The Trenchard Memorial Lecture

Delivered by Air Chief Marshal Sir Brian Burridge At RUSI on 17 Sept 2004

Introduction

The scene is the North Sea airspace. The date is 28 July 2004. Nine Swiss F18s took part in Exercise NOMAD as the offensive counter air fighter sweep ahead of an offensive package. The defending team was four Tornado F3s with AMRAAM and ASRAAM, four French Mirage 2000s and four Swiss F18s. The F3s were on a full JTIDS link with the E3D. None of the other defenders had this facility. The offensive F18s were decimated, principally by the F3s and their modern air-to-air weapons that needed to make only three radio calls during the 20-minute engagement. Why was it like that? Because the offensive package had just met Network Enabled Capability for the first time. Marshal of the Royal Air Force Viscount Trenchard would have approved.

We do know that Trenchard did not approve of being termed the 'Father of the Royal Air Force'. This he felt was Lieutenant General Sir David Henderson's honour.[1] Better was Churchill's description of him as the supreme architect.[2] And architect he was. Architecture is, of course, the art or science of building. Much of Trenchard's achievement in terms of building an independent air force was indeed an art and relied on a number of pillars.

The first pillars were the great training institutes such as Cranwell, Halton and the Staff College. The second pillar was the establishment of a reserve through Short Service commissions and the creation of the University Air Squadrons. And the third was the focus on technical knowledge and understanding throughout the new Service. These are fine pillars indeed, requiring the deft touch of a skilled architect.

Not to milk the metaphor to death, Trenchard was a realist, given the difficult economic and geo-strategic conditions that existed in the '20s and early '30s. He pointed out that:

An RAF GR4A on patrol over Iraq

It is a fundamental truth that without control of the air, land forces and maritime forces cannot operate at an acceptable level of risk

"I have laid the foundation for a castle: if nobody builds anything bigger than a cottage on them, it will at least be a very good cottage."[3]

Over the years, it could be argued that the Royal Air Force had gone from castle to cottage and from cottage to castle a number of times. So, in this lecture, I want to look at the way in which Trenchard's legacy of technical thinking (*The Concise Oxford Dictionary* tells me that, like architecture, 'technical' means a particular art, science or handicraft) will take us into the future. I draw a distinction here over technological development, which is merely the hard-edged application of science. Today I wish to focus more on the blend of the equipment, organisation and thinking exemplified by the performance of those F3s on Exercise NOMAD that now allows us to take an effects-based approach to operations.

So, I intend to have a look at Network Enabled Capability from the Air Power perspective. In doing so, I will address the 'technology versus numbers of platforms' debate. I will also cover the capability developments that are needed to run in parallel with the creation of a Network Enabled Capability.

Network Enabled Capability

Let us then begin with Network Enabled Capability or NEC as I shall term it from now on since it has already had an airing.

In achieving 'effect', there is a trade-off that has to be made between platform numbers and capability. For example, take the advances in precision warfare. In the first Gulf War, 15% of the weapons dropped by the RAF were precision-guided. During the Iraq War, the size of the deployed RAF offensive force was smaller than in 1991, but 85% of the weapons dropped were precision-guided. There is no doubt though that the effect achieved in 2003 was greatly in excess of that of 1991. Looking to the future, it is clear that NEC will provide the same leverage.

For air power, NEC provides three enhancements. Firstly, by improving situational awareness and thus speed of response it reduces the risk faced in establishing control of the air. This is not new. The Battle of Britain was fought on just such a basis, with only the technology having changed. The Dowding System was the first example of NEC, and incidentally, time-sensitive targeting, sensors and shooters were linked through a network that included the decision-maker. It is simply that GPO telephone lines and WAAF plotters have now been replaced by secure data-links and plasma screens. It is a fundamental truth that without control of the air, land forces and maritime forces cannot operate at an acceptable level of risk.

Secondly, NEC allows the generation of overwhelming tempo by integrating air power and land manoeuvre. This generation of tempo is key to providing an enemy with problems that he can neither understand nor to which he can react in a timely fashion. More recent conflicts have seen this capability multiplied many times over and was well illustrated by the example of US Special Forces operating on horseback in Afghanistan calling in precision-guided munition strikes from B-52s. Also, the destruction of a large part of the Medina Division of the Iraqi Republican Guard from the air during a sandstorm (which had made action on the ground all but impossible) was a further stark reminder of how far we have come in terms of networked operations. They can offer the means by which our responsiveness is capable of keeping adversaries permanently 'on the back foot'. So air power can shape the battle space and deal with obstacles to progress as they occur. It can only do so if information can be disseminated and understood rapidly and if the resulting analysis and orders can be executed without delay.

