



Sir Julian Young

Interviewed by

Jane Bird

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Via Zoom

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Welcome to the Archives of Information Technology where we capture the past and inspire the future. It's Monday 15th November 2021 and we're talking on Zoom, as has become customary during the coronavirus pandemic. I'm Jane Bird and I've been reporting on the IT industry for newspapers such as The Sunday Times and the Financial Times since the early 1980s. Our contributor today is Sir Julian Young, the 140th President of the Institution of Engineering and Technology. Sir Julian recently retired from the Royal Air Force after forty years of service as an Engineering Officer. He held a variety of posts, including project team leader for the Harrier fleet and on a support helicopter force during the Falkland Islands War, the Cold War in Germany and the First Gulf War. He recently was Director-General Air within the Defence, Equipment and Support organisation in the Ministry of Defence. Sir Julian is a Fellow of the Royal Academy of Engineering, a Governor of Bath College and a Trustee of the RAF Charitable Trust. He was awarded a KBE in 2020, a CBE in 2013 and an OBE in 2000.

Sir Julian, welcome. I'm very much looking forward to hearing more about your life and experiences as an engineer in the RAF and your ambition as a President at the IET.

It's very nice to meet you, Jane, and thank you very much indeed for the invitation.

No, you're very welcome. I think, did I get that date right, actually, the OBE in 2000?

Yes, 2000.

It was?

Yes.

Right. So, if we could start at the beginning. You were born in Cambridge in 1961.

I was.

Yes. So, and it sounds like a happy family life. You had a younger brother and a younger sister and your parents were, well, your father was in fact in air propulsion, wasn't he? So how do you remember your early family life?

Erm... golly. A bit mixed, actually. I think the picture you paint is slightly different to how it really was. I think- my parents, sadly, split up when I was about nine or ten years old and I think they got married when they were very young and perhaps that didn't perhaps get them off to the best of starts, really. So my father actually at the time that I was born was actually in the Royal Air Force. He had actually, he joined the Royal Air Force at the age of fifteen as one could in those days and was an apprentice. So he finished a three-year apprenticeship in propulsion engineering, but he and discipline didn't really get on too well and in fact very soon after that my brother was born in 1963, he had the opportunity of leaving the Royal Air Force and so did. Soon after that, sadly, as I've mentioned, my parents split up and went their separate ways, both remarrying and with then what is quite a long and extended family of half and stepbrothers and sisters, which is lovely, fabulous to have that family now, it wasn't always the happiest childhood. We lived, my brother and I lived with our grandparents for a number of years and then eventually moved with, to live with my mother and her new husband, my stepfather. So we lived in a very small village called Steeple Claydon, which I think I noted going to school there for a number of years, and then we moved to Buckingham, which is not a very large town, but happens to be the county town – well, not the county... was the county town of Buckinghamshire – Aylesbury's got all of the offices and councils there. But no, so it was really, when I look back it was a bit of a mixed up childhood probably, in terms of bits of family, different family life which didn't always tie together smoothly. The one constant was school and I really enjoyed my time at school and I think gave, you know, put all of my energy into doing as well as I could at school. Was never great at sport, though I was pretty good at football, but others took past me, indeed when I ended up going to the grammar school we had to play rugby, didn't play football, which was a great shame, so I sort of dipped out in football there, where indeed I could have been, could – well, I'd never have been professional – but I would have, you know, could have enjoyed a life playing football. Yeah, it's a mixed up childhood in many respects.

Yes. How about, were teachers quite important? I know you mentioned that your first, your teacher in primary school, you stayed in touch with until she was in her mid-nineties. So I suppose if you've got a slightly disturbed home life often teachers can become quite influential, can't they?

Yeah. The teacher you speak of is Miss Davis, sadly died just a few years ago. She was, well, a wonderful figure, quite inspiring, saw something in me perhaps that maybe others didn't see and just encouraged me to try much harder at school academically, such that, you know, a few years later I passed the twelve-plus and was lucky enough to go to a grammar school and so I think lucky enough to move on to better education, and I was the first person in my family to stay for A levels, I was the first person in my family to go to university and much of those opportunities would not have been there if indeed, in some respects, if it hadn't have been for her.

And she was right at the very beginning, I mean she was a primary school teacher.

She was, she was. And yeah, she saw something in me and just inspired me to want to do as well as I could at school. And perhaps, as you say, a disturbed childhood, from a domestic perspective. It wasn't a horrible, I mean it wasn't a horrible background, it was just disturbed, we were never really sure quite where we were, where we were going to live, etc, you know, the next year or so. But we were happy, certainly, as children but it was just school was that great opportunity and a place where you could be someone different.

[0:07:02]

Yeah. And what about your interest in technology? Was that something that happened quite early on?

I guess so. I think in those days I lived in a family, I mean my grandfather was always making things at home. He was good, very good at woodwork, and was always making all variety of different tools. He'd make a sort of farmyard, literally, and paint it all and it was the most magnificent farmyard, for my brother and I to play with. He made us, I recall, a model of Stonehenge, painted up, you know, again, it

really took our imagination. So we'd help him often in the garage doing work. Later on...

Was he the piano tuner grandfather?

No, he wasn't. He was my maternal grandfather. My, interestingly, the piano tuning grandfather was quite a remarkable man as well, and in fact I'm just looking to see if I can see something. Can I just – I'll come back to you in just a second.

