

# **ANNUAL WILBUR AND ORVILLE WRIGHT LECTURE 2016**

## **Royal Aeronautical Society**

**6 December 2016**

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President, ladies and gentlemen, thank you very much indeed for that introduction. Can I also offer my congratulations to those new Honorary Fellows and also to Gordon Woolley for the Presidential Sword Award. I did happen to notice that Sir David Henderson was put up there as one of the first of those Fellows and he does indeed have a bit of a claim to be the father of the RAF. In fact, I am being pressed constantly on that. It's because he was Scottish and those who don't know me will have noticed by now that that also happens to be my origin, and so with the 100<sup>th</sup> anniversary of the Royal Air Force coming up you can understand that I'm under considerable pressure in relation to David Henderson.

It is an absolute delight and a privilege to be here this evening. It is a particular privilege to be delivering one of your 150<sup>th</sup> Anniversary lectures and I have to say in particular the Wilbur and Orville Wright Lecture. As you know, the theme of this lecture has historically been about pioneering aerospace, and we are honouring tonight 2 gentlemen whose endeavours gave the world heavier-than-air powered flight, who pioneered the means through which most of us in this room, and dare I say perhaps me especially, have lived our professional lives. They not only provided the means, but they also provided the inspiration. It was Orville Wright who said, "I got a thrill out of flying before I had ever been in the air at all, while lying in bed thinking about how exciting it would be to fly". And I have to say that pretty much describes me as a young boy because I used to sit there in my bedroom and I actually had a poster over the bed of the first flight of the Tornado. Rather to my surprise, firstly I eventually got to fly the Tornado, and rather also to my surprise it is still in service at the moment. But as was mentioned in the introduction I do lay a very slight claim to being a current Tornado pilot because I think it is important that I do that, and so I do still fly the Tornado and it's doing a remarkable job on operations.

It has been my very great fortune, I think, to have been able to translate my early inspiration into a career which has presented me now with the ultimate honour and privilege of commanding the Royal Air Force.

I hope to do justice this evening to that inspiration by talking about how we are growing the future RAF. I was a little bit conscious as I was sitting there, I thought, well, what's the backdrop, and it says the next 100 years. As we are growing the RAF, the RAF, very shortly, in about 18 months, will start its next 100 years and part of my job is to make sure we celebrate and commemorate our first 100 years appropriately. I am a little bit worried that you will look at this [*points to RAeS advertisement material behind the lectern*] and say, "the Next 100 Years to Mars and Beyond". That's not the subject of the presentation this evening, and it's not how I intend to grow the Royal Air Force. What I'll be talking about is new equipment and technologies. You would expect that. What I also want to talk about is opportunity, challenge and risk. I also want to talk about people, because you don't either get the technology without them, or indeed the means to do something useful with that technology. If I might quote Wilbur Wright, he said, "It is possible to fly without motors, but not without knowledge and skill".

Ultimately, my ability to lead the RAF on the path of successful growth will define my tenure as its commander. What I am talking about here is real growth. As has already been mentioned, the Defence Review last year, we are now deep into the process of planning how to deliver those considerable and very welcome enhancements. But it is always worth reminding ourselves that the RAF has rarely been required to grow its capability in this way. What I mean by that is, grow whilst fighting. Perhaps it has only been during the World Wars that we have been in this position. Today our Royal Air Force is facing that challenge. Perhaps not on the same scale as before, but certainly proportionally it is there. It is a demanding task, full of opportunity and risk in equal measure. What I will do in this lecture is argue that the Royal Air Force and, by extension, those in this room who support it, will only succeed in this endeavour if we are going to live up to that strapline we have about being Agile, Adaptable and Capable.

So I am going to break this up into 3 themes. I am going to look at today's Royal Air Force; I am going to look at that demand signal, that growth; and then my main focus will be how to meet that challenge of growth.