Taken further, because air power will become more responsive and can be applied with precision to areas where it will really make a difference, NEC will allow us to maintain momentum using fewer ground forces and less heavy equipment, such as tanks and artillery. Given then the resulting need to deploy less heavy equipment, a nation like the UK can respond more quickly to distant emergencies.

Thirdly, air power enabled by NEC allows us to take advantage of fleeting opportunities in a way that is denied to other forces of lower responsiveness. This aspect is particularly important in dealing with asymmetric enemies. Even the most covert terrorist has, at some stage, to communicate or move location. Such events represent fleeting opportunities because, for a short space of time, they present a tangible symmetric target of a type that air power can address. This was certainly the case recently in Al Amarah where a terrorist mortar team periodically attacked the British CIMIC house from within the cover of the urban area. The combination of a Tactical Air Control Party and an on-station F16 put an end to their activities minutes after they revealed themselves to carry out another attack. We need to be able to do this over and over again. This is the type of persistence required to dominate post-modern battle space, and air power can deliver it.

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Numbers of platforms versus technology

This is not simply about worshipping at the altar of technology and there is frequently a tendency to say, 'Gee, yes!' rather than 'Why, how much?' Rather, it is about applying capability in novel and creative ways to solve the problems that both the recent conflicts such as Iraq and Afghanistan presented. I believe that the time-value of

information will be at its heart. So, in order to take part in such operations safely in future, it will be imperative to be able to function as part of a network-enabled force. Whilst in an ideal world, the aim would probably be both to maintain platform numbers and to provide NEC, every indication is that this will be simply unaffordable. So there is a tough balance of investment decision to make. This was recently manifest in the outcome of the Workstrands, in which the decision was made that we will reduce both Jaguar and F3 numbers with the resulting savings allowing investment in NEC. Clearly there are risks implicit in replacing numbers of platforms with high technology enablers. If the appropriate network enablers are not in place then, in future, we simply

Sopwith Snipes of No 1 Squadron over Iraq, 1923

Suppressing the 1920 Iraq rebellion cost the Army the lives of 2,000 men and the Exchequer £100 million, with a continuing presence costing £32 million a year. Switching to an air approach took just eight squadrons, costing only £100,000 for a six-month operation

will not be able to take part in such operations at all — irrespective of the numbers of platforms that we could bring to the fight.

Future challenges

My vision for Strike Command in 2015 is encapsulated in the phrase, 'Precise Campaign Effects — at Range — in Time'. My interpretation of 'precise' is one of an effects-based approach in that it is implicit that the effect attained should be proportional and, where weapon selection is concerned, precise enough to achieve the desired effect — no more, no less. This is fine where kinetic attack is required but is much less easy to visualise and execute where non- kinetic attack is concerned. In terms of the former, the Royal Air Force has transformed its ability to strike targets with precision over the course of the last decade and to do so at considerable range, both in a strategic and a tactical sense. In order to be able to use our weapons effectively, with the least possible risk of both collateral damage and 'blue on blue' engagements, together with the maximum effectiveness in terms of support for friendly forces, we now need a similar investment in the technology required to ensure that the timely and proportionate element can be achieved. Reducing the time element in the effects-based equation is the key challenge for the immediate future. Doing all this using a non-kinetic approach is vastly more complex and much more thought is required if we are to understand how to achieve a non-kinetic effect that is synchronised with a kinetic scheme of manoeuvre.