[pause]

This is going to be hard on video, isn't it? But he was a jeweller as a hobby in his spare time, and cutting a very long story short, but this came into my possession only about a week and a half ago, and it's a model, silver model piano that he made, with his own hands.

Wow.

It is exquisite. Exquisitely made. And he made so much of this - and it's got its own little, it's got its own little seat to sit on - it's an exact replica, clearly scaled, of a four-legged piano, which is quite unusual for a grand piano to have four legs, that existed in Aberdeen, which is where he came from. Anyway, he must have taken countless photographs and measurements of it and made this. This was one of his hobbies. We've now got, I mean I've got a number of things: some items of jewellery that my daughter has, and a quaich to drink whisky from, that he made, and my brother and my sister have got other things. But, you know, so it's a shame I really didn't ever know him as well as I wished I had. I think that I could have learnt an awful lot from him and clearly could have even picked up this kind of hobby, because it was just a hobby. He was a very particular, meticulous person. So I didn't pick it up from him. Later on I spent a lot of time with my stepfather keeping our car on the road, so I don't know how many times the engine came in and out, it was almost in and out on Velcro, you know, the gearbox, the clutch we'd fix, we'd fix parts of the suspension, we'd do all sorts of things to keep this car on the road, as one used to in those days. And so I think that's where perhaps I got a bit of an engineering bent, other than

perhaps it's come from both my grandfathers, if indeed, you know, we believe in picking up things through, in that way. And the other thing, I was always taking my bicycle apart and changing, swapping the wheels round, putting different wheels on it. I used to mend bikes for my friends. And so, at school in fact when I went to visit the career master, he said, you know, so what do you want to do with your life Julian? I said, I'm not really sure. He said, well, you know, tell me a bit about yourself. So I told him a bit more than he knew already, a bit about the bikes, and he said, well, what you need to do is be an engineer. Sounds to me you could be an engineer. And it was, oh, great, okay, well that's what I'll be then. And I think I probably do have the mindset, so I think there was something a bit more than just, this sounds an appealing job, I'll do it. I think once you're an engineer you're always an engineer in terms of one's own mindset in how you go about things. One's never, I always like to think engineers are restless, always described as restless in as far as we're never quite content with how things are, we're never quite content with the last time that we did something, even though others may have said jolly well done, when you look at it you think, hm, could have been better, I think we could have improved that. And I think that we have a mindset around continual improvement, always wanting to do better than one did previously, with the experience that one gained.

[0:11:54]

Yes. Okay, so at school then you studied, so you did A levels in physics, maths and design and technology, didn't you?

I did.

So I guess, by that time had you already decided you were going to go the engineering route then, or...?

Yes, I had. And had already started to apply for, yes – sorry, those three topics, yeah, absolutely, that was what I wanted to do. Still didn't really know which field in engineering, and in fact my father, who we had then started to see again, he was working at that time for British Airways, where he spent most of his working life working for British Airways in propulsion, and had half a day with him at Heathrow and had seen the then RB211 engines being tested on a testbed at Heathrow, and just

the power, the size, the enormity, the complexity of it all, I thought gosh, aircraft engineering is a wonderful field, this is what I'd like to do. So as it came to the end of one's sixth form, I applied to go to university. A lot of the people I was at school with, that was the natural path that they were going to tread. So I'd already done something different by staying at A level, so I thought well, I'll go ahead and do this, but didn't think that my parents could afford for me to go to university without any help, so I applied for sponsorship to go. I wrote off to – did all my own homework, without the internet it's quite difficult, actually, thinking about how we even did it – but I wrote off to eleven companies to ask if indeed they might sponsor me to go to university. Got one reply from Rolls-Royce which said no, I didn't get a reply from many of the others, but luckily was accepted by the Royal Air Force and was accepted, ironically, by British Airways. Both the organisations would have put me through the degree course that I did, which was at the City University, something called Air Transport Engineering, was a course that had been established by British Airways, actually, and then the Air Force caught on to this particular training scheme and thought it was a good way of training their own engineers. And so I went through the selection process and, as I said, was offered a place with both of the organisations. Can't tell you now really why I chose the Royal Air Force, but certainly had never thought that it was a bad thing, never regretted it.

It's a different, it's a very different deal, isn't it? Signing up to be prepared to sort of lay down your life for your country and so on, rather than being a civilian?

I guess. I'm not quite sure that in all honesty I saw it necessarily in that way at that time. I mean in those days, yes of course, we were still in the Cold War, towards the end of it, but we were, you know, we were in the last ten years of it, but we were in the Cold War. The world in fact in some respects was much more stable than perhaps it is now where there are different conflicts across the entire world for different reasons and huge numbers of refugees and harm and hurt that's gone on. So I'm not, I wouldn't like to, you know, pretend that indeed, you know, I was, at that stage gave it a serious amount of thought of laying down my life for the country. If, however, that had happened and I did find myself in a war zone through Gulf War – you mentioned that – and with responsibility for other people, you know, did we think about it, did we think about the threat that potential chemical or biological warfare could cause us,

yes we did. But we took all the precautions that we could; we planned, we trained, we exercised, and then luckily it never happened. But we did certainly think about it and certainly at that stage as the senior engineer officer on a squadron, and I gave serious consideration as to actually, I could be asking people to, actually I could be asking people to lay their life down to make sure the aircraft are serviceable so they can fly, so they can take more ammunition, more spare engines, whatever was required by the army in a battle environment to be able to take, you know, to continue their job. And we worked out exactly what it was to the bare minimum that we would have to do to, you know, if an aircraft came back and needed an engine change, then we were going to have to change the engine in whatever environment we were in. So we did think about it in those days, or I thought about it later, but I'm not so sure I did those days right at the beginning. Sounded like a really good, sounded like a great job and a great opportunity to get close to, you know, some magnificent technology. Bit dated, looking back it now, but wonderful at the time.

