CAREER FLIGHTPATH
Your guide to aerospace careers and professional development

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CAREERS WITH ALTITUDE
BRINGING YOU THE LATEST OPPORTUNITIES IN AEROSPACE AND AVIATION

ISSUE 3
PROUD!

Louise Robinson
Senior Programme Manager
Aircelle
Safran is a very ambitious company, which drives development and helps me grow outside the box.

Jane Gee
Customer Support Manager
Messier-Bugatti-Dowty Services
What I like about Messier-Bugatti-Dowty is that we embrace innovative ideas at all levels.

Madan Velu
Senior Technical Consultant
Morpho Cards
Morpho Cards is truly an international company in every sense.

Jon Pickard
Production Coordinator
Turbomeca
I'm proud to work at Turbomeca. Everybody is always willing to support each other to meet our objectives and exceed expectations.

Hasmukh Patel
Stress Engineer
Safran Engineering Services
At Safran graduates have broad leeway to gain wide knowledge from experienced professionals.

Jonathan Visagie
Engineering Group Leader
Messier-Bugatti-Dowty
Safran lets me be as innovative as I can be and employee empowerment is anchored in the culture.

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Bigger and brighter

Welcome to the features-packed third issue of Career Flightpath, the careers advice and guidance magazine of the Royal Aeronautical Society, and our biggest edition yet! With features covering all aspects of the aerospace and aviation industry and interviews ranging from early career professionals through to industry leaders, as well as advice and guidance from experts on entry routes through to climbing the career ladder, there is something for everyone.

The future is even brighter for UK aerospace manufacturing - still the world’s number two, second only to the USA, and Europe’s biggest - with a number of joint investment deals announced by the UK government and industry in 2013, increasing greater still the need for engineers, scientists and professionals over the next 20 years.

UK aviation is also recognised worldwide as a leader in safety, quality and management and we talk to pilots and maintenance engineers about their career progression. We meet Tim Peake, British astronaut-in-training, about his preparations to travel to the International Space Station in 2015 and his plans to inspire younger generations through the mission. And we also meet Gautam Lewis and hear his incredible story - from surviving polio as a child in India, to developing solutions to enable more people with disabilities to learn to fly and experience the liberation and excitement he and many others enjoy - and how he is using his skills from a career in the music industry to achieve his goals, proving that aviation is opening its doors to people of all backgrounds and abilities.

We hope you enjoy this issue and are inspired to take your next steps to a fulfilling, high-flying career!

Rosalind Azouzi
Careers and Education Manager, Royal Aeronautical Society
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The content does not necessarily represent the opinion of the Council of the Royal Aeronautical Society
Recognised by UK Government as a key sector to invest in, Keith Hayward reports on why aerospace and aviation represent a great career investment for your future.

Aerospace and aviation is one of the most dynamic and exciting sectors of the British economy. It offers a range of technological and managerial challenges from designing and building complex equipment – the pinnacle of manufacturing – to managing large and intricate human enterprises, the modern airport. And in between, flying and operating airlines – a truly global experience.

The UK aerospace industry is the second largest in the world; its civil business is set to share in a market that will be worth several trillions of pounds over the next 20 years. Aerospace manufacturing supports 100,000 plus highly qualified and skilled people that work in its companies throughout Britain, who deliver over £20 billion a year in sales and add nearly £3 billion annually to the balance of trade. The UK is part of an international industry that collaborates to develop civil and military products. UK Aerospace also has an unusually high level of foreign owned companies and British investment overseas. This does of course raise concerns about dependence and jobs leaking abroad, but the track record so far are of more and better jobs flowing from Britain’s place at the centre of a world manufacturing hub. There are very few manufacturing sectors left in the country that can claim such a leadership position.

Whether producing wings for Airbus or control systems for Boeing, and engines and undercarriages for both, UK companies are world leaders. They also produce highly advanced defence equipment that has enabled UK Armed Forces to operate alongside Britain’s allies. UK Space is also a major supplier of telecommunications and other satellites that are transforming the way we live, as well as exploring the Solar System.

This record of technical and commercial success has been recognised by the British government, with substantial sums being advanced even in times of austerity to support aerospace research and development. More important, given that aviation has to be environmentally sustainable, much of the industry’s research is on green aspects of air travel. The UK Government’s commitment to £150 million a year for research directed at the next generation of environmentally friendly airliners, helicopters and engines – a government-industry commitment over the next seven years of over two billion pounds – should help to maintain the UK’s place as a major location for aerospace activity. The creation of an aerospace technology institute will act as a focus and delivery system for this work is a creative and dynamic initiative, and will substantially improve the links between industry and the academic base.

Operating and managing the aeroplane and the infrastructure of air travel is equally demanding. With air travel expanding at over 4% a year, a lot of people want to fly. This has to be managed safely and efficiently and with as little environmental impact as possible. These often contradictory objectives have to be managed with imagination and technical skill.

UK based airlines have pioneered low-cost flying in Europe, as well as offering first class service for all types of passengers on long haul, global routes. Running this type of business demands all sorts of hard and soft skills - technical and people skills. Maintaining an Airbus or Boeing is as demanding as building it in the first place; but so is juggling aircraft and personnel across a worldwide network.

Directing fast-flying objects in busy airspace offers a similar challenge. The UK is responsible for one of the most important and congested blocks of sky in Europe, as well as guiding aircraft into major airport hubs.

The UK airport network is effectively a constellation of large towns. London Heathrow employs several hundred thousand people looking after people and cargo, which includes an impressive array of exotic animals. Again growth brings problems and these will have to be handled if the demand for air travel is to be consistent with environmental interests. A key challenge for airport operators will be to introduce green friendly processes that will also ensure a smooth and secure passage from airport entrance to aircraft gate.

Most of these skills are also mobile and in demand from companies world-wide. Many of the UK aerospace manufacturing companies are international with subsidiaries in the US and Europe as well as further afield. Airlines clearly offer international opportunities; but aircraft maintenance and overhaul is equally globalised. Airport operation is another gateway to an international career.

Pundits are often divided over what constitutes real value-added activity to a modern economy. There is sometimes a division made between manufacturing and services. In aerospace and aviation the two tend to flow together seamlessly. Producing or operating a satellite for a direct broadcasting service requires a similar level of skill, but with differing characteristics; the same goes for building an aircraft or managing its operations. In this sector, most tend to be high-value activities, with individual opportunities to match.
Futures Day
18 July 2014

Futures Day at Farnborough International Airshow 2014 has been designed to give groups of young people aged 11 – 21 a chance to see the exciting career opportunities available in the dynamic sectors of Aerospace and Defence.

Groups from schools, universities and youth associations can experience the exciting prospects available and be motivated in their study of STEM subjects.

The interactive, informative and engaging programme enables them to see first-hand the variety, innovation and expertise that makes a career in these key sectors so rewarding.

RESERVE YOUR FREE TICKETS TODAY!
Contact Claire Parsons on 020 7091 4507 or email claire.parsons@adsgroup.org.uk
www.adsfarnborough.co.uk/futures
Your career decision will depend on many factors, so to help you prepare, fasten your seatbelts and sit back for your journey with our insight into key entry routes for your aerospace or aviation career with advice and tips along the way.

**Design and manufacture**

The traditional route to work in designing, developing and testing aerospace products is to study a degree in aeronautical engineering or related fields such as avionics, space, mechanical or systems engineering. There are over 30 highly respected aerospace/aeronautical engineering degrees in the UK, many of which have been accredited by the Royal Aeronautical Society.

To access most engineering degrees you will need to have A Levels or equivalent (such as Scottish Highers or BTEC Engineering) in Maths and Physics and another subject.

Following university, there are many graduate recruitment programmes offered by the large aerospace manufacturers, or OEMs (Original...
Equipment Manufacturers), such as Airbus, GKN Aerospace, Rolls-Royce, Cobham, Thales, Lockheed Martin, Messier-Bugatti-Dowty and AgustaWestland, as well as with engineering consultancies such as Atkins and Fraser Nash. The UK space industry is also growing, directly employing over 27,000 people and with varied career opportunities such as mission ground control and satellite design and manufacture.

There are also hundreds of smaller aerospace firms which are part of the OEMs’ supply chain and looking to recruit graduates – often into direct entry roles specialising in one particular field of engineering such as aerodynamics, materials, structures or certification. Some graduates also look to join the Maintenance, Repair and Overhaul (MRO) divisions of airlines, manufacturers or independent MRO providers, usually in quality assurance, planning or engineering management roles. Both British Airways Engineering and Virgin Atlantic run excellent graduate schemes - although may not recruit year on year - while airlines such as Monarch may advertise positions for Flight Operations Engineers with aerospace graduates in mind.

**MEng or BEng? Aerospace or aeronautical?**

Generally speaking, the content of most UK aerospace and aeronautical engineering degrees tends to be similar although you may find some universities have particular specialism following their research links, such as composites, aerodynamics or manufacturing management.

Some employers demand an MEng degree as the integrated Master’s qualification provides the pre-requisite educational requirement for Chartered Engineering status. However, most also accept a BEng with separate MSc which you may prefer if you wish to specialise in a particular aeronautical field at postgraduate level and many will provide MSc study support to their staff entering with BEng. Check out our Funding article on page 22 for more information about financial support.

Remember your degree outcome is frequently used in the graduate selection process; many employers demand a 2:1 or at least 2:2. Some also take A Level results and/or UCAS points into account – if you didn’t get the results planned, ensure you speak to a careers advisor about your applications.

**Aircraft engineering**

Aircraft maintenance with a Maintenance, Repair and Overhaul (MRO) provider offers an alternative route which is particularly suited to those who like the idea of working closely with the aircraft, and who are very practical and good at using tools.

Although the traditional route is via an apprenticeship, there are now some universities offering aircraft maintenance degrees. Many of the course providers work closely with industry, giving you the opportunity to gain relevant, supervised experience. However, the degree is a not a guaranteed fast-track into licensed engineering roles - MRO employers will prioritise applicants with excellent craft skills – but could offer alternative MRO roles such as quality assurance or management. To increase your suitability for hands-on roles, while studying, preserve and develop your hand skills not only through practical activities in your modules but through work experience in MRO or use your leisure time to develop hand skills: you could volunteer on an aircraft restoration project, work on cars or at a flying club.

Back at school subjects like Design and Technology can really help acquire an early aptitude for working with tools.

In MRO, the apprenticeship is perhaps the most valued route into the field, working alongside qualified engineers learning the job hands-on with additional college and in-house tailored training to acquire both vocational qualifications and professional licences. Schemes exist with Monarch Aircraft Engineering, Virgin Atlantic, Flybe, British Airways, Marshall Aerospace and others. The RAF also offers schemes for school-leavers.

**Manufacturing Apprenticeships**

Most aerospace OEMs offer apprenticeships for budding engineers and these have perhaps seen the largest increase in numbers in recent years. Therefore, like for graduates, the major aerospace ‘primes’ such as Airbus, AgustaWestland and Rolls-Royce have well-established programmes accompanied by training and support; many aerospace apprentices go on to study for a degree with the tuition fees picked up by their employer. Some primes also ‘over train’ apprentices on behalf of the SME firms in their supply chain - a trend which is likely to increase in future years.

Again, manual dexterity is important, as is a good educational grounding including Maths, Science and Design and Technology, as you will be learning to
apply prior to starting any training, to ensure you meet the medical criteria.

One development which could really make a difference is the proposed Higher Apprenticeship in Professional Airline Pilot Practice: this incorporates a work-based degree alongside the pilot’s licence training and is aligned to the Student Loans system providing a more affordable source of finance and potential to earn an apprentice salary. Initially launched with CTC Aviation, expect to see more airlines and Flight Training Schools get involved.

Becoming a pilot through the RAF, Royal Navy or Army Air Corps also avoids high training costs. The selection criteria, particularly medical, are tougher and the work means flying in difficult conditions, be they warzones or humanitarian missions, and there has been a decline in recruitment in recent years, but many military pilots go on to successful careers as airline pilots or instructors, or into other exciting fields such as flight test.

Many universities also offer a pilot training element to their programme - both engineering and air transport management programmes – which may be a good way to ‘test the waters’ while getting a back-up career such as aeronautical engineering or technology if you are unsure.

Business and operations

Many colleges and universities have introduced courses in airport and airline operations and related fields of management. As with many vocational programmes, these can work best for you if you have work experience in the same field, such as passenger services, ground handling or flight operations alongside your studies to help you get both the academic underpinning and practical experience to make you stand out in a competitive market where graduate programmes are scarcer than in other sectors.

Summary

Such is the variety and complexity of aerospace and aviation, offering opportunities for people with all types of skills and interests, it figures that the many routes into the sector may seem as complex as the route map of an international airline! However, you can view company directories and download specialist course and employer listings on the Careers in Aerospace website, which also has comprehensive descriptions of the key fields in aerospace and aviation.

If you have further questions, don’t forget that the Royal Aeronautical Society also offers free and impartial careers advice.

