original WW2 airfield surrounded by buildings and vehicles used by Bomber Command makes this a unique site and project."

#### WHAT DID YOU ENGAGE WITH THE CIVIL AVIATION AUTHORITY ON?

"We engaged with the CAA to discuss the project and

work towards an A8-23 certified status to qualify us to perform the restoration work. It is important to us to work with the CAA throughout the project and to have their backing adds both credibility and confidence in the project."

## WHAT ADVICE WOULD YOU GIVE OTHERS WHO ARE LOOKING TO ENGAGE WITH THE CIVIL AVIATION AUTHORITY?

"I would recommend that anyone who wishes to engage with the CAA starts as open and honest as possible. As an authority they have always worked to help and correct us rather than criticise. This working relationship is helped by the fact that the CAA know where we have started, what the aim is and how we will get there. They have been involved from the beginning and we have therefore had the opportunity to build trust and knowledge in the project from the outset."









### NOT ONLY 'JUST JANE', BUT ALSO A WHOLE LOT MORE

#### The ambition? To rebuild an original wartime airfield

he Lincolnshire Aviation Heritage Centre is a family run museum set up more than 20 years ago by Fred and Harold Panton isn't just a tribute to their eldest brother, Christopher, who was killed on a bombing raid over Nuremberg in 1944, it's also as a living memorial to the 55,500 men of Bomber Command who lost their lives during the Second World War.

Based at the old wartime airfield of RAF East Kirkby, Lincolnshire, it continues to expand every year, and the brothers' ambition is to rebuild it fully as a complete original wartime airfield, preserving the memory of Bomber Command for many years to come. The original 1940s control tower has been retained and the main hangar is built on the original wartime hangar base

The centrepiece is, of course, 'Just Jane', Lancaster NX611, one of only three working Lancasters worldwide. It was bought by Fred and Harold in 1983 and they had planned to keep it for their private collection, however it was suggested they should make an exhibit for the public and so the museum was set up, with the Lancaster and control tower as its centre pieces.

Of course they wanted it to be more than just a static exhibit and in 1993 two ex-RAF engineers were brought in to restore one of its four Rolls-Royce Merlin 24 engines. After some 700 hours of work at a cost of around £7,000 the engine was finally ready and ran. With that done, work was then completed on the other three engines and they

are now at a fully operational taxiing standard.

While not yet in flying condition, 'Just Jane' regularly has engine runs and provides 'taxy trips' for visitors — which are booked months in advance — to help fund its restoration. You can get a feel for these in the videos on the museum's website, <a href="https://www.lincsaviation.co.uk/gallery/videos/">www.lincsaviation.co.uk/gallery/videos/</a>

All of the restoration work is will be completed by the centre's engineering team, and to comply with CAA regulations they have set up the 'Lancaster Restoration Company'. It's an estimated ten-year project with the end goal of 'Just Jane' being airworthy.

In addition to the Lancaster, the museum also has a Douglas C47A-DC3, fitted with glider pick-up gear, that towed an assault glider on D-Day, a Percival P.31 Proctor Mk.IV, utilised as a three-seat radio trainer during the war and now a long-term restoration project, a Handley Page Hampden, another Bomber Command veteran, and a privately-owned Mosquito night-fighter, the only existing version of this variant, also undergoing restoration.

As well as the aircraft there's a host of Second Word War memorabilia in the museum, plus the centre has a range of Second World War RAF vehicles, including a Ford WOT1 aircrew bus, thought to be the only one of its kind in existence.

You can read more about the Lancaster and the centre at linesaviation could



# STEM OPPORTUNITIES IN AVIATION





"We want to inspire and engage with young people to explore careers in STEM, aviation and aerospace to support and encourage their future career choices. Aviation and aerospace needs to be ready for the future and we need different talent, ideas and values to make that happen. We are committed to supporting the ambitions and interests of everyone to create opportunities which are inclusive and engaging for all."

Richard Moriarty, CEO, Civil Aviation Authority

#### stem.caa.co.uk/

STEM (Science, Technology, Engineering and Maths) is the umbrella term for work promoting those subjects to young people.







Restoring vintage helicopters isn't for the faint-hearted, but approached in the right way things can be less complex

tepping into the Historic Helicopters hangar in Somerset you are greeted with a pretty impressive sight. Most obvious are the two huge Sea King helicopters, but then you notice the Whirlwind, Scout and enough spare parts to probably keep a small air force operational! We spoke to owner Andrew Whitehouse about his operation and his experience of working with the CAA's General Aviation Unit, all while sitting in the cockpit of one of the Sea Kings.