[0:17:03]

Yeah. So then your – and your course was a sandwich course, wasn't it, so you were...

It was.

How did you find that university experience then, that presumably worked quite well for you?

It was absolutely fabulous. Again, I wouldn't have changed the university course that I did. Thin sandwich, so it was four and a half years long, so it was a long course, it wasn't a Masters degree, in those days it was a BSc Honours degree, but you spent six months at university and then you had a couple of weeks' leave, and then into an industrial placement, which for me was in the Royal Air Force. So I worked as a tradesman, working on aircraft, fixing them. I worked on Phantom F-4 jets up at RAF Coningsby, strapping pilots in, doing operational turnrounds and so on. Great experience just being within the Air Force and engineering environment, but actually hands-on. And so with that, I think looking back, I caught up the eighteen months of loss of seniority against my peers who went to university and then hit the Air Force

earlier, I think probably within five years I'd caught them up because I'd got so much more experience of having done the jobs as a technician, or as a mechanic actually, I was trained to be at mechanic level, not technician. Again, if you were going to be a technician you'd actually need to spend longer in your training and longer in your experience. But it gave me, you know, amazing insight into how the Air Force worked, what the jobs were, etc, that I would then go on to manage and not necessarily hands-on on aircraft, so it was a great time. And again, I was young at the time, thought nothing of getting up at four in the morning to put, you know, service aircraft and pull them out on to the line ready to go, and in snow and in the wind and, you know, it was just, it was just an amazing opportunity, I just loved it. Loved the time at university as well, always had wanted, having lived in a small village and relatively small town, loved my life living in London. Expensive to live as a student in London, but nonetheless, a, you know, a great opportunity, almost a rite of passage really to live in London.

[0:19:26]

So did they fund, did the RAF fund, pay you a salary, basically, to go to university?

Yeah, they did. I had an amazing salary of, in fact how the military used to pay people was by the day, so you had a daily rate of pay, such that whilst it's now all evened out and people see it as a monthly or an annual salary and it is evened out, at the end of February you'd only get twenty-eight days of pay. So your pay would vary through the month. Later on, certainly when you'd got a mortgage that gets paid on a monthly basis, you've got to kind of plan accordingly. However, I remember my daily rate of pay, I got paid the princely sum of ten pounds and a penny a day when I was at university. So actually, looking back...

That was sort of in the late 1980s?

It was in the early 1980s, so it was a pretty good wage. I was able to afford a car, which again, I spent most weekends, or most of the week actually, keeping it on the road so I could use it at the weekends to go wherever. I met my wife-to-be whilst I was in London, she was a nurse at St Bartholomew's Hospital, she was a student there, and we met, and again, we had a great time. We were very keen theatregoers,

student stand-by at theatre, etc. It's interesting, so whilst as an engineer I do quite like the arts, and in fact you'll have, anyone looking at my CV will note that I like impressionist painting, impressionist art, and I think I get a lot of that from my wife encouraging us to go to various things. Although we do look at it differently, she says, gosh, isn't the light wonderful in that? I will say, I know precisely when that was painted, and I think, you know, even where, because I study the dates and exactly where was it painted, so I love to go to galleries, be able to stare at a painting, not look at the date, not look at where it was, and try and remember it from the various pictures that I've studied in books, etc. So I'm a bit of a trainspotter, in all honesty, for art.

Right. Yeah, but you've obviously got a head for figures and facts.

I guess.

So what, and what about...

I think, again, I think that's very typical for an engineer. You know, we're not scared of numbers. You know, our whole world really is made up of numbers and that's the way we work. So I think that that lends itself to being pretty good with finance. It lends itself to being pretty good with risk, whether that's financial or safety risk, clearly safety being foremost in an engineer's mind, but actually makes us quite versatile, I think.

[0:22:22]

And what about computers, then? Because after all this is for an information technology database. So can you talk a bit about what, how you came across it, you know, did computers figure in your life much at that time in the early 1980s?