**Useful contacts**

www.careersinaerospace.com
Royal Aeronautical Society careers team:
T: + 44 (0) 20 7670 4326 / 5
E: careers@aerosociety.com

Many colleges and universities have introduced courses in airport and airline operations and related fields of management.
RUNWAY SUCCESS
BECOMING A PILOT AND CAREER PROGRESSION

James Smart,
Head of Flight Crew Training
at Flybe began his career as a pilot in the RAF and moved into commercial aviation in 1991. He talks to Rosalind Azouzi about his career path and gives his advice for those considering flying careers.

Tell us about your RAF career.

I joined the RAF after school in 1982 as a pilot cadet officer. I opted for short service commission which was 12 years in length with the option to leave after eight years. At that time, the RAF had three pilot streams: fast-jet, multi-engine and helicopter. I was selected for multi-engine aircraft which suited my personality and served me very well in my later career in civil aviation. After training my first role was as a co-pilot on the VC10 air-to-air refuelling tanker and I had a fantastic time flying around the world on operations. For my second tour I flew the HS125 which the RAF called the ‘Dominie’, Latin for ‘school teacher’ and was used as a platform to teach the aircraft rear crew – such as navigators. I stayed on this aircraft until the end of my RAF time in 1990 and at a young age I had learnt a vast amount from the experienced officers around me.

What was your entry point into commercial aviation?

In 1990 I began applying to airlines and made over 20 applications. I received three offers and chose Loganair based in Scotland. I became co-pilot and within three months was offered a command position as pilot recruitment was buoyant, opening up opportunities within the airline.

How did you move into management?

Over time I became interested in getting into management and became both Line Training Captain and Security Manager for the airline.

Loganair merged with Manx Airlines in 1994 and then eventually became British Regional Airlines and I changed fleet to the Embraer 145. Then British Airways acquired British Regional Airlines in 2001 and rebranded it BA CitiExpress and then rebranded it again in 2006 to BA Connect. By then, I held a number of training positions: Type Rating Instructor, Type Rating Examiner, Crew Resource Management Instructor and Crew Resource Management Examiner – all quite a mouthful but giving me good understanding of training issues. I became Embraer 145 Fleet Manager in 2006. In 2007 Flybe acquired BA Connect and I stayed in this position for 18 months until we sold all the Embraer 145 aircraft and replaced them with Bombardier Dash-8 Q400. Then I changed roles to become General Manager - Flight Crew, becoming line manager to Flybe’s 700 or so pilots. I moved into my current role this year.

Can you tell us more about what the Head of Flight Crew Training role entails?

All airlines have to have an Airline Operators Certificate (AOC) which is issued by the CAA. The CAA requires the airline to have a designated accountable manager who oversees four key postholders responsible for safety, aircraft maintenance, ground handling and training. I am Flybe’s postholder for training and am responsible to the CAA to ensure that all pilots and cabin crew are given appropriate training and that training records are up to date.

Do you enjoy this role?

Oh yes, I enjoy holding a role of responsibility in the airline system. When I was in my 20s I didn’t want an office job on the ground, I loved flying and being on the move. However as time passed I wanted more challenges than those provided by flying and to have a more varied roster. This is why the Training Captain roles are so interesting – it’s different each day. One of the beauties of airlines is that you can choose to fly for your whole career or move into a training environment, depending on your skills and preferences.

What skills do you think pilots need to have?

My colleagues come from a wide range of backgrounds – some are ex-military others are not, some have been educated to degree level others to A level standard. In terms of skills I would say: dedication; adaptability; passion for flying; the ability to remain calm under pressure; loyalty to the industry.

What advice would you give people today considering taking a pilot training route, which is likely to be self-funded?

I am aware that the route I enjoyed via the RAF where I was paid to learn to fly is increasingly unavailable to today’s young people. With the three commercial pilot routes currently available – integrated frozen Air Transport Pilot’s Licence ATPL, Multi-crew Pilot’s Licence (MPL) and modular frozen ATPL – all are likely to involve significant self-funding so you need to have a very clear passion for the job, a great deal of determination as it can take a long time and is a large financial commitment. You need to develop a relatively mature head on young shoulders. I would recommend starting your research as early as possible, using social networks to keep up-to-date so you are fully prepared to work in the sector. As you can see, the airline network is ever changing and regulations also change regularly so the more you know the better prepared you will be for the challenges that lie ahead! I would strongly recommend the profession to anyone with the aptitude and dedication.

Useful links

Gapan publication ‘So you want to be a pilot’ for impartial advice. Visit www.gapan.org

@aerosociety linkedin.com/raes facebook.com/raes www.aerosociety.com www.careersinaerospace.com

FLIGHT TRAINING

ISSUE 3
FRIENDS IN HIGH PLACES: WHAT IS NETWORKING AND HOW DO I DO IT?

In person or online – most people agree that networking is important for your career development. Paula Barratt, of the Royal Aeronautical Society demystifies the art of networking and hears from those who have used it in their careers.

Networking is something that you are probably doing without realising, but its value should not be underestimated. Not just for the chatty and confident, networking can be achieved in different ways, each with their own advantages. Take some time to think about how networking might benefit you - it could make a big difference to your future.

What is networking and how does it work?

Put simply, networking is about getting to know people and building knowledge, in the context of your career. There is some truth in the adage “it’s not what you know, but who you know”, and networking is all about putting that concept into practice. It doesn’t matter if you haven’t yet decided on the career path you wish to take – it’s never too early to start thinking about networking.

Many people make the mistake of thinking that networking is about meeting people who can give them a job, but it is actually about helping you to help yourself. Networking offers you the opportunity to gather knowledge that will help you move through your career, gathering skills along the way. By introducing yourself to a range of people, you can learn a huge amount that will have a positive impact on your career. Whether it’s getting a deeper understanding of the industry, meeting an inspirational leader, or simply gaining insight into the skills required for your chosen job, networking can make all the difference.

Networking opportunities

Whatever your stage of life, you already have a network, and this is constantly evolving. Whether you are in education or employment, or somewhere...
in between, the opportunities for networking are numerous. Wherever you are in the world, you should have access to some of the following:

- **Royal Aeronautical Society** – provides global networking opportunities across the aviation and aerospace industries, through its lectures, conferences, careers fairs and committees.
- **Industry/trade events** – a great opportunity to build knowledge about developments in the industry, and to explore which companies are operating there.
- **University/college alumni groups** – your alumni status means you already have something in common with the people you will meet here – an opportunity to chat about where people’s careers have taken them and to seek friendly advice.
- **Local networking organisations** - you will find networking organisations for young professionals in many towns or cities. These are a good way of meeting people and exchanging ideas.
- **Your social network** – chat to family and friends about their work and your own career aspirations. You might be surprised at the useful contacts you can make and the ideas that they can spark.
- **LinkedIn** – a fantastic way of building knowledge in preparation for meeting people. Use it to learn about companies and topics which interest you; join “Groups” and follow the discussions. Once you have built your confidence, you can contribute to those discussions, which is also useful to start getting involved.

**Doing your homework**

Before you head off to a networking event, it’s best to be prepared. What are you actually trying to achieve? Set yourself a goal - not only will it help ensure a more successful event, but it can help you feel more confident too.

If you are still in education, you might not yet have a firm idea of the direction you wish to take. Networking can help you explore a range of professions and fields, to help you decide where your interests lie. Alternatively, you might already know which field you wish to work in, but don’t know much about the kinds of jobs available or how to find them. By networking, you can learn more about the field and meet some of the people who are working there. This will help you plan ahead and make sure that you have the necessary skills, as well as a good understanding of the field that you can demonstrate in applications and interviews.

Later in your career, you may wish to progress up the career ladder or to specialise. Your network is vital here, helping you to keep abreast of industry developments, demonstrate your skills, be aware of opportunities and make a good impression on people you might be working with in the future.

**Networking for beginners – the rules!**

Remember that networking is part of your professional life, so professionalism is expected.

- **Present yourself well** – whether in person or in writing, first impressions count! When meeting individuals or attending events, dress smartly and polish your shoes; when emailing or writing, check for grammar and spelling and use formal business language.
- **Be polite and professional** - treat people as you would in the workplace, and if somebody helps you out, be sure to drop them a line to thank them afterwards.
- **Networking is a two-way thing** – it’s not just about what you can get out of it. And remember that providing help or advice to others in your network is a great way to help people remember you.
- **Networking is not just for job-hunting** – be sure to get in touch with your contacts from time to time, and not just when you are looking for a job. Let them know what is going on in your career, and find out what they are doing too.
- **Be interested and interesting** - a professional network is about relationships between people, so invest in it as you would in your social network. Most people love to talk about their jobs, so don’t be afraid to ask questions.
- **Practice makes perfect** – the more events you attend, the more you will get used to talking with new people and working out the best way to interact with professionals in your field.

Finally, be patient! If you are looking for employment, you may not be offered a job by the first person you meet, but you never know which contacts you will make that could generate later interest in you! People are also more likely to accept your requests to join their social networks if they have already met you. And if you are still studying, networking will help promote your university or college and your course and may help increase its attractiveness to potential employers.

**Get involved in relevant societies and associations in the industry, as they can help you develop you career, but don’t be afraid to push yourself out of your comfort zone as it will make you more rounded and competitive.**

**Nick West**  
Director Communications, Raytheon
Philo Boyle FR Aes, Managing Director, Ramsey Hall
Ensure that you learn about every aspect of the sector that interests you. Network and research widely, attend events, connect to people that you think can help, and keep the contact going in a constructive way. Don’t be put off by the first challenge; the more determined you are, the more successful you will be.

Simon Witts FR Aes, Managing Director, Aviation Skills Partnership
Join groups and societies relevant to your career path and get a LinkedIn account – get talking and get your face known. A prospective employer is more likely to give you an interview if they’ve heard of you.

Robert Gage, Media Manager – Communications Department, Airbus
Identify some long term mentors and don’t be afraid to ask for help.

Simon Luxmoore FR Aes, Chief Executive, Royal Aeronautical Society
Don’t just take it from us!
Networking tips from senior aviation and aerospace professionals who have made it work for them.

Take opportunities offered, as you will increase your personal portfolio and also get known as someone who says ‘yes’.

Jenny Body FR Aes, President, Royal Aeronautical Society
Plan – what do I want to achieve? Prioritise – select a few targets and aim for quality of interaction. Prepare – what are my three key points and how should I express them?

Sir Brian Burridge FR Aes, Vice President Strategic Marketing, Finmeccanica UK Ltd
Everybody finds networking a little scary, but most people will want to help you. And remember, always listen first; speak later.
Networking is about getting to know the right people. You can spend all evening only speaking to the one person but if you’ve targeted the right person, then it’s all worth it!

**Nick West**, Director Communications, Raytheon

**Paul Bailey MRAeS**, Deputy Chief Executive, Royal Aeronautical Society

If you know the contact, open with something that you think will catch their interest. If you don’t know the contact, something interesting about the event/place/topic breaks the ice. Have this prepared and ready. Then just be confident - everybody is in the same boat!

**Jeremy Green**, Managing Director, Green Aerospace Group

Networking is an opportunity to make new friends and to learn as much about them as possible.

**David Heathcote**, Business Development Manager, Steadcross Solutions Limited

Try to maximise networking opportunities by openly engaging with those across all aspects of our industry. Follow up on developing your relationships, as quite often you will end up working together later on in your career.

**Dominic Allen MRAeS**, Maintenance Manager London, Singapore Airlines

Get involved in relevant societies and associations in the industry, as they can help you develop your career, but don’t be afraid to push yourself out of your comfort zone as it will make you more rounded and competitive.

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**Travel and Aviation courses**

- BA (Hons) Airline and Airport Management
- BA (Hons) International Tourism Management with Air Travel
- BA (Hons) International Travel and Tourism Management
- BSc (Hons) Air Transport with Commercial Pilot Training
- BSc (Hons) Air Transport with Pilot Training
- MSc (Hons) Air Transport Management.

Come and see us at our stand for a chat about our exciting industry links and unique courses.

bucks.ac.uk 0800 0565 660 advice@bucks.ac.uk
Marshall Aerospace and Defence Group, whose headquarters are based in Cambridge, is one of the UK’s hidden gems. The company remains proudly under the ownership of the family-run Marshall of Cambridge Group which was founded by David Marshall in 1909. Today it has a world-wide reputation for excellence in aircraft maintenance and support, aerospace engineering design, modification and testing.

Marshall ADG maintains and supports military aircraft for both the UK’s Royal Air Force and overseas air forces including Canada, Netherlands, Sweden and Denmark and Austria. Marshall ADG also provide civil and business aviation maintenance services with customers including Netjets and has a successful design office which advises on aircraft modifications, conversions and repairs whose work includes design of Concorde’s drooped nose.

In recent years, Marshall ADG has been quietly expanding through acquisition of other aerospace businesses including the Yorkshire-based composite materials specialist Slingsby Aviation in 2010 and most recently Hawker Beechcraft Ltd in Broughton in 2013 which supports the expansion of the company’s business aviation service business. In total, the aerospace group employs 2,000 people and has an annual turnover of in excess of £280 million.