"We have a number of old helicopters that we're intent on getting in the air" explained Andrew. "Started with the Whirlwind, then the Wessex 5 and the Sea King we're sat in then another Sea King in the bay and a Lynx Mark 7 and another Sea King to do after that."

The operation has five full-time engineers and holds an A8-23 Maintenance and A8-25 Continuing Airworthiness Management approvals from the CAA.

#### HOW HAS THE RELATIONSHIP WITH THE CAA BEEN?

"Never been a problem at all" says Andrew. "Whatever you ask, if you ask in the right manner and to the right person then you normally get an answer quite quickly.

"The best way to work with the CAA is by prior agreement. So, when we were thinking about restoring the Wessex rather than go blundering in the first thing I did was speak to the CAA. Our surveyor came back and said he didn't see a problem with that. Same with the Sea King, which is a big aircraft, we asked again, and the surveyor came back and said, 'you've done a Wessex I don't see a problem with that'





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I find
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and the Sea King we're sat in is now awaiting its test flight certificate and I like to think we'll be flying it next week."

Based on that we asked Andrew if he then thought the key was early engagement with the CAA? "Absolutely, we're already talking to the CAA about our Lynx Mark 7, which the surveyor did raise an eyebrow to! Fortunately, our chief pilot is a test pilot trainer with decades of experience who was able to share his experience and now we're on the way to restore that as well."

That does though have to wait in line behind the other various airframes waiting attention. "We've got work for about another five years!" says Andrew.

"Ultimately I find the CAA extremely helpful – they want to see these things fly as much as we do."

#### **GETTING THE PAPERWORK DONE**

We hear a lot of people complain about the timescales it can take to get paperwork processed so we asked Andrew about his experience.

"If you do the documents correctly, if they don't have to come back with questions, then it's as smooth as silk. If you don't do that then that's what takes the time. You have to answer all the questions, even if you think it's a daft one – you might think 'why do they need to know how the wheel works?" but they do."

#### **SAFETY FIRST**

"From a safety point of view it's safety first with us. With helicopters, if in doubt there is no doubt. Our pilot team is headed up by probably one of the most experienced helicopter pilots in the world."

#### **THE FUTURE**

"We've got a busy airshow season this year and an even busier one planned for next" said Andrew. "This year we hope to open the Yeovilton show with the Sea King and the Wessex flying together. I think helicopters might just be the future of airshows."

#### **ONE BIT OF ADVICE**

Finally, we asked Andrew what one bit of advice he'd give to an organisation looking to work with the CAA. "Call them up, make an appointment, go and see them. We encourage our surveyors to just call in if they're passing by, that's the kind of relationship we've developed with the CAA."





Restoring helicopters in no easy task, but now there's a fleet of them

Thomas, near Chard, Somerset, is the brainchild of Andrew Whitehouse and has forged new ground in the world of historic aircraft preservation.

Established in 2013, its aim was to preserve, restore to airworthy status and to operate a select fleet of vintage military helicopters, perhaps not the easiest of dreams given their complexity.

The fleet is preserved and maintained by a small, dedicated team of aircraft engineers, most of whom are former members of the Royal Navy and RAF

so they bring a wealth of knowledge and experience — a few of them have previously worked on the very aircraft which now occupy the charity's hangar. Plus, there are volunteers who provide valuable extra work.

During the airshow season the helicopters attend as many flying events as possible. The fleet currently consists of a Westland Whirlwind HAR10 XI729

Westland Wessex HU5 XT761, Westland Wessex HU5 XT771, Westland Sea King HAR3 XZ597 and a Westland Sea King HC4 ZF122.

The primary focus of the displays is to chart the history of Royal Navy & Royal Air Force Search & Rescue and the history of the Commando Brigade Air Squadron, the Commando Helicopter Force and the 'Junglie' helicopters.

Back at base the charity also aims to provide an opportunity to learn more about the historically significant helicopters which were built locally at Westland in Yeovil. It also hosts aeronautical engineering students from Bridgwater College and aims to provide a venue to promote, encourage and conduct Science, Technology, Engineering and Mathematics (STEM) activities to inspire children the young.

A visitor centre and small museum is in the process of being established to complement the helicopter collection and the centre says it will be grateful to receive donations of artefacts, photographs, models, documents, uniforms and equipment related to Royal Navy/Royal Air Force SAR and Commando Aviation.