Yes, they did. I didn't have a Spectrum ZX, but I had an Amstrad – I think it was 464, from memory – so I did buy myself a computer with part of those wages very early on in my time at university. It must have been about 1984/85, I think, probably towards the end of it where computers were becoming a bit more available. But I did, and I wanted to try and teach myself to program. Can't say I was ever great at

programming, but I used to use the computer a lot, certainly a lot for word processing. Again, taught myself- well, this was pre-Word and Excel, etc, so there were various different programs in those days. But again, taught myself a lot of Ex... what would be spreadsheets and how to manipulate data, etc, which I enjoyed. In fact there was a funny story when at the end of my time on my first tour at RAF Odiham I got posted down to the Falkland Islands, and this was the summer of 1987. And my friends on the squadron said, because I said I'd like to take my computer down with me, and they said, oh, you're a bit limited as to how much you can take down, but the thing to do is wait right until the end in terms of checking and if they've not actually got, if they've got a relatively light load with all of the other people who are travelling down to the Falkland Islands or cargo, then actually they're quite prepared to take more. So I hung on and hung on and checked in almost last and said, oh, these are the things which I need to take, but I've got these other things, can I take those as well. And they looked, they checked the manifest and said, yes, absolutely, you'll be able to take these down. What actually happened then was we stopped for fuel in Ascension Island and the weather in the Falkland Islands was seemingly very bad, very windy, so there was a distinct risk that the aircraft would not be able to land, and so it had to take on more fuel for a diversion up into South America, not recognising from the Falkland Islands you couldn't land in every country, even in South America. So you had to get enough fuel, I think to get back to Uruguay, if I recall rightly. Anyway, in taking on board fuel they took off one of the pallets of baggage, so they took off all of my bags and my computer, which when I got down there was pretty much all I stood up in and a book that I read on the plane. So I had to survive for about four days in what I stood up in, which the troops on the squadron just thought was hugely amusing. And I did think I'd never see my computer again, but I got them both back the next time the aircraft, on the next rotation.

[0:25:28]

Yeah, yeah. So you were a bit of a computer enthusiast.

Yes, I was. And, you know, and from there on, you know, I've clearly always used computers to do with work and these days, you know, I wish in some respects I'd kept up coding. I can't program at the moment, though I have declared it as an ambition within the next year to learn, or at least the basics, probably Python or something

along those lines. But, you know, certainly towards the back end of my career, when one is responsible for bringing new technology either on to aircraft as a modification or new aircraft which are nothing other than computer systems and they just happen to fly, they are computer networks in themselves. You know, you can't put a hydraulic valve on to an aircraft that's not actually governed and managed by software. But all RAF engineers end up learning about, well, more about software and digitisation than indeed perhaps we ever imagined that we might, because all of the safety related cases and argumentation about an aircraft post modification, or indeed a new aircraft into service, is all about making sure that the software-controlled computers operating the aircraft working system keeping the aircraft stable are safe. And so they are, you know, so software architecture is built to a particular standard, the coding is, again, done to, well, very, very particular standards which then allow that all to be verified so that aircraft can fly safely. It's exactly the same in civil aviation. The thing about the military is often one doesn't have quite as much duplication or triplication, so you don't have quite so much redundancy, and of course the aircraft are, you know, the Formula 1 cars compared to double-decker buses. So they are whizzing round corners, pulling high levels of G, flying at low level in very bad vibration. You know, these are not environments that would then allow software errors to be anything other than disastrous, really.

Yes, I mean it wasn't the RAF so much, but there were AI problems in the Falklands War, weren't there, on Exocets, that, you know, were mistaken for being friendly because they were French or, I forget the details now, but there were, software didn't always do what it was supposed to do and especially new technologies like AI.

No, no, very true. I mean AI is, you know, for as much as we all think we know what AI is, I still think it's in its infancy in terms of what it can really do. I think the easy part is to understand it as a principle, the most difficult part is to actually get it to work to its fullest possibilities, because it's almost beyond our own imagination at times, and the algorithms to ensure that AI works in the right way can be, you know, hugely – well, not can be – are hugely complicated. And it's a wonderful field in itself. And again, it's something which, when I look back, you know, if I had my time round again, would I change anything, probably not, but I think, you know, people coming into engineering these days, the world of robotics, automation and artificial

intelligence must really capture people's imagination and the possibilities are just endless as to what the future will hold. Certainly as ever, you know, if you're an engineer and a half decent one, you've definitely got a job for life. And the technology's just moving so fast. I mean one of the challenges is to keep up with technology, and indeed I think that that is, that's a real challenge for a group of people, for everybody, but a group of people that I have coined the phrase, 'the neglected middle'. So a lot of engineers traditionally, well, a lot of people traditionally get a big slug of education, whether that be at school, college or university, at the beginning of their career and then find themselves out in jobs learning experience on the job, as it were, gaining experience, doing great things, you know, delivering some great projects, but rarely do people really keep up with technology and get another inject or regular routine inject of education, and thus you can find yourself in the, you know, mid-, late-thirties, mid-forties with huge amounts of experience as being, you know, an amazingly competent engineer, but actually, don't actually keep up with the skills needed and, you know, I'll use software as the example. It's rare for people of my, well, certainly my age but a bit younger, for them to have done a huge amount of digital work or software in their university courses. Where indeed I would say these days, you know, if one is a mechanical engineer, for example, you know, that course has still got to have a healthy amount of software and software architecture within it so that people come out understanding digital technology far more than perhaps they have in the past, because that will be their future. Do we still have structures, do we still need to know, do we, are we still going to make solid things? Yes, of course. Will they need to be as light as they possibly can, so we need to know what the load paths are, etc, yes of course, all of that is a given. But the reality is, what's really going to make that thing clever, you know, an aircraft clever, is going to be software.

[0:31:39]

Right. So, and you have actually kept your education up, haven't you, you've been and done sort of quite a lot of other impressive academic qualifications since you launched yourself into the working world?