However, Marshall ADG also has a reputation for excellence in training and in recent years the company has not only retained its Advanced Apprenticeship and Graduate programmes but also introduced Foundation degrees in partnership with Kingston University. The head of Marshall’s AeroAcademy, Rob Butler, says, “Due to the investment we have made here at Marshall ADG in training programmes, we have not faced the same skills shortage problems that many other aerospace business are concerned about and are very proud of our apprenticeship programme which has run unbroken since the 1920s”.

Foundations for success

We spoke to four young people at Marshall ADG at various stages of their career about their experiences of the Foundation degree and Advanced Apprenticeship programmes.

Lewis Hollingsworth (right), 21, is in the third year of the Advanced Apprenticeship Programme.

How did you get into aircraft engineering?
My interest in engineering began at school when we did an Engineering Education Scheme (EES) project designing a retraining mechanism for the Palm Island scheme in Dubai. Then I did two weeks’ work experience at RAF Conningsby and knew aerospace was the career for me. After school I started a course in aerospace engineering at Bedford College. After the first year I started applying for apprenticeships. I am not from the local area - I commute 45 miles each way to work from my home near Peterborough – but found out about the company through friends working here.
and applied online. I was really pleased to be offered the Marshall scheme and get into aircraft maintenance as the company is renowned for its training excellence and reputation.

What aspects of the apprenticeship do you enjoy most? You spend a lot of time on the shop floor and really are counted as one of the team and treated with equal status to the technicians who are very supportive and can be inspirational with so much experience to pass on. We go to Bedford College to study the technical certificate part of our NVQ Level 3 training. The college are also really good and support your learning. One of my proudest achievements was when we worked over the Christmas period to deliver an aircraft to Afghanistan to bring troops back home to see their families.

Kevul Patel, 20 is in the second year of the Foundation Degree programme.

Can you tell us more about the Foundation programme? It’s a three-year programme. Year One outlines the fundamentals such as theory of structures and engines as well as a practical workshop experience once a week. In Year Two you move into equations and more in-depth theory such as propulsion, maintaining the practical element. In Year 3, as well as engineering, management modules are introduced which introduce you to the management of engineering services.

How did you find out about the Foundation programme? The Foundation degree is delivered in partnership with Kingston University so I found the course through the university website. This one appealed because of the link with the Marshall Company which gave added benefit. I’ve always loved aircraft from going on holidays with my family when I was younger, and, after studying Maths, Physics and Chemistry A Levels at college, was looking to get into the aviation industry.

What are you planning to do after the course and how do you think it will help you prepare for employment? My career plan is to work in civil aviation in an area such as maintenance management. The course has shown me how important safety and quality are for the sector and through the lectures and support on site has given me more understanding of industry and military requirements. In January of Year 2 we also spend two weeks working on engines and avionics which will provide even more practical experience as well as developing team work skills.

Jessica Gibbs, 20, has just started the first year of the Advanced Apprenticeship.

How did you learn about the Marshall scheme? I am from Cambridge and when I started coming to college here and saw the airport I thought it looked like a really interesting company. After A Levels I started an electrical installation course. During the course I started working on metal and electronics and realised I wanted to go more in-depth, doing more complex work. My dad had been an aircraft maintenance engineer in the US Air Force so maybe that had subliminally influenced me! I didn’t know about the Marshall Apprenticeship scheme but just happened to drop my CV at Reception and then got a call asking if I would like to apply for the apprenticeship.

What did the recruitment process entail? First I had to do an aptitude test. After that I was invited to interview, then a practical test and a final interview. The whole process took a few months so you need to be patient and well prepared as there is a lot of competition for places.

What skills do you need for the programme? You need to be practically-minded and hands-on. It also helps to enjoy what you do and have a sense of humour!

Where do you hope to be after you finish the apprenticeship? I am hoping to stay on at Marshall working as an aircraft maintenance engineer.
Anna Davanzo, 22, Design Engineer (Repairs Group). Anna completed the Foundation Degree followed by the top-up BSc (Hons) Aerospace Engineering at Kingston and now works in the Design Department for Marshall.

Can you explain what the Repairs Group do?
There are many branches of design work. In the Repairs Group we design and advise production on repair work that needs to be carried out on an aircraft which might be due to age, for example.

Tell us about your background.
I did A Levels at 6th Form in Physics, English Language, Psychology and Maths to AS Level but didn’t know much about engineering opportunities then. I was in the air cadets and actually wanted to be an RAF pilot. However I was too short! I saw that Marshall were doing a presentation at Stansted Airport and my parents encouraged me to go along. I decided to enrol for the Foundation programme; although I didn’t have the pre-requisite A Levels, I could enrol at Year 0 and pick up the Maths and Physics required, which was great. After the Foundation Degree I completed the final year top-up at Kingston University, getting a taste of typical student life. I was offered a summer work placement with Marshall in 2012 which went really well and was offered a graduate position which I started in September 2013.

What did you enjoy about the Foundation programme?
It was great being located by the airport and studying at a company which is well known in the industry for training and aircraft engineering. I enjoyed being in small classes and having access to industry on site. Studying near the engine ground test centre meant you could often hear what was going on! We also got practical experience at Bedford College and spent a day each week in Marshall’s training workshop over two years learning skills like riveting, which really helps designers understand the hands-on aspect of engineering.

Did the Foundation programme give you special access to jobs within the company?
I didn’t get any special treatment when applying for the placement scheme. I had to apply online and go through the interview process - which included a design exercise - just like everyone else. After the placement however, Marshall offered me a graduate job which I started this year.

Where do you see your career progressing?
The company has offices overseas and I am very keen to get some international experience. I would also like to do a Master’s course part-time in the future and am looking to become a Chartered Engineer.
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Join the Royal Aeronautical Society as an Apprentice Affiliate from just £43 and get:

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- Get involved with our Young Persons’ Network development level
- Access to Scholarship Schemes such as the Centennial Scholarship Fund and MSc bursary scheme
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UK AEROSPACE - WHERE?

We uncover key areas of the UK where you can find the hundreds of SMEs offering fantastic opportunities in fields as varied as component manufacturing to business aviation.

There are a number of aerospace manufacturing ‘hubs’ in the UK around which supply chains have grown up supplying the major aerospace primes - such as Rolls-Royce, Airbus and BAE Systems - and where there is a history of research and design excellence. Meanwhile, other areas are seeing growing support for the sector from local government. From traditional manufacturing regions such as the Midlands, to the South East of England (where the first powered flight on UK soil took place 1908 at Farnborough), to Wales - which includes both maintenance and manufacturing excellence through the presence of British Airways and GE Aviation in South Wales and the Airbus Wings facility in Broughton, and is now venturing into UAV flight test – now, more than ever, you can find key organisations to help you pinpoint potential employers.
Design and manufacture

A number of regional trade associations for aerospace are well established across the UK. They have membership schemes for local employers in their areas including both major aerospace employers and hundreds of small-medium sized enterprises, or SMEs, as well as local universities with aerospace programmes:

• North West Aerospace Alliance (NWAA)
• Midlands Aerospace Alliance (MAA)
• West of England Aerospace Forum (WEAF)
• Aerospace Wales
• Farnborough Aerospace Consortium (FAC)

However, it doesn’t end there. In Northern Ireland, there is also a significant aerospace presence, perhaps the most well-known being regional jet producer Bombardier Aerospace, carrying out some of the most exciting composites work in the UK aerospace industry today. Elsewhere, it may be a surprise to learn that Essex is home to significant aerospace manufacturers including Raytheon, Selex ES, Gardner Aerospace and BAE Systems, while a few miles away in Hertfordshire are the defence manufacturer MBDA and satellite manufacturer Astrium (part of the Airbus Group), employing thousands of people.

In terms of aircraft engineering, this is not only concentrated around major airports such as Heathrow, Gatwick, Stansted and Manchester; airports including Prestwick in Scotland, Biggin Hill, Farnborough Airport and many other smaller airports are home to the UK’s independent MRO providers while Exeter Airport is home to Flybe’s head office and Training Academy which includes aircraft maintenance and aviation operations training programmes. Several smaller airports also host significant business aviation companies such as TAG Aviation at Farnborough. Meanwhile, further growth can be expected. In Cornwall, the Cornish Development Agency has developed a strategy to develop Newquay Airport not only for tourism purposes, but also for increasing the number of aircraft-related business such as aircraft maintenance. To see which airports are in your area, a full UK airport listing is available from the Resources section of the Careers in Aerospace website.

In summary, for many UK areas, the aerospace and aviation remains at the heart of their economic growth and for some has become the key to future growth and employment!

Focus on the North West

In the North West of England, aerospace is a highly significant component of the local economy with many apprenticeship and graduate programmes for young people on offer. As well as members such as BAE Systems – whose Air Systems division at Preston produces the Eurofighter – and Aircelle (part of French giant Safran) and MBDA, the North West Aerospace Alliance (NWAA) has around 250 member companies of all shapes and sizes. The NWAA runs a flagship skills programme, ‘Take Off in Aerospace’, aimed at primary and secondary schools, colleges and universities in the local area, as well as targeting key influencers such as teachers, parents and careers advisors to ensure local awareness of the fantastic opportunities on their doorstep and the campaign has so far reached over 28,000 young people, parents and teachers since its launch in 2010.

Rachel Brickell, Skills Manager, explains:

“The North West of England, comprising of the five sub-regions Lancashire, Cheshire, Cumbria, Greater Manchester and Liverpool, is today home to nearly a third of the UK’s Aerospace Industry. The North West has the skills and resources to design and integrate a whole aircraft in just one sub-region of the UK and employs almost 20% of the total number of aerospace workers in the UK. Our ‘Take Off in Aerospace’ programme aims to attract the next generation of aerospace talent and demonstrate the excellent career prospects that our employers offer.”

The campaign focuses on hands-on opportunities for young people a chance to experience a taste of the challenges and rewards associated with a career in aerospace. Initiatives include the Take Off In Aerospace Toolkit, New Talent Awards, attendance at careers events throughout the North West and promotional tie-ups with local radio stations. With the inclusion of awards for those already studying or working in their early stages of their aerospace careers, the Take Off campaign highlights the importance to the region of retaining talent to sustain the area’s formidable aerospace industry well into the 21st Century and beyond.

Useful links

Resources section of www.careersinaerospace.com
Take Off in Aerospace: www.aerospace.co.uk/projects/asce2/skills/take-off-in-aerospace
British Business and General Aviation: www.bbga.aero
ADS Group: www.adsgroup.org.uk

The North West of England – comprising of the five sub-regions Lancashire, Cheshire, Cumbria, Greater Manchester and Liverpool – is today home to nearly a third of the UK’s Aerospace Industry.

Rachel Brickell
Skills Manager

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Employers include airlines’ Maintenance repair and Overhaul (MRO) divisions, to independent MRO providers and the after-sales divisions of aerospace manufacturers. With the competition for MRO apprenticeships so high – which are often employers’ preferred route for licensed engineering roles – we meet two former students from Newcastle Aviation College and find out about their route into aircraft maintenance and their tips for people interested in a career in this field.

Sevanthi Chandrasekara

Sevanthi joined Ryanair’s maintenance support team in 2008. She started work as an Assistant Aircraft Maintenance Engineer at their Stansted base, then became Aircraft Maintenance Planning Engineer and was recently promoted to Planning Supervisor.

“I came to live in Sunderland in the UK from Sri Lanka aged 16 and did A Levels in Maths, Physics and Chemistry. I really wanted to be an aircraft mechanic and enrolled on the Kingston University Foundation Degree programme which is partnered with Newcastle Aviation Academy, and where I also completed the Part-66 course as part of the programme. While studying, I met my present manager during trainee mechanic interviews at the college and was later offered a position in aircraft maintenance planning. During my first two years at work I completed the top-up final year BSc Honours part-time and gained my honours degree in engineering in 2010. It was a big learning curve, working full-time and studying, but worth it!

While I was working in planning, my manager saw my potential and suggested me for other projects. One really interesting project was managing the parts process of an aircraft which had to be taken out of service following a heavy landing. My role was to project manage the process of salvaging all parts which could be returned to the manufacturers and repaired for future service. I was in charge of more than 1,500 parts – it was amazing just how many parts there were! The project involved a lot of liaison with Boeing and other parts manufacturers as well as understanding things like ‘return to service’ criteria and inspections. I also had to liaise regularly with the B1 and B2 Licensed Engineers and the Stores Department. I learnt a lot about the aircraft and got to see the different parts up close. Sometimes it could be a little tedious as everything had to be accurately and correctly labelled and carefully boxed but it was a great experience both in aircraft understanding and liaising with external and internal departments.

I have found my course really helpful for this job. Although I originally wanted to work as a mechanic, the course opened me up to other possibilities in aircraft maintenance and also gave me a good understanding of the skills licensed engineers need to have. I really recommend this route as becoming a licensed engineer can be difficult, you need to work for a long time on type to obtain the licence, but if you are keen to work hands on, there are many other things you can do and which I was well prepared for.

In my current role I work daily in the hangar, close to the aircraft and with the team of engineers. Some people might think it’s not for women as the sector is historically male-dominated but I get on really well with the team and my Line Manager is also female and a former engineer.