Today's RAF then. Those who have already heard me speak over the last few months will know that I invariably start by saying about what the RAF is doing not just today, but right now, at this very moment. I do that because ultimately this is what defines us as an organisation. It is our ability to project and deliver precise air power effect to wherever it is required, and do it quickly. I also do this as a constant reminder to myself that at this very moment some, in fact many, of my people are in harm's way and that returning them safely requires consistent, exemplary risk management at every link in a very long chain of people and organisations. And they do that so well. So right now I have pilots and ground crew on 15 minutes' alert with Typhoons at Coningsby and Lossiemouth, ready to defend our airspace. You will know from the media just how busy that task has now become. There are Typhoons also at alert in the Falklands. Tankers and support helicopters on alert as well. Air transport in the air, right now, supporting operations around the world. ISTAR airborne right now, supporting operations in the Middle East, and for every hour of the year that has just gone by, the RAF has flown nearly 2 hours of ISR on operations in that theatre alone. Tornados, Typhoons and Reapers collectively delivering over 600 precision strikes in Iraq and Syria this year alone, and Reaper is there right now, 24/7. The operating crews might be in the United States or they might be close to here at RAF Waddington, but that physical separation I can assure you doesn't mean that they are in any way separated from the mission or indeed its consequences.

Such remotely piloted operations are now routine business for the RAF, but how did we get here? I think to truly understand the RAF of today we need to understand that journey that we've been on, indeed since 1990, with the relatively certainties of the Cold War, through the 1991 Gulf War, a character of conflict which I think it is reasonable to say is unlikely to be replicated. Then it was Bosnia, Kosovo, No-Fly Zones over Iraq, the 2003 Gulf War, enduring stabilisation missions in Iraq and Afghanistan, then Libya at the same time, and now Iraq once again and Syria. At each stage the RAF has been agile, adaptable and capable, providing the

Government with viable military operations. It has provided us with that decisive military edge. Now I'm not saying that the air power has done it alone, of course I'm not. But what I do say is that without air power, none of it would have happened. Others have taken due note of our strength in the air and they have adapted accordingly, and that sets us new challenges for the future.

So what overall does this tell us about the RAF of today? Most obviously a battle-hardened force; everyone has experienced operations, at least to some degree, many over multiple tours. My people know what it is to go away and fight. But there is a risk; that experience is deep, it could also be relatively narrow though and continuous operational tours are inevitably tiring. Now I know you will be thinking the RAF has shrunk considerably in size since 1990, and that is absolutely the case, but in qualitative terms we are a formidable giant, I would argue, with an almost recapitalised force, not just platforms but weapons and system. It is an enviable position. I know this – in my 5 months in command so far, I've been to a dozen countries, some of them more than once, and I've talked to my counterparts and they look at us with envy. In our people there are far fewer Regulars, but at the same time we have embraced the Whole Force approach – Regulars, Reserves, civil servants and contractors – to deliver our military outputs. Affordability has become an increasingly important factor, but we simply cannot live in a vacuum, disconnected from the nation that funds us, or resist the challenges of value for money or increased efficiency. We owe it to the public and to ourselves to get every last bit of capability out of the money we are given. We have therefore modernised our approach to become as effective in the business space as we have remained in the battlespace.

The context in which we generate and employ military force has also changed. The information age is well and truly here. All operations are now Joint by default as well. Globalisation has sped up, technology proliferates rapidly with commercial companies now increasingly dominating what was traditionally a cutting edge defence activity.

So the RAF of today – continuously fighting, 25 years of valuable combat experience. Smaller, delivering more punch for our weight. An almost completely modernised

force with new, more efficient ways of doing business than before. Pioneering new methods for the generation of air power and sharing the US's journey in areas such as precision weapons, low observability and remote operations. We have evolved from single-role to multi-role platforms and we are able to act simultaneously as a result across air power roles at multiple levels of warfare. We have come a long way but our journey has barely begun. But it does provide us with a starting point for our growth into the future.

So let me then now turn to growth. Why has the RAF been tasked to grow in a way in which we haven't seen in generations? Well, there is a fairly self-evident, obvious, point but it is important nonetheless – it's because we are that common denominator in every military operation. When was the last time we had an operation where air wasn't involved? Air power provides the nation therefore with viable, ie, capable and affordable, options, and we have the agility to act quickly at range when necessary. The source of the growth signal is the SDSR in 2015, and I do always promise at this stage it wasn't because I was running the SDSR that the RAF did so well, but nevertheless the goal of that was to give the UK the ability to fight in the information age, to give us a greater potential to operate across the spectrum of operations and to do so alongside NATO and her allies. This is a much-changed emphasis from where we were in 2010. How we are going to do this is Joint Force 2025. What is the headline figure? Well, it's about 50,000 people fighting in a joint and integrated way and the RAF's part of that: an Expeditionary Air Group, between 4 and 9 combat air squadrons, between 6 and 20 surveillance platforms, up to 15 transport aircraft and somewhere up to 10,000 people. SDSR15 also brought welcome financial certainty. I'm not pretending that all of our financial challenges have gone away, I'll cover more of that shortly, but a commitment to spend 2% of GDP over the life of this Parliament means that we can plan for growth with certainty and confidence. It also sends a really important message to our allies.