The future will call for novel and creative approaches in much the same way as Trenchard had to explain in his era, the role of an independent Air Force and, more particularly, the enormous leverage in 'effect' that air power could bring. The strategic bombing doctrine underpinned much of this but Trenchard needed a novel and creative way of achieving other types of effect. He was well aware that replacing manpower with capability arising out of technical advances would reduce both cost and risk. The success of 'air policing' in the Middle East of the 1920s and '30s shows just what can be achieved by looking at old problems in new ways. Even the limited performance of the relatively basic aircraft then available allowed large areas of territory to be policed using very small numbers of men on the ground. The ability to move men rapidly by air (or to attack rebel forces deep in their homelands) proved to be a significant force-multiplier. This resulting state of Air Control made absolute economic sense. After its debut in 1920 in Somaliland when a single squadron of DH9s defeated the Mad Mullah in just three weeks, the die was cast. Suppressing the 1920 Iraq rebellion cost the Army the lives of 2,000 men and the Exchequer £100 million, with a continuing presence costing £32 million a year. Switching to an air approach took just eight squadrons, costing only £100,000 for a six-month operation. Later, success on the North West frontier in 1925 and settlement of the Aden dispute by a single squadron at a cost of under £6,000, provided further seductive evidence of the ability and cost-effectiveness of Air power:[4] an example of Trenchard's cottage becoming a castle.

As we look to the future where should we build our cottages and what should they look like? Building castles in the air is, of course, a dangerous business!

Firstly, let me consider some of the capabilities that air power needs to generate beneath our umbrella of NEC in order to deliver an effects-based approach to operations. First, let us look at the generation of the information to feed the network. From a national standpoint, our position is improving and improving rapidly. The Nimrod R, the E3D and the Nimrod MR2 together with strategic recce from the Canberra and tactical fast jet recce have long been the backbone of our approach. Recent developments have taken this yet further. The RAPTOR pod yielded outstanding results in Iraq and the Westcam electro-optical (EO) pod on the Nimrod MR2 has been particularly successful. It has seen the MR2 move out of the genre of a maritime patrol aircraft towards that of a multi-mission platform. Having made its debut this way in Afghanistan, the EO sensor has also proved invaluable in counter-drug operations, in controlling smuggling and in curbing illegal immigration. Its real impact though

is being felt in Iraq in patrolling the border with Iran and in identifying and tracking the former Regime Elements and terrorists who are intent on making trouble. For such operations, the aircraft carries a Ground Liaison Officer. Such people only wish we could shorten the sensor-to-shooter time by equipping the aircraft with a precision-guided bomb, and this may, and I stress *may*, become a reality in the Nimrod MRA4. This new aircraft that flew for the first time on 26 August 2004, has the capability to carry most of the offensive weapons in our inventory. This makes it a truly adaptable aircraft with its capability making a big difference to the time element of my 'Precise Campaign Effect — at Range — in Time'.

Equally important in the ISTAR field is ASTOR, which we now call Sentinel. This again is leading-edge technology that brings the UK into the JSTARS-type field for the first time. The airframe

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Nimrod MRA4

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with all its modifications has flown successfully and now we are in the process of proving both the radar and the software. No 5 Squadron is standing-up at Waddington as a Joint unit with a view to reaching Full Operational Capability by April 2008. One area of concern over all of this is the universal provision of secure radios, Bowman is entering service now across land and land-related Force Elements, but by 2008 the US will have equipped *all* their force elements with the Joint Tactical Radio System or JTRS which will give universal connectivity to the network. It will be challenging for us to stay abreast.

Clearly the future of ISTAR will also embrace UAVs. Their inherent efficiency speaks for itself with their applicability to the 3D tasks — Dull, Dirty and Dangerous — is clear. However, they offer more subtle capability advantages such as over the horizon targeting and reachback tailored to a specific requirement. They also offer persistence but they are not as cheap to buy and operate as many imagine, so the degree of their ubiquity in our future force structure remains an open question. Nevertheless, it would be very surprising if UCAVs were not part of our future solution to long-range penetration, although the growth in bandwidth requirement is also an issue.

In delivering kinetic effect, Typhoon will be the backbone of the frontline for sometime to come. It is a stunning aircraft to fly and brings with it great agility and the potential for really elegant weapon system integration. It has proved very reliable so far, not least in two aircraft completing the 16,000-mile return journey to Singapore recently. Incidentally, one of the aircraft had only 12 hours on the clock when it departed. In delivering 'effect' with deployed fast-jet aircraft, we need to consider aspects such as host nation support, overflight and logistic lines of communication. This suggests a variety of approaches, not least Carrier Air. Projecting air power from the sea will make a significant contribution to my 'Precise Campaign Effect — at Range — in Time' equation. Clearly, carriers give us range and reach, always providing warning time is available. Recent history tells us that generally it is. But Carrier Air with its ability to poise in a diplomatically neutral or even coercive way makes a major contribution to the time element. Notice that I talk of carrier air not carriers themselves. For it is the aircraft that achieves the effect. Hence, we attach great importance to JSF, now JCA and to achieving the correct balance in both employing and basing JCA. As our first excursion into stealth, JCA represents a step-change in capability. We should not be seduced into forgetting the information requirements. Attacks against fixed targets in the modern air C2 environment together with closer land-air integration and flexible employment in aspects such as killbox interdiction all call for rapid, accurate and complete data distribution. Thus NEC must be tried, tested and absolutely axiomatic in our way of operating by the JCA era of the next decade.