To work in aircraft maintenance planning it really helps to be good at organising, to have attention to detail and work very accurately as safety is always paramount and have excellent communication skills. However, I would recommend it to anyone!”
Paul Ledder
Paul is an Aircraft Engineer at the Manchester Base of Monarch Aircraft Engineering Limited and also completed his studies at Newcastle Aviation College.

“In fact, I am actually an aircraft mechanic. I have been working for Monarch Aircraft Engineering for two years now after moving from ATC Lasham (Southend-On-Sea) where I worked for around two and half years following college.

My role involves undertaking any task given to me by my superiors (lead engineers, licensed technicians, crew chiefs etc…) to maintain an aircraft, whether that be from our own fleet or that of a third party customer. These can include a whole range of tasks depending on the complexity of the aircraft maintenance check. A few examples can include basic tasks such as general servicing of wheels & brakes, fluid top-ups, aircraft refuelling and greasing to more involved tasks such as engine replacements, skin repairs, fuel tank inspections etc.

My school education was a fairly standard one. I left high school with some pretty average GCSE’s and no A levels, however, I was very fortunate to find myself on a University foundation degree in 2002 studying Archaeology and Business management (a very strange mix!). In 2003 I started my full honors degree in Business management but failed to find any work after graduating in 2006. After spending roughly the next ten to twelve months in minimum wage jobs, I decided to pursue a career in aircraft engineering.

In September 2007, I started the two-year full time course in aircraft engineering at Newcastle Aviation Academy, studying for both the Part-66 B1 license and the Kingston University Foundation Degree. This was not a course designed for anyone, a lot of students decided that it was too hard and found themselves in a highly stressful situation what with the immense workload we all faced. However, the majority of the students that completed the course in my and other cohorts have gone on to successful careers within the industry which has paid dividends to their lifestyle upon graduating from a very well taught and constructed course, taught by industry experts and actual engineers. My sincere gratitude goes to everybody involved who taught and who studied at NAA whilst I was there between 2007 and 2009 for such a great time and money very well spent!

I applied for a mechanics job at Monarch in 2009 after seeing that they were recruiting on their website and various other aviation job websites. I think that there were roughly 250 applications made at the time for just 6 positions, which demonstrates how competitive the industry is.

Despite having fresh knowledge of aircraft systems and a basic appreciation for how an aircraft operates upon completion of the NAA basic training course, I did have a limited amount of experience actually working on an aircraft, which is very different to the classroom environment! Working in this industry requires an extensive set of skills - both technical and ‘soft’. You need to be able to use common sense and work in a logical and safe manner whilst using an abundance of technical manuals and tooling to complete maintenance tasks. Being able to use basic hand tools such as spanners, ratchets, measuring and marking equipment, rivet guns, drills etc. are of great benefit to anybody pursuing this type of work.

As well as this you will also need to be able to work with a self-motivated attitude, and also be able to work well in a team.

I am currently having to wait until August before I can apply for my initial B1.1 (Engine & Airframe – Turbine) license. In the meantime, I am studying for the B2 license (Avionics) and waiting for my first type course.

However, there are many options available to people wanting a career in aircraft maintenance. The first tip I would give is for that person to think long and hard about what type of career they would like to pursue. The industry has many roles and positions for those directly involved in the maintenance of aircraft such as:

• Aircraft Mechanic
• Licensed Technician (B1, B2 etc…)
• Crew Chief

For anyone wishing to undertake either of these careers, I would recommend that you have a keen interest in aircraft, an ability to solve problems, work well within a large groups and also keep calm under pressure.

If getting dirty is not your idea of a day at work, there are, “behind the scenes” personnel to any MRO (Maintenance, Repair and Overhaul) who ensure that the maintenance activities are planned and supported.

These examples are only a small proportion of aircraft support teams involved in the world of aircraft maintenance. The industry is complex to say the least, however, at the heart of any successful airline and or MRO are the mechanics and engineers who actually undertake the maintenance of aircraft. These people should have a keen eye for perfection and quality in each and every task they undertake whilst remembering that there is also a legal obligation involved in this line of work.
FUNDING

THE AEROSPACE MSC BURSARY SCHEME

Launching careers in UK aerospace, Angela T. Ringguth, AeroMSc Bursary Scheme Manager, tells us more about a Government-backed scheme to support postgraduate education.

We have the top aerospace industry in Europe, and are second in the world only to the US. There are great opportunities ahead …but aerospace is a global industry and there are many other countries hoping to have a slice of the pie. That is why the government is doing all it can to make the UK an attractive environment for aerospace – ensuring that companies are more likely to invest in jobs and facilities here with us.

If you’re a science, engineering or technology graduate, the AeroMSc bursary scheme offers help to make your career in one of the UK’s most successful hi-tech, high value industries.

The idea behind the bursary scheme is to generate more new MSc qualified engineering professionals with high level skills who will work in UK aerospace.

The scheme is especially aimed at those who have the right academic background to succeed at Masters level but may not have previously considered aerospace engineering as a viable career option. After all, this is a prestigious career which normally requires very specialised high level skills. These can only be achieved through postgraduate study. With most university tuition fees hovering around the £9,000 mark, it may not seem feasible to go back to being a student once you’ve got your BSc or BEng degree. But the bursary scheme now opens up this possibility, with the promise of a highly paid and high-flying career to follow.

Furthermore, if your first degree is not in engineering, but in science, maths or another technological subject, you may still have exactly the right knowledge set – particularly the all-important maths and physics – on which to build an aerospace engineering career.

In fact, the scheme is targeting talented graduates from a whole range of disciplines who may not previously have considered our sector. But people with good first degrees in these and related STEM subjects have already acquired the theoretical foundation on which to build an aerospace engineering learning that approved MScs deliver and which employers urgently require.

Bursaries are worth up to £9.5k for the payment of tuition fees. Only UK and EU nationals are eligible, and applications are considered in the order in which they are received, so early application is advisable.

Because the scheme seeks to attract new talent into the sector, people currently working in aerospace are not eligible unless their employer is one of the 9 scheme partners or an SME (small or medium sized enterprise) which is part of the aero engineering supply chain.

Traditionally, entry to an MSc programme requires
at least a 2.1 honours at BEng or BSc. But this is not always true nowadays – some universities will accept a 2.2 if it goes along with good experience and high motivation. And, increasingly, candidates who can offer a lower qualification combined with on-the-job learning – for example, working in helicopter or fixed wing repair and maintenance roles, or in another engineering sector – will not be ruled out. Dr Helen Lockett, Course Director, in the School of Engineering at Cranfield University says: ‘We can consider people with lower qualifications such as HNC/ HND if that’s supported by an extensive amount of relevant post-qualification experience’.

Funding comes from the UK government, the Northern Ireland Administration and nine major aerospace employers, working in partnership with the Royal Aeronautical Society and the Royal Academy of Engineering who jointly administer the scheme. The most successful applicants this year were those who approached Partner firms to support their applications – details of how to contact the Partners are given in the FAQs section of our website.

To learn more about the AeroMSc bursary scheme go to www.raeng.co.uk/aeromsc. Applications for study commencing in 2014-15 are now open, and once each year’s quota is filled the scheme closes, so apply as early as possible. 2015-2016 applications will open in 2014.

Rosalind Azouzi presents two other scholarship schemes which are also relevant to students in aerospace and aviation.

**RAeS Centennial Scholarship Fund**

Established in 2003, the Society’s Centennial fund is aimed at supporting aerospace and aviation pioneers of the future and includes two annual British Aviation Group Scholarships for air transport students. The scheme is also open to organisations running STEM and aviation-related programmes to encourage young people. Awards include:

- Final year MEng tuition fee support
- Postgraduate tuition for courses such as aerospace engineering, aircraft maintenance, human factors, space engineering and air transport management
- Completion of aerospace-related PhDs
- National programmes to encourage young people’s interest in the aviation industry including Headstart, the Air League and the Engineering Education Scheme.

There are no nationality restrictions but some membership restrictions apply to individual award applicants. Applications are accepted annually in May. The Society also has a travel bursary scheme for students, early career academics and professionals to present papers at overseas conferences.

Visit www.aerosociety.com/Careers-Education/centennial

**EADS Tech Master Scheme**

Every year EADS sponsors 6 top students in their aerospace-related postgraduate studies. To find out more on the EADS Tech Masters Bursary Scheme, worth up to £5,000 go to www.eads.com/TMA
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always encourage them to do a general engineering
degree, like mechanical engineering, which teaches you
skills you can use in many other areas.”

Dawn was fortunate that her physics teacher had
been in the military and talked to his pupils about his
experiences. She was also inspired to sign up with
the RAF after meeting a woman engineer who was
responsible for promoting military careers. And she was
good at science.

Like many people, she had the wrong idea about
engineers, thinking that all they did was fix things. The
woman engineer soon disabused her of the notion: “It
would be your job to tell people to fix things; you don’t
need to do it yourself,” she said.

So at the age of just 17, she committed herself to a
career in the RAF until she was 38 – more years than
she had so far lived, her parents pointed out. What
attracted Dawn was that the RAF would sponsor her
through university and that she would move straight
into management, something to which most newly
graduated students could not aspire.

“During my 23-year career in the RAF, I had more
than 10 jobs – that was the enjoyable part, you never
got stale.”

When Dawn Elson was studying
for a degree in engineering, she
would never have dreamt that
one day it would lead her to being
responsible for every engineering
aspect of the UK’s second largest airport and the most
efficient single-runway airport in the world.

Although tens of thousands of aircraft fly 34.2
million passengers a year from Gatwick Airport to
approximately 185 destinations, it is not the aircraft for
which Dawn has responsibility, but the airport itself.

It is her job and that of her team of 200+ engineers,
aided by 200+ contractors, to ensure that nothing
spoils the start of those passengers’ holidays. Her
responsibilities span areas such as the high and low
voltage systems, lighting, shuttle trainand the check-in
desks to the shops and the toilets.

It seems vastly different from her previous role in
the RAF where she was Head of Engineering at RAF
Waddington looking after the Intelligence, Surveillance,
Target Acquisition and Reconnaissance aircraft fleets.

“It is quite a change,” she says, “but the principles
are the same, such as analysing risk, cost benefit
analysis, managing people and motivating teams. When
I talk to young people about careers in engineering I

Dawn Elson’s career as an engineer has
gone from working on RAF Hercules
aircraft to being the first female Head
of Engineering at Gatwick Airport. She
explains to Clare Walker why she
chose engineering.
Dawn Elson’s Career Path

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Position/Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988 – 1993</td>
<td>Officer Training and Preliminary Engineer Training</td>
</tr>
<tr>
<td>1991</td>
<td>BEng - Mechanical Engineering - Bath University</td>
</tr>
<tr>
<td>1993 – 1994</td>
<td>Hercules Junior Engineer Officer</td>
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<tr>
<td>1994 – 1995</td>
<td>Engineer Officer Training</td>
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<tr>
<td>1995 – 1997</td>
<td>Aero Engine and Overhaul Squadron</td>
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<tr>
<td>1997 – 1998</td>
<td>Hercules Command Office, Strike Command</td>
</tr>
<tr>
<td>1998 – 1999</td>
<td>Aide de Camp to the Air Member for Logistics</td>
</tr>
<tr>
<td>1999 – 2000</td>
<td>Structures specialist, Training Aircraft Project Team</td>
</tr>
<tr>
<td>2000</td>
<td>CEng – Member of the Institution of Mechanical Engineers</td>
</tr>
<tr>
<td>2000 – 2001</td>
<td>Engineer Recruiting Team, Directorate of Recruitment</td>
</tr>
<tr>
<td>2001</td>
<td>Information Plans and Policy Team, Directorate of Defence Information</td>
</tr>
<tr>
<td>2003 – 2005</td>
<td>Senior Engineer Officer 216 Sqn RAF Brize Norton</td>
</tr>
<tr>
<td>2006 – 2007</td>
<td>Logistics Transformation Programme Lead HQ Air Command</td>
</tr>
<tr>
<td>2007 – 2008</td>
<td>Advanced Command &amp; Staff Course Joint Services Command &amp; Staff College, Shrivenham</td>
</tr>
<tr>
<td>2008</td>
<td>MA Defence Studies - King's College London</td>
</tr>
<tr>
<td>2008 – 2010</td>
<td>Officer Commanding Engineering Wing RAF Waddington</td>
</tr>
<tr>
<td>2010 – 2012</td>
<td>Deputy Chief Engineer: Air Transport and Air-to-Air Refuelling</td>
</tr>
<tr>
<td>2011</td>
<td>Fellow of the Institution of Mechanical Engineers</td>
</tr>
<tr>
<td>2012</td>
<td>Fellow of the Royal Aeronautical Society</td>
</tr>
<tr>
<td>Oct 2012</td>
<td>Nov 2012 Senior Engineering Manager Engineering Services, Gatwick Airport</td>
</tr>
<tr>
<td>Nov 2012</td>
<td>Present - Head of Engineering, Gatwick Airport</td>
</tr>
</tbody>
</table>

Passenger numbers increasing all the time at Gatwick. There is also a buzz about the place,” she said. “In addition, the commercial focus is significantly different. In the military - especially in times of war - although there was a cost incentive, you could make decisions and not worry about the cost.