I have always taken the opportunities that are there before me and I did a part-time MBA as my next degree back in, oh golly, 1991, I think I started it. Took me about a

year longer than it should have done, than it was supposed to on the tin, because I ended up in a couple of – my excuse – very busy jobs and just trying, with a young family as well, trying to find the time to actually do the right amount of studying and writing the essays and the dissertation were exceptionally hard work, but again, I wouldn't have not done it. And indeed, what it taught me was actually, you learn so much more by reading books- sounds crazy, it's a given really, of course you learn by reading books and applying that knowledge to your work. But the nice thing about a part-time course, firstly it's not a big chunk out of your career, you know, you're not missing out on doing another job...

No.

... by going to university for a year or so, even if in fact your employer would pay for you to do it. So it's a much cheaper way of going through. But from the first assignment you probably had to read half a dozen books, you certainly had to apply theory into practice, and you can start doing that and using that experience immediately in your place of work, so it's a really good, it's a great way of learning. And yes, I got two more, both of which largely were, well, the third one was entirely part-time, the other one was done whilst I was on a course, but again, you had to put yourself out to, you know, to do additional work if you wanted to convert what was an academic course, but if you wanted to get a, as was, a Master of Arts in international studies out of it, you had to put a lot more work in at weekends and evenings and actually, again, write a dissertation in addition to what you were already doing, etc, and do exams. Which, great opportunity. And the lovely thing about, you know, the government, the public sector, the MOD, is that these opportunities are there and I have taken the most that I can from those opportunities and I'd like to think that the MOD and defence has benefited, the Royal Air Force has benefited from me doing it in the way that I describe, is your, you become a better, a more broad and a better person, more knowledgeable, and you can apply that knowledge straight back into work.

[0:34:23]

Yeah. So just looking at your forty years in the RAF, would you pick out a few high points during that time that would be worth telling us about?

Yes, of course. Thank you for the opportunity. I look back and I tell everybody that – anybody who'll listen – that my best job ever, that I ever did, was between the years of 1990 and 1993, so it's an awfully long time ago, and so one could ask, why am I still in. But it was the Senior Engineer Officer on Number 18 Squadron Chinooks in RAF Germany. So it was during that tour that I deployed on the First Gulf War and also we, because of the defence cuts, post-Cold War, Cold War had ended, RAF was pulling out of Germany. So we moved from RAF Gütersloh to RAF Laarbruch, another base, but we were condensing down into two bases from four, and we still needed to keep helicopters in RAF Germany to support the army. So I did most of the planning and the logistics about how we were going to, as a squadron move from one base to another, and in doing so we also became a joint helicopter squadron. So what did that mean? Whereas when I started we had twelve Chinooks on the squadron, at the time I finished we had six Chinooks, six Puma helicopters and a couple of Gazelle helicopters. So it was a real multi-helicopter force. And so it was one squadron where indeed there had been two, three in the past, so we were trying to do everything for a smaller British army on the Rhine. So again, wonderful opportunities of actually bringing about change and really influencing the outcome, but most importantly, being the Senior Engineer on a squadron, which was the, you know, the highest job that I could possibly imagine ever doing when I first joined. And so for me I felt I'd almost made it. So why did I stay in? It's an interesting question. I guess what I really learnt was through rank advancement, what one really got, it was never about, you know, wanting to be at the next rank, it was always wanting, about to influence more of the things that went on around one: strategy, the policy, the training, the way we did things. And, you know, you pick up a lot of baggage, particularly on the frontline as to how things, you know, don't go according to plan and sometimes they're outside of your control, they're with the resources or the constraints that you're being set, and so always wanting to try and push back on those things and try and make life easier for those people who are, you know, the next generation and the next generation in the frontline so that we can be as capable and as, you know, agile and adaptable as we possibly can be and perform our job to the best of our professional ability. That's what's really driven me on. So I had a job as a Group Captain where I actually had policy and strategy in my job title, but I had the opportunity there of introducing multi-skilling to the engineering technical workforce.

And so in simple terms, what we did was take five aircraft trades and boil them down to three. So technology was moving, so the aircraft weren't quite as hard to fix, you didn't need quite as much detailed information. We were on that kind of cusp of it where built-in testing, which was standardised there, or more standardised on aircraft, was helping the technician. The technical publications were better, a lot of black boxes clearly avionic-wise, so they were easier to fix and we took that advantage of actually double-skilling our tradesmen. So there was a lot of cultural pushback at the time from people who said it would never work, but more so what we did, we'd take the advantage of mirroring the trades that actually were in sort of the aviation. So we went to, principally two aircraft trades: mechanical and avionic, so we mirrored very much the syllabuses and the type of technician that worked outside, and then of course we had weapon technicians, which clearly there isn't a parallel to them outside. So they were the three aircraft trades. And we also did some work on some of our supporting trades as well by amalgamating a couple again into a single trade. Hard to convince people to do it, absolutely the right thing to do, and when we look back, I can't imagine us living without that degree of flexibility that now exists. And the most important part for me was to replicate what was going on in the civil aviation world so that everybody leaving the military, because in those days you couldn't serve beyond the age of fifty-five, and indeed there were a number of age level, age barriers or hurdles set, such that you either got promoted by a particular age, length of service it would equate to in simple terms, or you would leave.

Right.