You can read more about Historic Helicopters at historichelicopters.com



## Complex challenges

## Tackling bullet holes, fire damage and corrosion

estoring and maintaining historic and ex-military aircraft is demanding — not just because of all the physical work that goes into them, but also because of the technical administration that's required.

Because of their age many of these aircraft, ex-military in particular, require different standards of airworthiness, operational management and pilot competency than other 'more modern' types, particularly because they were built and operated with the support of complex military systems that are unlikely to be available nowadays to civil operators.

In addition, many factors associated with all aspects of their operation and flight

require thorough consideration to maintain safety standards, so restoration has to be managed appropriately throughout the life of a project to ensure an airworthy machine that's properly defined and compliant with the relevant requirements.

The restoration of ex-military aircraft varies considerably from the transition of a just-out-of-service aircraft into the civil world, to a more substantial recovery of a severely damaged World War II aircraft, complete with bullet holes, fire damage and corrosion.

All of this means that each historic aircraft will have to comply with a different set of criteria to assure airworthiness. In such cases the CAA can issue a Permit to Fly, considering its overall design, construction and maintenance, but not to the extent provided for by the level of assurance that an aircraft with a Type Certificate and Certificate of Airworthiness could achieve.

In practice, this means that each historic, ex-military aircraft is regarded as being unique. Although a number of the type might have already qualified for a Permit to Fly, the circumstances surrounding the nature of an individual aircraft's history needs separate consideration, so each aircraft has its own Airworthiness Approval Note (AAN) covering the history, any work done on transition to the civil system and the conditions associated with the issue of the Permit.

Although many aircraft, including the majority of aircraft of military design and service, are not able to qualify for a Certificate of Airworthiness, a small number of types of military design and service are. In these cases, the type is either supported by organisations taking the role and responsibility of Type Certificate holder or it has a formally published Type Certificate.

These aircraft can be operated with fewer restrictions than ex-military Permit to Fly aircraft. In accordance with the Air Navigation Order 2016, Article 40 (2) the aircraft will be issued with a Certificate of Airworthiness and be considered compliant with ICAO Annex 8. Such aircraft include, for example, the Boeing Stearman and the Consolidated PBY-5A.



Similarly, some aircraft of UK design are supported by an organisation holding a Type Responsibility Agreement with the CAA, taking some or all of the continued airworthiness responsibilities of a Type Certificate holder, to the extent that such aircraft of military design and service may also be eligible for a National Certificate of Airworthiness.

Most ex-military aircraft have specialised technical equipment or systems specific to the role of the aircraft or the conditions under which it was designed to operate. Any systems, equipment, operating requirements or limitations that were required in military service irrespective of the nature of the flight should be continued to be used, unless superseded by requirements agreed and published by CAA.

In general, the CAA should be consulted at an early stage as to which route a particular aircraft is required to take so that it can be involved in the process and approve the work throughout the restoration process.

The CAA has supported the system of restoration of ex-military and historic aircraft developed over the last 50 years or more, and although such backing brings unique challenges, where appropriate levels of safety can be assured it will continue to do so.

#### More detailed information on restoring historic aircraft can be found at:

<u>CAP1740: Guidance on maintenance Programmes for Aircraft</u> operating on a National Permit to Fly (caa.co.uk)

<u>CAP 632</u>: Operation of 'Permit-to-Fly' ex-military aircraft on the UK register (caa.co.uk)

Ex-Military Aircraft - Design, restoration and continuing airworthiness approval (caa.co.uk)





## SAFETY SENSE CARE OF PASSENGERS



Taking up friends and relatives is one of the most rewarding elements of GA flying, but there are some considerations for the health and safety of passengers and to ensure any associated risks are managed.

#### **FIND OUT MORE**

Safety Sense - Care of Passengers

#### **SAFETY GUIDANCE AND RESOURCES**

www.caa.co.uk/General-aviation/



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"As an aerobatic display pilot I really value the accessibility and helpful reminders of the SkyWay Code; it is a one-stop shop for everything you need to consider before you brief and head out to your aircraft to go flying. I encourage all pilots to take the time to read through this free online document."

#### **Kirsty Murphy**

Blades Aerobatic Display Pilot and former Red Arrow pilot

The SkyWay Code provides practical guidance for GA pilots, students and flight instructors on operational, safety and regulatory issues relevant to their flying.

Download your copy at: www.caa.co.uk/skywaycode