“Another noticeable difference is the respect you are accorded in the military. As a result of your rank, everyone knows what you do. In the commercial world, you have to work to gain credibility and respect.”

When Dawn realised that it was time to leave the military, she took a gamble and applied for a job that she believed was a step backwards in her career: the role of Senior Level Engineer at Gatwick.

“I didn’t expect to leave the military, but I am very career driven and I wanted promotion, so I looked at other roles. During my interview at Gatwick, I made it clear that the job I really wanted was Head of Engineering. Six weeks later, I got it!”

Dawn Elson is keen to spread her passion for engineering. When talking to young people at schools, she tells them engineering is a dynamic and interesting career.

“In many industries, the jobs are very similar, no matter what company or organisation you work for,” she says. “But in engineering you can apply the basic principles to lots of different jobs – in manufacturing, maintenance, civil aviation, the military, space – which allows you to grow and diversify.”

But why do so few women choose engineering? “That’s easy. They have the same misconception I had that it’s a mechanic or technician fixing things hands on with tools and getting dirty. But today’s engineers are working in management and design and many are at the cutting edge of new technology. That’s why it’s such an exciting career.”
Ground or gather critical intelligence. The widespread growth of UAVs has not been without controversy thanks to their critical role in recent conflicts – but it is important to remember that only a tiny fraction of the military UAVs are actually armed. The rest are unarmed spyplanes.

But whether you call them UAVs, RPAVs, or ‘drones’ – unmanned vehicles are here to stay – both in the air, at sea and even on our roads (Google, for instance, is developing a driverless car). New uses are being found for UAVs all the time, from tracking poachers killing rhinos, to storm and hurricane research, to journalism and even delivering sushi! There has even been a concept to fly a UAV on Mars. The majority of aerospace research prototypes, from spaceplanes such as the X-37B, to high-speed scramjet powered record breakers like the X-51 or airborne long-endurance vehicles such as QinetiQ’s Zephyr.

Being a drone pilot?

In the 21st century, one emerging career path will be becoming a civil or military UAV operator. At first glance this may seem like a poor alternative to becoming an actual pilot. However, the role of a UAV operator is still an extremely responsible one and one that demands similar airmanship and understanding of flight operations, weather, deconfliction and safety. Military UAV operators follow the same rules of engagement as pilots in actual aircraft – it is not a video game. However, flying a UAV in support of ground forces can be extremely fulfilling – providing eyes in the sky, saving lives and critical intelligence to battlefield commanders.

Furthermore, even though civil UAVs may be small and lightweight, new generations of remote pilots will still need the skills of airmanship and awareness of aerial matters. If anything, in fact, the new generation of UAV pilots will have to be more responsible and demonstrate superior safety awareness than the pioneers of manned flight in the 1900s – UAVs need to integrate into our complex ATM.
Designing a drone?

However, another career path may be in designing new UAVs. This is particularly exciting because, unlike manned aircraft which are so complex now that no one person is the overall designer, UAVs can be simple enough that one person can put their stamp on a design. The range of operations, too, for UAVs is an open field for would-be designers. They may be hypersonic, or vertical take-off, or even fly to space and return.

Removing the human pilot also removes the constraints of manned aircraft. The UAV may be the size of a hummingbird, designed to go inside buildings to find earthquake survivors – or it may have the wingspan of a 747 and be designed to loiter for months at high altitude to provide satellite phone coverage. You may decide to give it morphing configurations, or give it flapping wings. It could be electrically powered, or use diesel engines or even liquid hydrogen as a fuel. It could be extremely fragile, or lighter than air or, alternatively, might be ultra-robust and capable of aerial manoeuvres far beyond the 9+ G that a human pilot can endure.

The air vehicle itself you might design might be expensive and designed to be upgraded constantly – or could be disposable and designed to be thrown away after each mission. It might use swappable 3D-printed parts that convert it from a long-endurance high flyer, to a low-level speedy racer. It might be designed to ‘perch’ on power lines like a bird to recharge its batteries, or might even be several UAVs that come together to make one larger one, or a mothership that launches microdrones.

In short, if you can imagine it – you will probably build it. Science-fiction ideas for aerial machines are becoming fact and concepts or configurations that would be outlandish for manned aircraft can be used for UAVs.

Yet the real skill for UAV designers will be marrying these imaginative and creative impulses with hard aerospace engineering limits and practical trade-offs. Reliability and airworthiness are major challenges for UAVs at the moment. It is no good building a highly innovative UAV if it keeps crashing or if it flies but cannot carry a useful payload.

So how does one get into this? The ‘disruptive’ nature of UAVs means it is also very easy to become a UAV designer or builder and indeed there is a whole new sub-culture of ‘DIY Drone’ amateur builders making and modifying small UAVs from commercially obtained hobby parts and sub-systems. Another path is of course to join an established aerospace company – but as well as the established names don’t forget to research smaller companies too that are involved in manufacturing UAVs – the industry is growing fast and some of these tiny companies may turn out to be the next Boeing, EADS or BAE Systems in 50 or 100 years.

Systems, sensors, propulsion, datalinks

But there’s more. The wide range of missions and roles that a UAV can perform also means that the UAS is much more than the air vehicle itself – it is a ‘system’ involving datalinks, computers, ground stations and sensors – all of which need to work together. If your university subject is not aerodynamics but computers, artificial intelligence, image processing, network
security or collision algorithms to name a few, you could be invaluable in contributing to the design of future unmanned air systems.

For instance, the UAV will need sensors. These are getting ever smaller, but the key thing here is in automating as many functions as possible. You might, for example, wish to program the image database of a search and rescue UAV to automatically recognise and identify lifeboats – but ignore normal maritime traffic. Or you might want to create sophisticated software to merge and stitch images or video from the UAV sensors to create 3D maps or detect other aircraft in the vicinity.

In particular ‘sense and avoid’ is a major challenge for UAVs when the pilot is on the ground and cannot ‘see’ what the UAV can see. What is the best way of solving this? Radar, ADS-B tracking, electro-optic sensors, all of the above or perhaps some new technology or idea?

Maybe you are interested in the human-factors side of UAVs? How the human-machine interface is designed? Some UAVs can be controlled using a laptop and mouse, others need joysticks, throttle levers and a cockpit on the ground. But which is most effective? Can humans control multiple UAVs? Does boredom set in? These are emerging fields of research which will need answers – especially if there is to be a global UAV ‘pilots license’ one day. In manned aviation, the transition from PPL to CPL, to multi and APL levels of expertise is well known. But how will this work for unmanned vehicles – especially given the varying sizes, speeds and missions they can do? Simulation and training will be another growth area.

Finally, there is the biggest challenge of all – autonomy. Contrary to popular belief the majority of UAVs flown today (especially military) are not in the strictest sense ‘robots’ – they are controlled by a human during all phases of flight and are essentially remote-controlled aircraft with very sophisticated autopilots. These can, for example, stabilise a rotary-wing UAV to make flying it a question of swiping a button on a smart phone – rather than the delicate balancing act of cyclic, collective and rudder pedals that a real helicopter pilot uses. However, there is a need for greater autonomy or ‘artificial intelligence (AI)’ – both to reduce the workload of the operators and also to increase safety. A more autonomous system, able to make (limited) decisions for itself would be safer in that it, for example, the communication link was lost, the UAV would automatically return home. A more autonomous system would also be better in emergencies. For example, should the UAV have an engine failure, the AI could bring up alternate landing sites within gliding range, then examine them with electro-optic sensors to check it was clear of people before carrying out a forced landing. This kind of autonomy would also be necessary in potential collisions with other air traffic. In this case, the AI may have to decide itself to undertake an avoiding manoeuvre without the operator’s intervention, because the closing speeds of the air vehicles may be too fast for human reactions.

As can be seen, the design and creation of autonomous systems to aid the remote pilot are a major challenge. On the one hand, we want a UAV that can replicate the best part of a pilot’s flying skills and airmanship. But it must be predictable and its level of autonomy must be transparent to the user. In a sense, this is all about trust. Can I trust the AI to do a task, once I have given it the order? This field of research, of course, is not limited to aerospace. Google and others as noted are working on ‘driverless cars’ and everything from the way Amazon ‘learns’ your book and music preferences to smartphone apps now include degrees of AI. However, the safety aspects and the complex task of the pilot (some of which is taken for granted), means that creating a ‘computer pilot in software’ is a big challenge.

Finally as well as flying, designing and building and programming these new class of uninhabited aerial flying machine – you might consider running your own commercial UAV operators company.
Aerial filming using UAVs is now being used for TV and films, but also to track progress of large construction projects. There are even UAVs being used for aerial advertising and marketing – a recent Star Trek publicity event saw microdrones with lights fly at night to create the Star Trek logo. There are thus many new avenues opening up, from extreme sports photography, to drone journalism, to wildlife filming. Scientific research also is another growth area for UAVs, from tracking whales to hurricane research. There is even a plan to distribute medicine in Africa using small cargo UAVs.

Indeed, perhaps the first use of bigger UAVs in civil roles will be for cargo operations, conceivably initially for remote areas (the arctic, or islands) and then over more populated areas. Perhaps one day, a delivery of groceries from an online retailer will see a small electric quadcopter fly directly from a warehouse to a landing pad on your house – saving precious carbon fuel.

But here again, success will go to not only those with the best and creative ideas, but those also with business acumen, a responsible approach and awareness of the issues. Safety and privacy are rightly major issues and ones that have to be thought about before you accept your first contract. Is it safe, legal and ethical? If not, your dreams of being a drone entrepreneur may be short-lived. Demonstrating to others that your business can operate safely, legally and respect property and privacy, that your operators are fully trained and that your UAV is reliable and airworthy.

**Summary**

In short for anyone entering the exciting world of UAS in the near future the sky is really the limit. The field is very similar to the early days of manned aviation at the turn of the previous century – where aviation pioneers experimented with this exciting new technology. Some foresaw a military role for aircraft, others that they would be used for leisure, or would replace the car. The UAV visionaries, engineers and scientists of today could build the aerospace giants of tomorrow. Are you ready to create the future?
Ask a young child to draw a picture of a pilot, and there is a good chance the result will depict a white male wearing the pilot’s uniform. Long perceived as the pursuit of the rich and able-bodied – with high flight training costs and perceived tough medical restrictions – several organisations are helping to change these assumptions, including Freedom in the Air, led by Gautam Lewis. Beginning in poverty, followed by a fairy-tale twist, Gautam’s story shows that you don’t have to be born into aviation to transform lives through flying.

Rags to riches

Born in Kolkata, India, Gautam Lewis contracted polio as infant, which caused disability in his lower limbs. Whether because the polio had caused him to be paralysed, or simply because there was no money, his family were unable to look after him properly and he was taken to an orphanage.

Though this might be considered an unlucky start in life, Gautam counts himself lucky in the way events played out. Initially taken into the care of Mother Theresa’s Missionaries, he later crossed paths with someone who would change his life. That person was Dr Patricia Lewis, now Research Director for International Security at leading independent policy institute Chatham House. At the time, Patricia had just completed her studies and was in Kolkata working with children with disabilities. “Little did she know, she would meet me and we would create a bond so strong that she would decide...
to adopt me,” Gautam reminisces. “I think the last thing she imagined she would be doing at the age of 27 was adopting a seven-year-old from Kolkata with polio!”

From then on, Gautam’s life became a real-life ‘rags to riches’ tale: “Overnight I went from being one of India’s poorest to having a comfortable life,” he says. “I was thrown into education – I had never been to school or even learnt to count, but I just had to learn to adapt. I had only been taught to survive, not to be educated, so it was a steep learning curve but this was the first time that I had a sense of belonging.”

However, the transformation didn’t end there. After a period working in New Zealand, Gautam’s new mother returned to London so that he could attend British schools. “Although at the top end of the British school system, both schools offered mainstream education with no specific focus on disability,” says Gautam. “It was so different from how my life started out - from zero to everything, a stark contrast for the boy who had once been one of India’s poorest children.”

Following school, Gautam took a year out and developed an interest in photography. “My love of aviation had begun as a child,” he says. “But, like most people, and especially those like me dependent on crutches, I just didn’t think it applied to me. I didn’t know what I wanted to do. During my gap year I travelled back to Kolkata to take photos. When I came back to the UK, I enrolled for an International Business degree with French. It was not really me but I’d had a bit of an identity crisis in Kolkata and fell into it.”

However, he didn’t become a typical student and his entrepreneurial nature began to flourish. “I went to Cranfield Flying School to complete my PPL training with no idea of how important Cranfield is to my future,” says Gautam. “I knew I wanted to fly, but I didn’t know how.”

By December 2006 Gautam had left the music industry and could finally revisit his interest in aviation. “I have never forgotten the day I first saw an aeroplane and then flew in one as I left Kolkata,” he recalls. He went on to achieve his Private Pilot’s Licence in September 2007 but, being Gautam, did not go via the usual PPL training route!