Let me just briefly recap the content of that growth signal and the task that we are trying to pursue. We have 3 new combat air squadrons of Typhoons and F35s; we are going to buy a new fleet of Remotely Piloted Air Systems, more than doubling our current capability; we are going to buy Maritime Patrol Aircraft; we are going to extend the out-of-service date for lots of ISR platforms and our air transport

platforms; we are going to provide more of those vital crews into the same; and overall a welcome uplift of around 300 Regular personnel to assist the growth. The question again, though, is why grow us now? Well, I think what we have is that, for the first time in a while, there is a coincidence between the requirement and the opportunity. The biggest drivers of this growth signal are the global security picture and a national appetite to employ the military instrument. I think the re-emergence of Russia as a potential peer challenger is significant and, as the Chief of the Defence Staff recently described, a new strategic competition between Russia and NATO. So when I was talking earlier about others have noticed where we have been strong in the air and have adapted, that's the sort of thing that I have in mind.

Let me now turn in my final section to how we are going to meet this challenge. There are 3 distinct sections: first, a little more on the challenge itself; second, our conceptual approach to it; and, finally an identification of some of the tangible ways in which we are going to deliver the growth.

Now as many of you will know an uplift of equipment doesn't equal capability growth until we have satisfactorily addressed what we would call the Lines of Development – training, personnel, support etc. It's an old chestnut, it sounds obvious, but we must not forget it and this is a very large part of the work we are doing, moving behind the headline of the platform into those deeper areas. What are the 2 aspects of that challenge that stand out? Well it's people and it's finance because both of them are fundamental to us ultimately being able to deliver that success. To give you a feel for what the challenge is about: before the Defence Review, and in fact now, the RAF strength was about 7% short of what we need – that is about 2,200 people. We need to address this before we can uplift the 300 people in the Defence Review. We say that recruiting is strong at the moment, but it remains a big challenge. The big uplift in equipment also means that I have to reconfigure the people that I have. I need a significant aggregate increase in the skills of my organisation compared to where we were before. Everyone in this room is acutely aware of the growing challenges of attracting and retaining those specialist skills. Let me just give you some examples of what that means in practice. If I just look at the pilot into-training figures across our various Conversion Units, that needs to increase by around 70% if we are going to grow our capability at a reasonable rate. Now that sounds like a tough ask, and it

comes off a pretty low baseline that we have been through over a number of years, and these are the cadres which are often most difficult to recruit and the most difficult to retain, but it gives you some idea of the challenges that we face. And you can't grow the capability unless you can pay for it, and the RAF's planned budgetary allocation in the Defence Review didn't immediately give us all the money that we needed. The whole principle here is about being a more efficient organisation and then translating that efficiency gain into growth. This is a great challenge to have because the incentives are so powerfully aligned. If the RAF becomes a more efficient organisation the money gets recycled and we become a more capable one. Frankly I can motivate people around that.

Let me then move on a little bit to explain our conceptual challenge to meeting those head marks that I've described, because this too is fundamental to our success, how we think our way through this challenge. The goal is straightforward, as I say, create genuine and sufficient headroom to grow the Air Force and move forward. Let me just give you an idea of some of the principles we need to look at. First and foremost I think we must, indeed we will, act now. The challenge is simply too big to wait and see whether all of our existing approaches will work. Because if we wait until we discover that it isn't working then it will already be too late to recover and we'll have missed a golden opportunity. Secondly we must investigate every aspect of our current operation, and our business model, to see if we can improve it. Everything is on the table and up for discussion. Then we need to make sure that the solutions that we develop are going to endure, that they're not just going to be sticking plaster solutions which in all likelihood will fail over time. We need to accept that risk is very closely tied to innovation. It is easy to say, but it is not always easy to deliver in practice. We can't be reckless – we need to retain our license to operate – but we need to be further out there on the edge and be prepared to challenge. And that leads into the decisions that we need to take because some of them will be hard decisions for the medium- to long-term health of the RAF. Some of them will challenge us to do business in a different way.