It was an up or out type arrangement. And so everybody leaving the military, everybody leaving aircraft engineering in the Royal Air Force, short of a lottery win, is going to have to get another job. And what I wanted was for our aircraft technicians to be able to transition more straightforwardly than they previously had into doing what they were good at and what the country needed, which was, and still is, aircraft technicians. And so I was very proud, not only did it make us more flexible in the Royal Air Force, but I believe it made us, you know, have much better throughput of people, it would inspire people to join us, we'd train them to something that equalled, and in some respects I would say surpassed in terms of the experience one could get inside, but also hopefully open up a pathway to them gaining aircraft

licences when they leave and then continue doing what they were very good at doing in the Air Force.

[0:40:48]

So, would you say that it was the civil service- who was leading who, really, here? Were the military ahead in aircraft engineering or was it the commercial sector?

Well, I think one, you know, one would always look at the commercial sector and as far as, you know, when I joined the Royal Air Force there were 103,000 people in 1980 and when I left there was 31,750. So we, since the end of the Cold War, plus also just the overall cost of the military and the cost of the equipment, and also technology has come along and made aircraft so much more capable. So if we think back to 1982 where we saw Vulcan aircraft clearly, you know, a magnificent operation in terms of bombing Stanley Airfield to try and show the Argentinians what could actually happen during that particular conflict, but they fell through gravity out of the bottom of the aircraft. And as we know, they dropped something like a stick of twenty-one bombs, from memory, and I'm sure somebody will tell me no, it wasn't twenty-one, it was eighteen or whatever it was, you know, but we only hit the runway with one of them. So we proved that we could do it and it scared people enough, but the reality is, it was hardly precision bombing. Whereas now, you know, on an F-35 on a Typhoon, which window do you want to put the bomb in, at ten miles distance. Which one? Name it and it'll go in. And what second do you want it to go off? I mean, you know, the technology and the ability of munitions with military aircraft these days is almost unbelievable, compared to how things were then.

[0:42:36]

Yes. Those would be technologies developed by the military for the military though, wouldn't they? I mean that's not something you would learn in... I was only trying to sort of get a feel...

Yeah.

If you really wanted to pioneer aviation technology, would you go into the military or would you go into the commercial sector, I suppose?

Well, I think you can, I wouldn't say you can't do either. I suppose the point I made, and I got a bit carried away about the weapons there, that the issue is the Air Force is still a relatively small outfit compared to when you think of all the civilian aviation. So the number of people involved in civilian aviation I would, I think, I imagine, absolutely believe that to be true, is, you know, far larger than the now out of the 31,750, it's about 12,100 of those people are technical by profession, either engineer officers or aircraft and engineering technicians, including ICT technicians. So, 12,000, there's got to be more than that in civil aviation.

Yeah.

And civil aviation has taken on more challenges. I mean it's clearly how far can you get aircraft to go, how efficient can you make them, how comfortable can you make them. So there's an awful lot of innovation in civil aviation, particularly on engines. As I say, and more to come, you know, electrical power now as we look within the green economy. I mean, you know, again, the opportunities in civil aviation are just incredible as to how fast things are moving. With electronic vertical take off and landing aircraft, you know, Amazon delivering parcels and, you know, just there's so much. Within the military there's always been innovation but it's been innovation, you know, trying to get the best you can out of technology, but also clearly you've got a competitor. Used to be in Cold War, Soviet Pact, as it were, Warsaw Pact. These days it's, well, who is it? It could be anyone. It could be very small terrorist organisations or it could be nation states. Luckily at this moment there are no nation states with conflict with us, but small numbers of operations. So that innovation, which by and large, you know, the Air Force is the receiver of that innovation, we may have set the requirements, we may help project manage them, which is what I did in my last job, but it's industry that actually deliver them. That's either a British industry, European or worldwide and, you know, certainly when we were still a member of the European Union, you know, the rule was you competed everything, unless there was a very strong security reason for not doing that, if you've got particular technology that you wanted to retain sovereign ownership of, then you could get a commercial bye, as it were, to not have to go down the, you know,

competition. But the, but industry, you know, generate the equipment that the, all militaries use.

Yes.

So it's a real balance. I mean, so I think that anybody coming in as an engineer looking for an interesting career within the aviation world, it would be equally as exciting to work for a defence manufacturer as it would the Royal Air Force, or the other services, the other services have got their own air arms. The F-35 is a joint Navy/Air Force squadrons force and very successful at doing that, clearly they are, the F-35 at the moment deployed on HMS Queen Elizabeth halfway around the world, with a joint Navy/Army... joint Navy/Air Force unit. So it's hugely successful.

So... yeah.

Or to go into civilian aviation. I think that there's great challenges and great accomplishments to be had by anybody going into any of these fields.

[0:46:51]

Yes. So, and in terms of people then, over the years. Going back to Miss Davis, your primary school teacher, I mean have there been other mentors and, you know, inspiring people that you have encountered on your career that have made a difference?