“My first flight instructor was a former RAF Tornado pilot, Flt Lt Paul Carvosso, who now flies for a major UK airline”, says Gautam, “and I started my training at Lasham airfield, which is famous for gliding. Carvosso encouraged me, and though my learning curve was steep, he helped me achieve my first solo flight. I was also lucky enough to have had lessons from the Chief Pilot of the Antarctic Survey, Alan Meredith, who was equally inspiring. Finally, I got to know a Chinook pilot at RAF Odiham, Flt Lt Nigel Thorpe (now an Ambassador for Freedom in the Air) who gave me some navigation training. It was these amazing people who helped me get through.”

Gautam’s aviation path had only just begun. “I went to Cranfield Flying School to complete my PPL training with no idea of how important Cranfield is to aviation,” he continues. “Again my flight instructors were amazing and truly dedicated to giving time to trainees. By then, aviation had helped me snap out of the depression that working in music had given me. I felt ‘plugged in’ again and completely alive and literally on top of the world! I felt I had to share this experience.”

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Taking to the skies

As the blog developed, Gautam felt he had to do more and decided to turn Freedom in the Air (FITA) into what he describes as an ‘advocacy’ project. FITA is committed to opening horizons for people with disabilities so that they can fly higher socially, physically and
professionally. With increasing numbers of disabled people across the globe, Gautam reminds us, “There is a growing market for disabled flight and it’s also about ensuring the best people can learn to fly, not just those who fit the cockpit design.”

Since its launch in 2008, FITA has given over 600 free flying lessons to disabled young people and also offers flying scholarships through a Fight Training partnership with Cranfield Flying School (CFS). Donald Putnam, Senior instructor at CFS, said: “Both myself and our organisation are keen to support the promotion of aviation to disabled people. We are happy to do as much as we can to help disabled people become pilots. As an instructor, I am naturally keen to encourage anyone to learn to fly.”

Having now clocked up over 500 flying hours himself, and with an impressive bag of pilot tricks, Gautam was keen to share his passion with others. He explains why: “Learning to fly is a way to change peoples’ lives, build confidence and re-ignite self-belief. For many people with disabilities, flying an aeroplane is empowering. People feel free, liberated from their disability with nothing to hold them back. There are no differences between disabled pilots and able-bodied pilots. In the air, everyone is equal. If you can fly an aeroplane, then you can do anything.

“However, people with disabilities find it hard to learn to fly. Most small aircraft are fitted with foot pedals for rudder control and unless a nearby flying school has aircraft fitted with hand controls, disabled people do not get the opportunity to learn to fly. In addition, the hand controls that are currently in use are no longer being manufactured and so unless something is done about this very soon, yet another area of activity and economic enterprise will be closed off to people with disabilities.”

With this in mind, Gautam began working seriously to develop his plans to create a universal hand control that could be used by people with lower limb disabilities to control the rudder pedals for the single engine Cessna and Piper, removing the need to use legs and feet. He began to engage with the Civil Aviation Authority (CAA)’s Safety Regulation Group, Airworthiness and Medical divisions, and EASA, the European aviation safety authority, to see if his ideas could accepted by the regulators.

“Then,” he says, “realising the expertise on my doorstep, I also started talking to Cranfield University, pinning down Professor Phil Stocking and Professor Howard Gough from the MSc Aerospace Vehicle Design programme and asking them to consider introducing a hand control conceptual design project for students on the course. Obviously FITA had no money, so we needed to find ways to get experts involved in the process - this seemed to offer students a fantastic, real-world engineering programme, adapting existing designs to client specifications and EASA safety requirements, enhancing their employability skills. The university agreed.”

FITA encouraged the students to think about what it is that prevents people from flying, and to focus on enabling more people to learn to fly. As Gautam points out: “Now all students on the MSc programme have to include accessibility of cockpit design in their final group MSc project presentations at which often Airbus and Boeing representatives are present, thanks to the hard work of Professor Stocking.

Turning dreams to reality

The key outcome from the partnership was the concept of a universal hand control that could work for both single-engine Cessna and Piper aircraft such as the PA28 Cherokee, Warrior, Archer and Arrow.
wheelchair basketball athlete Ade Adepitan an ambassador for Freedom in the Air, there is also the intention to promote FITA’s work at the 2014 Commonwealth Games and at Rio Games in 2016.

More exciting still, work is underway with Cranfield University to produce a multi-engine hand control unit – which would enable disabled pilots to train to Commercial Pilot Licence (CPL) level with a Multi-Engine (ME), Instrument Rating (IR). “Freedom in the Air cares about the future and we have a long-term plan which won’t be achieved overnight,” says Gautam. “I know aviation can change people’s lives and will continue working to make it happen.”

No one can judge me by looking at me

But why is this so important? Gautam explains: “When I started learning to fly, I saw the world from a completely different perspective. Suddenly the world was boundless and full of possibilities and I thought: ‘Finally no-one can judge me by looking at me.’ When you are on crutches, people often make assumptions about you, but in the pilot’s seat I was just a pilot. Also, many people whose disabilities mean they are wheelchair-bound or of small stature see the world from a lower level and flying offers a whole new perspective. This is what aviation has given me and thousands of other disabled people. Perhaps one day in the future when Cranfield University students go on to build the next generation of airliners, designed for both disabled and able bodied pilots, the dream for disabled pilots to fly airliners can be realised.”

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What’s next?

Once approved, FITA plans to introduce the single-engine hand control across Europe and would also like to donate a number of units to UK-based flight training schools which have demonstrated a genuine commitment to increasing diversity in aviation. With
Airshows are an important part of the aerospace and aviation sector. From local, seaside air shows celebrating aviation heritage, to global trade events unveiling the latest technology, they inspire new generations and enable aerospace manufacturers to meet their customers. Every two years, a quiet town in Hampshire turns into a magnet for international aerospace professionals: the Farnborough International Air Show. The show is traditionally seen as a trade show for industry to showcase its products and meet customers, but it has multiple faces. The Friday of “Farnborough Week” has now been transformed into Futures Day, aimed at advertising career opportunities to thousands of young people from across the UK, while the final weekend becomes a public air show combining world class air displays with fun activities for all the family. Three very different key audiences, a huge organisational challenge and the 2014 countdown has already begun!

Two years to go
During the 2012 airshow, the event’s organisers, Farnborough International Ltd (FIL), were already planning the 2014 event, gathering feedback from their customers – the show’s exhibitors and trade and public visitors – to see what worked well and how they could make the show even more valuable in 2014. For the trade visitors, says Amanda Stainer, Commercial Director for FIL, the key aim of the event is to maximise business opportunities, while the general public are looking for spectacular air displays and a great family day out.

Building a small town in a Hampshire airfield
The trade halls are composed of temporary pavilion buildings which are put up six months before each show begins on the Farnborough airfield. There are four main exhibition halls, a media centre, specialist pavilions, such as one to showcase the Space sector, and countless ‘chalets’ – hired out by aerospace manufacturers to wine and dine their customers and give media presentations. And of course, they all have a fantastic view of the runway. There are also restaurants and food outlets to plan for, ensuring that the thousands of visitors don’t go hungry. This means that the Farnborough International team has to build the equivalent of a small town on the airfield, with the requisite utilities such as water, electricity and wi-fi, even air conditioning … despite the unpredictable British weather! Finally, the site organisers will also have to decide on which contractors will build the pavilions and also liaise with the exhibitors’ own contractors who will come and build the stands – many to an extremely high specification.

Rules of attraction
The sales team are working hard throughout the two-year period running up to the show to sell the exhibition spaces – 2012 completely sold out! Large, ‘prime’ aerospace manufacturers will take out huge spaces in the halls to showcase their latest technological developments – it is not unusual for Rolls-Royce to bring a Trent 900 engine to the show, for example – as well as ensuring their aircraft are included in the flying display and that they have chalet space for their business meetings. The sales team work throughout the two years to retain existing customers and attract
new ones, and this will involve many meetings with aerospace companies’ marketing and communications teams, liaising with the industry’s key media platforms, and travelling to other air shows around the world such as Paris and Dubai to market the Farnborough package. For Futures Day, the planners work with schools, colleges and universities around the UK to ensure those students who are passionate about aerospace get the opportunity to see the industry at close hand.

Then there are the public days – marketing campaigns will include working with the local press and radio, but also, with the show attracting aircraft enthusiasts from both the UK and overseas, there may also be national press campaigns and advertisements on the London Underground tube network – all requiring months of planning.

The Aircraft Display

For many, the highlights of the show are its large outdoor display of static aircraft and a varied air display ranging in recent years from the Red Arrows, Airbus A380 and Boeing 787 to the Eurofighter and Bell Helicopter V-22 Osprey. This aspect of the show involves an international-scale logistical operation to ensure the aircraft arrive at the right time, in the right order and with the required air display insurance and airworthiness certificates for the UK. The air display planners must liaise with the airport’s Air Traffic Control, as the Farnborough runway is in regular use by the nearby Business Aviation terminal with hundreds of corporate jets landing and taking off throughout the year. Safety is of paramount importance throughout the process and the organisers cannot afford to take any shortcuts.

Showtime!

Once the show kicks off, the team have no time yet to sit back, relax and enjoy all their hard work. Amanda says: “During show week, we operate what we call ‘show control’ which is the office from where all activity on the site can be monitored and a hub for all the emergency services – police, security, traffic, communications etc. The Farnborough International team have to be in constant contact with each other, using radio handsets so we have always got our ‘ears to the ground’ so to speak. They do so much, yet go about their business unnoticed by our visitors and exhibitors alike.”

Meanwhile throughout show week, the Communications team will be liaising with national and trade journalists to ensure the show has as much air time and media presence as possible – many major industry announcements are made following the business meetings taking place at the show, and it helps to highlight the show’s importance to FIL’s business customers.

The ‘A Team’!

With such complex logistics and safety operations and the need to work with a variety of customer groups, from global aerospace giants through to SMEs and the general public, Amanda notes: “We have an excellent core team here at Farnborough International Ltd that work together on the Farnborough Airshow, for FIVE (our permanent events and exhibitions venue) and on other events around the world. They work effortlessly, and during the run-up to the airshow, incredibly long hours to achieve all our project plan goals. While some are specialists in their field and travel from further afield, many are local to Farnborough. As we get closer to the show, we employ more local people, many returning for each show, which we hopes goes some way to show how rewarding it is to work on the event.”
Major Timothy Peake FRAeS is the first British citizen to be selected as an astronaut by the European Space Agency. He was in the Army as a helicopter pilot before becoming an instructor and then a test pilot. Tim made time from his punishing astronaut training programme to talk to David Houston.

With two years to go, how’s the training going?
It’s fantastic. No two days are the same and there is a lot of travelling. I’ve just come back from Montreal, Canada, spending two weeks doing my robotic arm training which was a fascinating insight into the robotic arm’s operations, whether using it for another crew member who’s on the other end of the arm doing EVA (Extra Vehicular Activity) spacewalk tasks or for capturing the HTV supply vessel (an unmanned cargo ship that carries around 3.5 tonnes of supplies to the International Space Station (ISS)). I’m now in Houston, Texas, learning about the United States Orbital Section (USOS) of the ISS in terms of life support systems, how we recycle the water, how to do all of the maintenance activities and the scientific payloads in that section. I’m also working through all of my exams on that section in order to get to a base level of qualification. I’ll be back in the swimming pool next week doing a dive in the full pressurised spacesuit refreshing all of my spacewalking and EVA skills. So the training is just incredible, it jumps from one activity to the next and overall there is a lot to do in the two years so we’re given refreshers so that as you jump from each topic you maintain your skills. By the time that you fly you’re pretty much an expert in all the required areas.

How much of your training is physical fitness and how much is academic?
Probably about 80% of it is technical knowledge and then 20% is fitness. A lot of the tasks that we do are physically demanding, especially the EVA skills. It’s quite punishing on the body; six hours in a pressurised suit and after a day doing your pool run (astronauts train in large water tanks to simulate the weightlessness of space) you really do feel it the following day. It requires good physical strength as well as good cardiovascular stamina. Your heart rate is probably equivalent to running a marathon and you’re doing that for six hours. Physically demanding activities are one side of it but maintenance is another big one; on
board the space station we’re the electrician, we’re the plumber, we’re the IT experts, we’re the guys who keep the space station going so, although there is a lot of academic study and theory, it’s mixed in with practical training and skills.

**What were you doing before you trained to be an astronaut?**

I was in the Army for just over 17 years, starting off as a helicopter pilot then becoming an instructor at quite a young age followed by about four years in the Army as a test pilot for the rotary wing test squadron working closely with companies such as AgustaWestland, Boeing and QinetiQ. That experience gave me a lot of skills; not only was it fantastic from a flying point of view but it also put me in touch with the commercial aviation industry and understanding how well they work. When I decided to leave the Army, I went to work for AgustaWestland as a test pilot and it was a very natural transition to make.