And finally I come back to our plans which must be realistic and affordable, because ultimately if they're not they're destined to fail. I think there is a risk here that this all sounds a little bit gloomy, and I might be creating the impression that I have some

fundamental concerns about the RAF and what it's doing. This could not be further from the truth. We are truly outstanding at the tactical level execution of air power, as evidenced on a daily basis: be it in the control of the air, ISTAR, strike or air mobility, our people are doing a superb job. But what I'm talking about is the need to change in order to ensure we sustain that output and to ensure that we can grow the RAF of the future. And the principal thing that we really need to get to grips with there is addressing our strategic workforce challenges.

Let me now move on to identify some, not all definitely, of the things we are pursuing with a view to creating our headroom for growth. I think they fall into 2 categories: there are the things that we've done previously and which are now starting to come to fruition, and there's those things we're considering as a direct result of SDSR15 outcomes – less mature, yet to be implemented. But both of these things together are key aspects of our growth potential.

So let me look at some of the things that are already in the pipeline. The most obvious of these is perhaps our new Military Flying Training System, or MFTS, which essentially contracts out or brings in a partner to work with us on the training of all UK aircrew. Now a programme as complex as this has been risky and there have been challenges along the way and it has taken some time, but we are now at the point where I think we can exploit all the hard work that has been put in. And we need to, because this is the fundamental vehicle where I will grow those aircrew that I need for that future front line. What I am looking for is more people, trained to a higher standard, and to do it in a shorter period of time. Perhaps less obvious at the conceptual level is our operating model within Air Command, and particularly how we manage our capabilities. Going way back to Lord Levene's Report, it was about decentralising capability planning and making the single Services responsible and accountable for acquisition. Well we are there now, and I think the RAF now has very much greater control of its destiny. This helps our headroom challenge; it allows us, the people who actually own the risks and deliver the output, to manage that capability growth.

And the third thing more at the conceptual level that I'll mention is the implementation of our Aviation Safety and Regulatory Model. Perhaps it doesn't sound like the sort

of thing you'd traditionally talk about with growth, but as I've mentioned earlier on, it's fundamental to have that confidence that you're managing your risks well, it gets you the reputation, it's part of the building blocks on which I grow the Air Force and sustain our reputation. So that duty-holder construct ensures that all of the operating and operational risk is fully considered; it has clear lines of responsibility and authority. If we understand our risks better we make smarter decisions about what to do with our capabilities and when, and that's fundamental to growth.

But I've already said that our current approach is unlikely to be enough in all respects so let me just give you a few examples of some of those developing initiatives. I talked about that brilliance of tactical level execution of air power, and we need also to stand up to the Operational level so we stood up a new Joint Air Operations Centre at High Wycombe, providing our Air C2 capacity and capability. Part of the Joint environment, partly with Allies, but we need to be standing up to the plate in that sense. And most recently we've used that Centre to control what we've been doing in East Asia, which hopefully you have seen a fair amount about in the media. Another example of what we're looking at is the establishment of a Rapid Capabilities Office within Air Command. It has the purpose of driving innovation and capability delivery. It is about exploiting already available solutions, off-the-shelf technologies. If we can grow our capability more quickly or sustain what we have more effectively it will free up that headroom for growth elsewhere. Let me also talk about Programme Gateway, our single air mobility hub at RAF Brize Norton. I think we are only really beginning to understand the potential efficiencies here. In the space of 3 years the average age of our air mobility platforms went from 42 years to 3 years. We now have a modern air transport force, how are we going to make sure we have a modern logistic capability to support it? I could talk about Estates as well. Presumably some will have read of the National Audit Office report on the Defence Estate – not really complimentary, but in terms of our estate we need a smaller estate, when we have got a smaller Estate we can invest our money more wisely and improve the condition of it, because infrastructure is definitely a very large issue for us at the moment.