Yeah. I mean I think on my first tour, which was as the Junior Engineer Officer, otherwise known as JEngO, on 7 Squadron, Chinooks at RAF Odiham in 1985 to '87, I was lucky enough to work for two Senior Engineer Officers, SEngOs, and they were dissimilar characters, you couldn't have imagined how different they were, and I really enjoyed working for both of them and being able to contrast and compare and I learnt a lot from both of them. You know, there were good bits and bad bits about them both, but to actually work closely with someone who I just learnt, admired, learnt so much from them as to how to deal with particular situations. Without a doubt it helped me enormously work out how to manage problems, how to solve problems, how to work with people and how to get the best out of people, I learnt an

awful lot from those two. Later on in my career I think, I can think of immediately three who went on to all be Air Marshals or Air Vice-Marshals and one of them an Air Marshal, again, people that I had worked for, sometimes several times over my career. I had worked for them as a Flight Lieutenant when he was a Group Captain, then when I was a Squadron Leader Wing Commander he was an Air Commodore, an Air Vice-Marshal. And then when I was an Air Commodore he was an Air Marshal. So I've worked for three individuals, all really hard taskmasters, I mean really tough people, very demanding as to what they wanted, but actually all of them gave me, well firstly, they trusted me, they gave me enough rope, I suppose the phrase goes, to, you know, not to hang myself but to actually get stuff done. So they, you know, must have bit their lips and did not tell me how to do something, they just told me what they wanted to be done. And looking back, I was successful in, you know, more times than not in actually getting what was then small projects, small things done, as it were, they were difficult and cumbersome at the time, but looking back, nowhere near as perhaps some of the bigger challenges that I had in my last four or so years. But, you know, great people. Can I mention their names?

Yes, by all means.

So the first was David Saunders, who I worked for, I was his Staff Officer, personal Staff Officer, so I worked very closely with him. He epitomised hard work, I mean blimey, did I put some hours in working for him. But I learnt so much from him. Peter Scott, another person that I worked for, first came up against him when I was down in the Falkland Islands, and again, he treated me very well indeed, gave me a great opportunity to take on responsibility and I didn't let him down, and I worked for him many times subsequent to that. And the person which most, certainly people of my era probably down to twenty years younger than me will know by reputation if not in person, a chap by the name, Sir Colin Terry, who was the Chief Engineer in the Royal Air Force over what was quite an influential period of my career itself, and again, I call him a friend and indeed, I'm so proud that my name as a Chief Engineer of the Royal Air Force is on the same board as his in gold leaf letter. There's a few names in between it, but to have actually mirrored his position as a member, as the member on an Air Force board who's an engineer, and to be the Chief Engineer of the Royal Air Force, and to do principally the same job that he did, though the title

changed over the years, just amazing. And I still see him, not often enough, actually. But he, and the other two, great inspirations. And I think, you know, what does one get from that? I'm in fact going to a dinner on 30th November where I'm going to be dined out - because of Covid we haven't actually been able to do that – by my colleague Engineer Officers in the Royal Air Force and I don't think I'll be spoiling anything when I say that when I'm going to be asked to say a few words at the end, I'm going to focus on, I'm going to pick out names who are there, because there are some of the old and bold at this particular dinner, I'm going to pick out a few and what I learnt from them. And I'm going to try and inspire the current one-star Air Commodores, young things, as it were, to learn as to what they've got to do to bring their people on. Identify those people who are there making a difference now. Find them, find out who they are and help them and be their guide. You can't do the job for them, but be their guide and just be there to, well I'll say mentoring, but I think it's a bit more than that, you've actually got to find the person. You've got to find them rather than they find you, I think, and really help them. And I think that, I'd like to think that they will, they'll see the sense in that, perhaps of the story that I can tell of, you know, specific things that people have done for me in the past and I've always been lucky to have got on. And people say yes, you make your own luck. The luck that you have is who is your boss. You cannot determine who your boss is. If you have a boss that appreciates – doesn't necessarily need to like you – but if they appreciate your hard work, and they can actually write and they are prepared to write on your annual report, 'Young has done a pretty good job, he's done this, this and this', as it were, then that is what gets one promoted because the way that the Royal Air Force promotion system works is a independent panel will look at all of the reports of a particular rank and branch, and they will order them and as and when promotion comes along, promotion opportunities, and you've got the right skillset to meet a particular job, you know, you'll get pulled off the top of that list. So it's what's written down about you.

Yeah.

So the luck is having a good boss who appreciates you and can write.

[0:54:02]

Yes. What about money? We haven't really talked about it. I guess getting rich hasn't ever been your main motive in life.

No.

But in the world of engineering and technology, you know, that can cause quite a tension, can't it?

It can. I spoke earlier about how I think engineering skills can lend themselves to other things, so let's say finance and let's say risk to do with money. There are a number of people who have trained at university, been educated at university to come out with an engineering degree, and then sadly have perhaps never gone on to actually gain, to being an engineer, to gain the experience to become a chartered engineer because they were succumbed by the Square Mile and working out that actually as a highly intelligent person who's happy with numbers, who can do risk, that actually you can apply that to another career opportunity and probably earn a lot more money. I think they've still got an engineering mind, but you know. So that never attracted me and in fact working in the public sector for the armed forces you'll, in my experience, will be comfortable, but you'll never be rich. And so, again, I've been comfortable. I have to say, I don't, I'd like to say I don't worry about money, but then that sounds awful. I don't because my wife does. So she has always looked after finances in the home. When I say I'm good at finances, I'm good at finances at work, at home she does, she runs the house. I never really know where my money goes, she knows where all of it goes. So we've been comfortable, we've had three children. I hope, like to think that we've given them the best opportunities that they can to head off in their own lives. Very proud they all went to university, though that was never, you know, we're not going to force you to go to university, we always just wanted to give them the opportunity to and it was their decision whether they did. They all did, and all did completely different things. None of them engineering, none of them military. I don't know, I must have drummed that out of them, I suppose, I'm not really sure. But, yeah, you know, I think if one could invent something enormous, albeit incredibly innovative with a new piece of technology, I think the opportunities

certainly are there to be rich, being an engineer, but I would say that money doesn't buy happiness.