**Did you know at school that you wanted to be a helicopter pilot or even go into the Army?**

I was one of the lucky ones because I knew exactly what I wanted to do at an early age because when I started secondary school at Chichester High School for Boys the schools had a Combined Cadet Force. I was in the Army Section but at the weekends I would go off with the Royal Air Force Section, gliding and flying. By the time I was 15, I thought that I wanted to join the Army but I also wanted to fly so the Army Air Corps was the obvious choice. At A Level I studied Maths, Physics and Chemistry which were not only a great choice in hindsight but also the subjects I enjoyed most and was best at. I was working towards studying aeronautical engineering at university but then the Royal Military Academy Sandhurst offered me a place in officer training. I knew at the time that I wanted to fly and become an Army officer - and the flying route takes a long time - so thought ‘why not just start straight away?’

So, I joined the Army at the age of 19, went through Sandhurst and then started on my flying career. I was really fortunate knowing what I wanted to do from an early age. The military is a wonderful environment for encouraging you to do many different activities and one of them is academic studies so I was able to do a degree in flight dynamics whilst in the Army as well.

**When did you think that space might be obtainable to you as a British citizen?**

Not until very late on. When I started working as a test pilot, you obviously work quite closely with the space industry because they are closely related. So I began becoming quite interested in the space industry as well, learning and studying about it, but becoming an astronaut was still something unobtainable. Britain did not participate in human spaceflight. At that time the European Space Agency (ESA) had never run a selection process for astronaut training; it had always been the individual nations that did participate in human space flight such as France, Italy and Germany, who had chosen their astronauts. A lot of things changed in 2009 when ESA said that they would select the next class of astronauts and not the individual nations - it was now open to all EU member states whether they participated in human space flight programme or not. That was the first time that British nationals had been able to apply to be an astronaut. I was aware that we had Brits who had changed their nationality in order to apply to NASA but that didn’t really appeal to me because I was engrossed in my test pilot career and wanted to solidify that. However, when the opportunity to apply to ESA arose I jumped at it and it’s interesting to note that out of 8000 candidates, in the final 22 there were five British people, showing how much interest there is in the UK and also how much expertise we offer.

**How did it feel when you reached the final stage of the selection process?**

It was an incredible process to go through but you’re trying not to get too excited because you’re thinking to yourself ‘this is such a life changing event that is extremely unlikely to happen’ because the odds are against you getting through. But the further you progress, the more excited you get that this could be your future career and you could actually have an opportunity to go into space and work in a fantastic dynamic environment. So it was a real mixture of emotions and going into the final interview was very tough.

**How long did you have to wait after the final interview to find out that you were the successful candidate?**

It was about three weeks and it was three weeks of complete silence which was even more disconcerting because there were 10 candidates who had the final interview with the Director General of the European Space Agency and the results would be announced in two weeks’ time. Three weeks went by and I heard nothing. In the third week I actually saw in the press that ESA was going to reveal the next class of astronauts to the press on the Wednesday. This was a Monday and I was thinking ‘well I haven’t heard anything so it’s not me’. Then on Monday evening I got a telephone call from Paris saying ‘can you make it here for Wednesday morning? You’ve been selected!’ So, they gave us slightly less than two days to get over to Paris and start the ball rolling.

I was completed dumbfounded. A huge mixture of emotions: absolutely elated and excited about what the future offers, mixed with a slight feeling of fright because this is a both a huge career change and a huge life change.
How do you find the role as an ambassador for the space exploration?
It’s actually a much larger rather role than I thought it was going to be initially but that’s encouraging because it just goes to show how much interest there is in space and human space flight. I really enjoy it and I particularly enjoy talking to the younger generations and it’s really encouraging to see how enthusiastic they are. I wish there was more time in the schedule for it but it all has to be mixed in with the training regime.

It’s a very important and enjoyable part of the job and something that I look forward to on completion of my mission is bringing that experience back and talking to people about it so that they can share in that too. Anything that inspires our young generation as to what’s possible, the opportunities open to them and what they can achieve if they set their mind to it is, to me, a very productive and enjoyable way to spend my time.

As an astronaut you’re the public figurehead of the mission but how many people are involved with the mission as a whole?
We’re talking thousands. Astronauts are literally the tip of a huge pyramid and the public face of the mission but actually there are so many people working extremely hard to support us and to keep the entire project running. Just on a day-to-day basis there are literally hundreds of people around the world who are involved in operating and running the International Space Station (ISS), the mission control centres in Houston, Munich, Tsukuba, Moscow and all of the international centres around the world, not to mention the enormous amount of training that goes into the mission - not just the astronauts, but the mission controllers, the payload specialists, the scientists, etc. So bringing that all together is truly a massive international task and one of the benefits of the space station programme: it successfully brings all of these nations together.

So do you think that space has the ability to unify nations and collaborate with each other?
Yes and I think that it has been doing so for many years. It became so apparent during the Apollo/Soyuz era at the height of the Cold War when the Soviets and the US were working closely together in the space sector while everything else in the political environment told you that those two companies were locked in conflict. And now Europe is opening up to the Chinese and welcoming discussions and collaboration with them. The Chinese have been to visit the European Astronaut Centre in Germany and a European delegation has been over to China. So space can bring together international parties and probably has to if we’re going to achieve what we want to in the future because it’s too much for one country and the ISS has shown what you can achieve when countries come together.

Do you plan on being active with social media and public engagement when you’re up in space?
 Completely! I’ve been active on Twitter for just over a year now. I started just prior to my NEEMO mission (NASA Extreme Environment Mission Operations) under the ocean last year (I was one of NEEMO 16’s “aquanauts”). I’m tweeting as I go through my training and will be using Twitter throughout my entire mission. The space station’s communications are getting better and better. The astronauts now have access to live e-mail and internet and therefore can do real-time tweeting and those communications abilities are only going to improve. We’ve always had the “ham” radio (amateur radio that NASA uses to allow astronauts to talk to schools) ability which is a bit more archaic but there is nothing more fun! If you’re teaching communications in physics to school kids then why not get a radio and talk to astronauts on the ISS? So those sorts of activities as well as getting involved with YouTube videos and Twitter are great.

Have you got any advice to young people who want to get in aerospace?
I’d say that the best advice is to be passionate about what you do, be good at it and bring those two elements together. Find out what you really want to spend your time doing and enjoy. They will probably be the things that you are naturally best at anyway; for me the rest has been a natural progression. Rather than setting a goal and working towards that too far in advance, I have preferred to have short-term aims because things will change throughout your career and you never know where life is going to take you - what you end up doing may not be what you think you’re going to be doing when you’re 16 years old. So I think that it’s important that you find out what you enjoy doing and are passionate about and focus on that.

Finally, what are you most looking forward to about space?
It’s hard to say just one thing because it’s just going to become such an all-encompassing experience! The view is clearly going to be the most impressive and most of my friends who have come back from space have told me that it’s the most jaw-dropping experience to go into the Cupola (the observatory module on the ISS) and to look down on planet Earth and see it passing beneath. Even more so I think that the entire experience of living up there for six months, really becoming part of the space station activity and then sharing that with other people - I’m going to enjoy the whole thing.
JOIN THE RAeS YOUNG PERSONS’ NETWORK

The RAeS Young Persons’ Committee exists to nurture and support the needs of young people, and in particular RAeS members, within the aerospace, aviation and space industries.

It also aims to inspire young people to develop an interest in a future career in aerospace or aviation.

The Network
Young people account for approximately one third of RAeS members so the Young Persons’ Network brings together all these individuals to actively engage with one another and participate in Society activities.

“The Young Persons’ Network is open to any RAeS member to join and will be of particular interest to students, apprentices, and those in the early stages of their career who are looking to be more proactive in their professional development.”
Mark Lees MRAeS, Chairman, Young Persons’ Committee.

The goal of the network is to enable young people to become more visible and actively engaged, and to create a way to more easily access information shared at university and Society branch events, or at meetings of specialist groups of the Society.

An Opportunity to Get Involved
Being an active member of the Royal Aeronautical Society is the best way to receive maximum benefit from your membership. It will also demonstrate your commitment to your professional development and make you stand out from other candidates going for the same job.

Some of the ways you can actively participate or volunteer your services include:
• Be on the RAeS stand at airshows and exhibitions
• Present to university fresher students about the RAeS
• Join a RAeS specialist group or branch committee
• Mentor students or those starting out in their career
• Be a STEM ambassador at our Cool Aeronautics events
• Volunteer to help run events such as AeroChallenge, the Young Persons Conference or the Young Persons Lecture and Awards evening
• Contribute to the writing of news articles and industry features.

Benefits to your career
• Attend events dedicated to your career stage and development level
• Network with your peers to share experiences and offer or receive advice
• Build business contacts of the future, benefitting both you and your employer
• Develop key skills including leadership, management, diplomacy, budgeting and presentation to add to your CV
• Access to scholarship schemes such as the Centennial Scholarship Fund and the Aero MSc Bursary Scheme
• Be recognised for your outstanding contributions or achievements through the RAeS Young Persons Medals and Awards.

Join the network
To join the network or for any enquiries about the Young Persons Committee and the Network activites, please contact:

E: youngmembers@aerosociety.com
The space sector is one of the fastest growing sectors in the UK’s aerospace industry. It represents some of the world’s most advanced technology and is a national leader in the conversion of innovation into high value products and services. Today, space contributes over £7.8 billion to the economy and employs nearly 25,000 highly skilled workers in the design, testing and manufacture of satellites and specialised space equipment and systems, with another 60,000 working in its supply chain. By 2030, it has been estimated that the global space market will be worth over £400 billion. The government has committed its active support for the UK space sector to aim to capture at least a 10% share in this valuable business. As the sector expands, it will open up exciting new opportunities that are expected to create over 100,000 new jobs. Richard Gardner reports.

Developing the future

There is a tremendous level of UK Government support to new initiatives designed to assist space companies and organisations to exploit emerging technologies, and to encourage young scientists and engineers to develop their skills. Firstly, the creation of the UK Space Agency (UKSA) has provided a UK focus for the space sector, with further initiatives being launched to help bring new organisations and people into this exciting sector, by matching individuals’ highly specialised skills and capabilities to emerging industry needs.

To support this bringing together of skills and industry needs, the UK’s innovation agency, the Technology Strategy Board, has been busy establishing a nationwide network of technology and innovation centres of excellence, including ‘Catapult Centres’, where UK scientists and engineers can work alongside businesses to identify opportunities for developing and exploiting innovative products and technologies. 2013 was a milestone for the UK space sector, with the official opening of the Satellite Applications Catapult on the Harwell Science and Innovation Campus in Oxfordshire, where there is also a new European Space Agency facility – perfect neighbours! The new Catapult organisation pulls together government, industry and academia from the former International Space Innovation Centre (ISIC) and the Harwell campus has been bubbling with start-up organisations dedicated to advances in space technology and satellite applications.

Rocket fuel

The Satellite Applications Catapult aims to accelerate UK space growth, encourage entrepreneurship, and become a world-class centre for the development and commercial exploitation of space and satellite-based products, services and applications. It’s easy to forget how satellites play an integral role in our daily lives and that, by providing unique opportunities for sectors to work together to make the most of satellite technology, countless innovations could happen. CEO Stuart Martin announced at the launch: “The Catapult’s role will be to act as a nexus between academia, industry and government, demonstrating the benefits that satellite applications data and technologies can bring to market sectors such as agriculture, insurance, maritime, fisheries, transport, logistics and emergency services. It will also help innovators and entrepreneurs turn their ideas and initiatives into commercially viable products and services.” Speaking at the same launch, the Minister for Universities and Science, the Rt Hon David Willetts MP, added, “to ensure the future success of our world class space industry we need to foster innovation and help businesses take their best ideas through to market. The Catapult will bridge that gap between research and commercialisation, driving growth and keeping the UK space sector ahead in the global race.”

A galaxy of ideas

The Catapult will help inspire and support innovation by bringing people from industry, education and technology together to consider how developments in space can be exploited in other sectors. Initially, it will develop two types of programmes – market-led and technology-led – to support UK space growth. Catapult events will demonstrate how space technologies are currently used in other sectors and to encourage participants to consider how they could be used in their own businesses. The Catapult will also provide practical support such as funding and partnerships for research and development.

There are futuristic conference and meeting rooms including an interactive facility for generating innovation between small groups. The video wall room has multi-panel high definition video screens with 3D projectors and can host 180 delegates for conferences and seminars. A variety of visualisation systems support the whole lifecycle of innovation activities, from developing new ideas and feasibility studies through to promotion and education. The
visualisation suite is integrated with other Harwell campus activities and can draw on environmental and Earth observation data, with an operations centre that allows an end-to-end solution, from mission operations through data downlinks to data processing. The workshop programme is well underway: over 80 delegates attended an “Inventorthon” in late October 2013, attracting entrepreneurs, scientists, technologists, and hi-tech enthusiasts to generate new ideas, processes, prototypes and business ideas.