So I could go on into a number of areas, and perhaps it would be better to explore them further in questions, but let me just talk a little bit more about the people challenges in particular. The people challenge is very much in that very large issue

category; we need to continue stuff that we have been doing before but we need to challenge ourselves to do stuff differently in the future. As this audience very well knows, the environment is changing out there. We cannot call on that pool of expertise we did previously in order to sustain things like our engineering capability, so we must change in order to continue. The first thing we have to do in that respect is deal with the requirement, that is to look at that demand signal. We too often see things like the supply of engineers as being a supply problem – how do you recruit more? Well, we need to look at how we reduce the requirement. And that leads into technology, for example. How do we exploit technology to reduce those challenges? We then need to look at some of our assumptions about how we do our business. We tend to be a bottom-fed organisation, people work up through the organisation and then they leave and they go into defence industry, but they shouldn't be lost to us. I don't think there's any of the employers here who assume that when somebody leaves the company that they'll never see them again, but we tend to see it that way. Why don't we attract people back in at the appropriate levels? Or why don't we look at models in which people can move in and out of defence industry and into the Services? We do exciting stuff, and people want to be a part of that, but we need to get over the hurdle of how do you give due credit for service you do outside your company or outside defence and elsewhere. We need to make sure that we give responsibility to the right levels in our organisation; one of the concerns that I have is that we tend to suck responsibility up when we have got a generation which really strives for that extra responsibility and that extra challenge. I am acutely conscious that I will never out-compete with the money offered, but I will compete very strongly with the outside industry in terms of excitement, challenge and that sense of purpose and sense of responsibility.

There are a number of areas I could mention but I will just perhaps come back to training. We, the Royal Air Force, UK Services, have an enviable reputation around the world for training. It is one of our strong selling points. But we do invest a lot in it, and it does take a long time, and the longer people are in training the less time they are on the front line. We need to question our training system, not changing the output, but how we do it. A competency based approach – when you reach the required standard you move on to the next stage of training. At the moment you do

the whole training regardless of what standard you are, and it is a time-based course rather than a competency-based course.

So I offer there some themes that we might want to explore further in discussion, but what I just want to do by highlighting those things in particular is emphasise the importance of that strategic manpower challenge to the future growth of the Air Force. I have been quite clear, and many will have heard me say it already, that there is no greater priority for the senior leadership of the Air Force than engaging with those challenges. Some might say, well where does that leave operations? Well of course the senior leadership are focused on operations, but I am confident the results are out there, I am confident that the RAF can do brilliantly well on operations, it doesn't require constant senior leadership intervention to make that happen, people are doing it very well. Where we do need a lot of strategic leadership intervention is to navigate the change in relation to our people challenges.

Let me now then conclude. I want to conclude just around the 3 main themes that I have discussed. The first is to remind us of the evolution of the RAF since 1918. It has been remarkable, and it is the engagement, that level of engagement in operations, where for 25 years across the whole breadth of operations that the UK has participated in, which gives us our strength and our sense of being as an organisation. We have now been tasked to grow as recognition of that valuable capability that we provide and how busy we have been, and that is partly for Joint Force 2025 but it is also in order to ensure we can keep doing what we are doing at the moment. The challenge is quite straightforward in a way: we need to meet that growth signal and simultaneously fight on operations. It is not unprecedented in our history, but it is rare and it is challenging. Turning those announcements in SDSR 15 into capability is the responsibility of the RAF today. It is an opportunity to set the RAF on its very clear trajectory into its second century, and much of what we do now will be setting the RAF for the next 30 or 40 years. It will define my tenure as the Chief of the Air Force. It is an evolution full of complicated risk, we need to safely navigate it if our growth is not to be hollow and in name only. The task is one we are happy to accept. The first requirement is to generate the headroom to make it happen. Our main mission is to address those strategic workforce challenges.

In 11 days from now it is the 113<sup>th</sup> Anniversary of Orville Wright's first powered flight, but his preparation had been many years in the planning. Many others were experimenting in a field that was perhaps viewed at the time as being so complex that its problems were unsolvable. But Wilbur and Orville realised that it was just a complicated problem which could be solved by considering the problem as a whole. I think that's a simple analogy for what the RAF must do today – not forsake that tactical excellence which gives us our reputation, lift our gaze to the Operational level, think well beyond today's problem. If we do, and we will, we will have identified the solutions which will allow us to grow into the future. It is time for us to demonstrate that agility and adaptability in pursuit of our new capability.

Finally, I note that in 1905, while perfecting the Wright Flier design near Dayton, Ohio, Wilbur made a spectacular flight which lasted 39 minutes. Well, I am at 38 minutes at the moment and so I am approaching that time where I think my time at the controls of this lecture has come to an end. I think it is an apt moment to draw it to a conclusion. Thank you very much for your attention, and I very much look forward to your questions.