Right. So what would you say to young people, you know, what would your advice be to the younger generation thinking, who are interested in, obviously in IT, because that's, you know, very much who we're talking about here, you know, would it make sense for them to sign up to the RAF, become aircraft engineers, what would you say?

I would say, I mean if people want to join the Royal Air Force to exercise their engineering knowledge and ambition, then well done to them. Or indeed, either of the other two services, or indeed the civil service within the MOD has a large number of engineers within it. So in the way that I've been around high technology from an aircraft perspective, and certainly technology's growing so fast. As I mentioned, the F-35, I mean *the* most advanced aircraft the world has ever seen, completely driven by computers. It is a network of its own and needs enormous care and attention from a security perspective, because of course if you've got ones and noughts you can hack in, can't you, so you know, there's a huge amount of protection that goes on around maintaining the aircraft's capability to make sure that it has a military advantage over, you know, any potential enemy. So if one is interested in doing those things, then absolutely, there is an opportunity. But I would say more broadly that engineering, certainly in IT, because that's where technology's moving so much more quickly than anywhere else – we spoke about automation, we spoke about robotics, we spoke about AI, and those definitely are the future. But I would say that anyone who is good with numbers and can work hard enough to get a good mark in science, then actually engineering can offer the most rewarding career for people. You know, we really, we are the people who solve problems, engineers solve problems, that's what we do, and, you know, if one is excited by trying to improve and make things better, then engineering is for you. And in the way that I described, there is a national shortfall of engineers, and in particular, IT ones. We haven't even mentioned the word cyber, but you know, people link, quite rightly, ICT, IT with cyber. I mean it's a particular, I would say it's a particular vein of IT and ICT, but it can often be the encompassing word, noun, collective noun, but the opportunities are there for the remaining of your life. I mean if you can get, if you can study engineering and get into engineering, and most importantly, keep your skills up and remain current, you have got a career

genuinely for life. And it's not just a job for life, the pay, the mortgage'll get paid, you'll have a comfortable life, but I think you will have a really rewarding, satisfying career where you are being, your brain is being challenged all the time in terms of solving problems, matching resource to the task, whether that's in engineering project management or whether it truly is in research and development sides of technology. But the opportunities are just wonderful.

[1:00:31]

Yeah. That's fascinating. So perhaps you, I was going to ask you what you see the biggest challenges and opportunities over the next ten years. I mean perhaps you feel you've covered that already, or is there something you might want to add?

It's about sustainability and climate change and the engineering that needs to be put in place to try and solve those problems and repair the planet. So whether that's electrical power or cars, vehicles, aircraft, trains, everything, and actually not just bringing it into service but making it cheaper, making it smaller, making it lighter, making it more effective, all of those things will make the difference in the future. And that is the area where I think are the greatest challenges for engineers in the future to, basically to save our planet.

Yes. Well, there couldn't be a more important challenge, could there, after all?

No.

And as the President of the IET, what are your ambitions to achieve there?

Well, I'm, there's one in particular. I'm going to shine a spotlight on technicians. So I've mentioned technicians a lot during the last hour and it is because I have worked alongside technicians all of my professional career and I think that they are an area, a group of people that we perhaps have not always tried as hard to get them professionally registered. And I think within this country where engineers and technicians don't necessarily have the same status as they do in some other European countries – Germany in particular and France – actually, if we were able to get more of our technicians professionally registered I think that could be the start of the

avalanche in terms of raising the overall status of our profession within this country. I know lots of people who have tried that in the past and one year isn't going to do that, but I'm hopeful that, you know, I can get that snowball rolling during my time. Other than that, I mean again, pushing hard where possible towards trying to address societal challenges. So sustainability and climate change is, I've already mentioned. I think the other one again is trying to instil digitisation and digital future into everything that we do. So I spoke about mechanical engineering degrees where I believe there needs to be, you know, a healthy module of software and IT skills within them, then it will actually futureproof those people for the future, to a degree.

Yeah.

You know, because software and IT, it's in everything, absolutely everything. So, if we can really push hard on those societal challenges, I shall be very pleased if we can do that. By and large just keep driving STEM, operationalising STEM, so again, trying to secure the next generation of engineer for the future, and I've already mentioned about professionalisation. So I would say institutionalising professionalisation. But again, that's, past Presidents have done that, future Presidents will do that. I will but carry the baton and run as fast as I can during my tenure in office and hopefully we're in good shape for that handover at the end of it.

Well, thank you very much, Sir Julian. It's been fabulous hearing all about your experiences in the RAF and beyond and we look forward very much to seeing how it goes during the next year at the IET, so thank you for your time.

Jane, thanks very much indeed, and I, yeah, look forward to the next few months and it's great to know that everyone out there is interested. Thank you.

You're welcome.

[1:04:21 recording ends]