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The human dimension

Much of what I have covered in capability terms is perhaps the science within Trenchard's architecture. What then of the art? Clearly, our doctrine needs to develop in both breadth and depth — breadth to account for changes in the context within which wars are fought driven by changes in circumstances. At the time that we were engaged in the Kosovo air campaign, few would have predicted the post 9/11 global war on terrorism and the need to be in Afghanistan. Doctrine needs to be developed in depth as we recognise the opportunities and limitations of platforms and weapons as they enter service — the reality of the rubber meeting the road if you like.

The need for doctrine is self-evident. A greater challenge exists in producing a Royal Air Force that is agile and adaptable. In a Service focused on expeditionary warfighting, never was the maxim, 'Train for war and adapt for peace' more appropriate. This goes to the heart of our structures from Headquarters to Stations and to the people themselves. Our people must adopt an expeditionary mindset; they must not become comfortable on main operating bases in the UK. Clearly, they must be responsive to changes in environment where things don't quite go to plan and where leadership really does mean taking ownership of problems. Strategically, we need to be forward leaning in both accepting and driving change. In the 20 years between 2000 and 2020, virtually our entire front-line will have changed and we will be changing our approach fundamentally to logistic support. There will be novel approaches to delivering capability such as the Future Strategic Tanker Aircraft. We are thus living in an era of huge opportunity that requires real agility from our people if we are to capitalise on the advantages of this outstanding re-equipment programme and deliver 'Precise Campaign Effect — at Range — in Time'. But from a human dimension, the matching maxim must be 'warfighter first — specialist second'.

Lord Trenchard

American airmen regarded him as the patron saint of air power but to us in the Royal Air Force, the nature of his contribution and his legacy is what gave us, and continues to give us, our pride and status

Conclusion

What would I say in conclusion then? First, Trenchard was right to drive the culture of our being a technical service. In no other environment do advances in technology provide such radical changes in capability. It was the technological nature which gave air power its relevance then and does so now. Secondly, the ability of air power to be relevant must rest upon its technological basis. The key elements are of course precision, stealth, the network, plus the ubiquity of air power and its enduring characteristics of speed and range. Particularly, I would emphasise that we have reached a point in the development of technological warfare where we must take an NEC approach to capitalise fully on new capability. Thirdly, Trenchard's legacy represented by that solid pillar of training remains just as important today. That many of our activities are now Joint in approach does not dilute the special nature of air-mindedness possessed by our people. Fourth, and very much a related point, the human dimension remains paramount. Creativity, novel approaches, command in complex environments and adaptability will be what ultimately gives us our winning edge. Our current focus on the effects-based approach is not new but gives a far better articulated framework for the employment of air power that is now more consistent with the language of gurus from Warden back to Trenchard. In taking all this forward, we should remember Trenchard's Memorandum of 11 December 1919 entitled, *Permanent Organisation of the RAF*. He described the existing nature of the Service as being like 'Jonah's Gourd':

"The necessities of war created it in a night, but the economics of peace have to a large extent caused it to whither in a day, we are now faced with the necessity of replacing it with a plant of deeper root"

So, as we renovate our cottage and occasionally construct the odd wall like a castle, we must take care never to dislodge those very deep roots. Roots that go back to the creation of our Service. So, it's hardly surprising then that Harold Macmillan regarded Trenchard as the man to whom the nation owed a debt beyond measure.[5] That American airmen regarded him as the patron saint of air power but to us in the Royal Air Force, the nature of his contribution and his legacy is what gave us, and continues to give us, our pride and status.

Notes

1 Henry Probert, High Commanders of the Royal Air Force, HMSO 1991 p1
2 ibid, p1
3 Architect of the RAF – Obituary of Lord Trenchard, The Aeroplane, 17 Feb 1956
4 Andrew Boyle, Trenchard, Collins p 365-369
5 Henry Probert, High Commanders of the Royal Air Force, HMSO 1991 p4