**Infra Red**

The Catapult also hosts the Remote Control Centre which is overseeing ESA’s most ambitious planetary rover test, taking place in Chile’s Atacama Desert, a location which shares very similar features to the Mars landscape where the ExoMars vehicle is intended to carry out its exploratory mission. The field tests of the rover vehicle are aimed at providing experience in operating a vehicle on a planet surface, which is very different to controlling a space satellite mission. This activity has been funded by ESA’s basic Technology Research Programme and the UK Space Agency and involved an international team of space scientists and engineers, as well as academics from several universities.

All of this indicates that the next stage of UK space innovation and international collaboration could happen more quickly than ever.

**Building on success**

The Catapult will propel a whole new set of UK space activities, but there are already some UK success stories that can provide inspiration.

Surrey Satellites (SSTL) was originally a spin-off company from the University of Surrey and has subsequently developed a reputation as the leading global supplier of small satellites, with a wide customer base for its compact space vehicles which are used for Earth observation and environmental monitoring, communications and surveillance, as well as for scientific research purposes. Now part of Astrium Space (which in turn is part of aerospace and defence giant and Airbus owners EADS), SSTL is one of the largest space vehicle and system manufacturers in the world. Its satellites extend into the heavyweight stellar observation category, Earth resources, environmental monitoring, defence and civil communications and the Galileo constellation of global timing and positioning satellites which play a vital role in everyday global networked communications and precision navigation.

Astrium has sites at Stevenage, Portsmouth and SSTL at Guildford and employs 15,000 people across Europe. Astrium is also the prime contractor for the Ariane 5 space launcher and the company’s satellites include the Mars and Venus Express spacecraft, the giant Envisat climate change monitoring satellite and the

**Space for MBAs**

In July, the Catapult announced that it was working with the University of Surrey to develop the first space industry MBA programme. Scholarships will be awarded to ambitious space professionals for up to 75% of the cost. Participating students will gain a thorough grounding in business theory and skills during their first year, with an opportunity in their second year to study specialist options focused on business issues relevant to the space and satellite industry. The specialist modules are being developed in conjunction with the Surrey Space Centre and sector businesses.

**Cryosat polar monitoring spacecraft. The company thus offers a variety of career entry paths including engineering apprenticeships and graduate development programmes.**

**To boldly go**

Commercial space travel has been another catalyst for space innovation with a veritable ‘space tourism race’ taking place in the Mojave Desert, California. But closer to home, another strong contender is UK space company Reaction Engines, based in Culham, just outside the Harwell space cluster. Led by the charismatic spacecraft designer Alan Bond, Reaction Engines is engaged in a major - and highly innovative - project that is now testing and developing a unique hybrid air-breathing engine, SABRE, that could power the proposed Skylon ‘spaceplane’. Unlike conventional rocket-launched space vehicles, Skylon would be a very large winged air vehicle that would use a conventional runway for take-off and landing, but which would fly into space at hypersonic speed to launch satellites of up to 12 tonnes in weight, or service a space station, or could travel above the atmosphere at great speed so that no spot on earth would be more than a few hours distant in travelling time. The initial version of Skylon would be unmanned, but a version carrying a human payload is also within the capability of the design. The potential for this breakthrough technology has been described as the most promising in aerospace since the invention of the jet engine, and the demonstrator phase has received £60 million support from the UK Space Agency and recently the European Space Agency has announced a £1 million project to consider how viable the proposal is as a future re-usable launch platform.

Therefore the UK space sector is firmly set on a path that will develop a growing share of this international hi-tech business. For every job created directly on new space projects, many more are also generated right the way along a lengthy supply chain involving SMEs and large companies in every aspect of spacecraft design, test, development, integration, manufacturing and service provision. The growing space momentum in the UK is also resulting in more opportunities in academia and pure science research on the vast number of associated specialist activities that range from optical and radar sensors to global communications and positioning, to satellite command and control services and project management. UK Space is certainly getting bigger and so is the scope for a highly-educated and motivated science-based workforce to take the sector to new levels.
Autumn is a key period in the internship and graduate recruitment calendar. While more senior roles may be advertised throughout the year, and apprenticeships are often advertised in the early Spring, in the competitive graduate and internship market, recruiters begin their recruitment drive as soon as the semester begins.

If you are at university or college, enhancing your learning, particularly through work experience, will help you graduate with all the necessary ‘employability’ skills and knowledge recruiters are looking for, particularly important as competition for graduate jobs has significantly increased since the recession. Nevertheless many civil aerospace manufacturers are booming with long order books that have been little affected by recent economic cutbacks, and, with plenty of growth ahead when the global economy improves, recruiters are looking to ensure they maintain their skills base over the next decade by recruiting new talent today!

**Freshers**

It’s never too early to be thinking about getting experience. Start planning now for a summer opportunity next year. Update your CV and have it checked by a careers advisor – you may find that the advice is very different to the CV advice you got at school! Explore work experience opportunities. You could work for a flying club, help out at an airfield, work on a historical project such as rebuilding a vintage...
aircraft at a heritage site or museum, work in customer services for an airline/airport operator … By using your vacation periods constructively, you can build up your CV and make useful contacts.

**Penultimate Year**

Now is the time to look for a summer internship or one-year sandwich placement! Summer placements are often project-based, working on a specific task or carrying out a particular aspect of an ongoing project. Sandwich placements usually last between 10-12 months, giving you the opportunity to settle into the company, develop your skills and understanding, take responsibility for a project or task and gain in-depth understanding of internal and external company operations.

Work-based learning can be invaluable, particularly if an assessed component of your degree. You can compare theoretical models with workplace application, appreciate factors such as customer requirements, budgetary and technological constraints, competition, and develop your ability to work with people, perhaps in multi-disciplinary teams, to a deadline, overcoming problems or challenges. The value of a placement is so high, that many employers use the placement as a recruitment tool for graduate schemes, and, although placement recruitment is competitive, the reward may be the offer of a graduate job in your final year, freeing up time to concentrate on your studies.

Both summer and sandwich placement recruitment usually start each Autumn of the academic year, so now is the time to start making applications. Remember, as well as larger companies, look for opportunities in small and medium-sized companies (SMEs) – see page 18.

**Final year of study**

If you are hoping to be in a graduate job to start in September after you graduate, you need to start applying one year in advance of the start date! All major graduate employers start their recruitment programmes in Autumn and online applications often close by 31 December.

**There are lots of questions to think about:**

What can you offer employers? How do they recruit – by CV and letter, or an online application form? How long does it take to fill in an online application? (If you haven’t done one before, it might be longer than you think!) Do you know what soft skills are? Can you articulate yours? Do you enjoy interviews? How would you perform at an Assessment Centre? What questions do aptitude tests ask and where can you have a go and get some feedback? How many companies should you apply to ensure you get a job?

Remember: employers are not only interested in your educational background, but also the skills and abilities that will enable you to blend in with their existing staff, maximise your personal development and contribute to the company’s development and ultimately profits. Larger employers receive at least 10,000 graduate applications each year, therefore there are no guarantees you will make it to the next stage. Look out for smaller companies – ‘SMEs’ – and apply to as many as possible! Check out the Careers in Aerospace directory for new companies. Prepare for recruitment tools such as aptitude testing, group exercises and interviews to make the most of any that come your way.

If you don’t think you have all-round experience and the soft skills they are looking for, think about getting additional experience such as through volunteering, taking up a sport, becoming a student ambassador or getting promotion in your part-time job. The Royal Aeronautical Society always welcomes volunteers!

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**Find out about the Royal Aeronautical Society’s FREE careers services**

**RAeS 1-2-1 Careers appointments**

For a personalised Careers session, book an individual appointment at our London office – from your CV and personal skills, to specific career development questions. The service is free of charge and unlimited and available throughout the year to all ages and special interest areas covered by the Royal Aeronautical Society.

**University and College Careers and CV Workshops**

Can’t make it to London? Let the RAeS come to you! For groups of 10 aerospace/aviation students or more, we will come to your organisation to run a one-hour workshop on CVs, skills and professional development advice.

The workshops will help you better understand the recruitment process, look at how you can articulate your skills and experiences on paper and at interview as well as cover job-hunting advice to ensure you are aware of the vast number of aerospace opportunities out there. Following the workshops, time permitting, there will also be Speedy CV 1-2-1s to look over individual CVs.

Bookings are accepted from students and members of staff.

To book a workshop, please contact careers@aerosociety.com

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**Useful contacts**

RAeS Careers and Education Department:
T: + 44 (0) 20 7670 4325 / 6
E: careers@aerosociety.com
W: www.careersinaerospace.com
When did you learn to fly?
I completed the integrated commercial pilot flight training course at CAE Oxford Aviation when I was 23. I had already been to university and completed a degree in Physics but I only became interested in flying after I graduated. This was following a conversation with a cabin crew member on a flight to Canada who told me how about their exciting lifestyle.

How did you fund your training?
I was lucky as my parents agreed to loan me the funds, which I am now paying back, but I also looked at some of the loan arrangements that the flight training schools were offering at the time.

Did your degree help you during the training?
Not as much as you might think. Some of the logical thinking and being good with numbers helped, but flight training was very different.

In your opinion, what skills do you think a pilot needs?
Good hand eye coordination and situational awareness is obviously essential for the flying, but there’s so much more to it. Social skills are an important aspect to the role: airlines are very “hot” on Crew Resource Management (CRM). Also our skills and attitude to how we communicate with each other, make decisions and solve what ever problems come our way. And you need to be very flexible and good at getting up early, there are lots of early starts!

We go through rigorous recurrent training, and at Eastern Airways headquarters at Humberside Airport in North Lincolnshire, the company has its very own Jetstream 41 aircraft simulator to test the pilots.

What’s a typical working day for you?
Usually I will fly four sectors over the course of one day. For each sector, you arrive 40 minutes before the flight for the briefing, weather check and to go through the fuel requirements. I am based at Newcastle and we fly domestic flights around the UK and also to Stavanger in Norway. It’s a regional commuter airline, so unlike large commercial airlines, all the crews know each other well and we are good friends. I fly a Jetstream 41 turbo-prop aircraft, which has 29 seats and one cabin crew member for each flight. We work as a team on the flights with the flight deck working very closely with the cabin crew. I really enjoy the banter with colleagues.

As the flight times are short, there’s lots to do, plenty of taking off and landing throughout the day, and each turn around is busy preparing for the next sector. We fly relatively low on some of the shorter flights so get to see some amazing views.

Who are Eastern Airways typical passengers?
Our passengers are mainly business travellers with many working in the oil and gas industry, from offshore workers to senior managers and company directors. Aberdeen is our largest base with Eastern Airways operating more flights from the airport than any other carrier. We’re in the business of flying people to work and with Aberdeen being Europe’s oil capital, we have a constant flow of passengers throughout the year, even in the wintertime.

How did you progress to Captain so early in your career?
I was lucky – my career started at UK airline, Air Southwest, on the Dash-8 and many of the senior captains at the airline moved on to the Middle East, opening up vacancies internally and I became captain on the Dash-8 aged only 28. When Eastern Airways acquired Air Southwest, eventually the Dash-8s left the fleet and I moved on to the Jetstream 41.

Do you enjoy the role?
It’s fantastic being a captain and I enjoy the responsibility that goes with it.

What are your career plans and what advice would you give young people considering the commercial route to becoming a pilot?
I plan to stay in a flying role and would like to move to a jet aircraft as my next challenge. I was lucky to join the industry before the recession but if you want to be a pilot you should do lots of research about the industry and role just to ensure you really want to do it before embarking on any financial commitments. I am really enjoying my career and don’t have any regrets!
Free student membership for all full-time students. Join the Royal Aeronautical Society as a Student Affiliate and get:

- Free digital access to AEROSPACE magazine
- Free attendance to over 400 lectures and events locally and worldwide through our branches
- Free 1-2-1 careers guidance for UK-based students
- Support towards professional registration (EngTech, IEng and CEng) with Engineering Council
- Get involved with our Young Persons Committee
- Access to Scholarship Schemes such as the Centennial Scholarship Fund and MSc bursary scheme
- Use of our internationally renowned National Aerospace Library
- Free places at RAeS Conferences (subject to availability)

To join simply visit our Student Affiliate page and complete the online application form or email membership@aerosociety.com for more details.

The School of Mechanical, Aerospace & Civil Engineering

Engineering is the art of applying scientific and mathematical knowledge, experience and judgement to produce things that benefit people.

Engineers design bridges, aircraft and vehicles, as well as developing processes for cleaning up the environment to ensure a sustainable future. In other words, engineering is the process of producing a technical product or system to meet a specific need.

Aerospace engineers are involved in every part of the design, development, testing and operation of aerospace vehicles and systems and at The University of Manchester we offer a range of innovative degree courses in aerospace engineering that are supported by excellent computational and experimental facilities.

We offer the following programmes:

- BEng (Hons) Aerospace Engineering (3 years) UCAS Code H400
- MEng (Hons) Aerospace Engineering (4 years) UCAS Code H402
- MEng (Hons) Aerospace Engineering with Management (4 years) UCAS Code H4ND
- MEng (Hons) Aerospace Engineering with Industrial Placement (5 years) UCAS Code H406

Check our website for further details www.mace.manchester.ac.uk
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