

Combat Operations: The Asymmetric Advantage of Air Power

RUSI Lord Trenchard Memorial Lecture 2009

By Chief of Air Staff, Air Chief Marshal Sir Stephen Dalton

I would like to begin by thanking the Director (Professor Michael Clarke) for his generous welcome. It is a real honour to be invited to deliver the annual Lord Trenchard Memorial Lecture at this distinguished institution and I'd like to take the opportunity to express my personal appreciation for the way that RUSI continues to stimulate debate in the Defence and Security arena. This is a particularly important role at the present time when, arguably, we are approaching a genuinely strategic crossroads in the design of our future Defence Policy and Military requirements. It will be critical that we really raise the absolutely essential focus on our current 'Main Effort' in Afghanistan and take a long hard look at our national security levels of ambition and requirements. If this results in a fundamental revision of our notion of Britain's place in the world then, inevitably, there will be significant implications for the size, shape and structure of our armed forces; but, we should not overlook the significant role that those armed forces are currently playing in defending and promoting the security of this country, our values and our interests, in their broadest sense, as an integral part of our current operations. You will not be surprised to hear that I intend to return to this theme through the rest of this talk.

As the relatively new Chief of the Air Staff, one of my real concerns is that while public support for the armed forces is as high as I have ever known it to be, witness the marvellous public turnout in Uxbridge for the Home-coming Parade for 63 Sqn Royal Air Force Regiment last month. Nor should we underplay for a moment the consistently humbling support from the people of Wootten Bassett. However, despite this marvellous moral and physical support, the genuinely informed understanding of the role of the military in contemporary society is worryingly low, and this is particularly challenging for the Royal Air Force. In Afghanistan, for example, without RAF aircrew flying our Chinook, and shortly Merlin as well, support helicopters, and transport aircraft in and through some of the most demanding environmental conditions faced by any military forces anywhere in the world, and in the face of the constant threat of being shot at by the same insurgents who threaten the Land Forces, without those very brave and highly skilled aviators, more often than not, the equally brave and courageous soldiers and marines would not be able to pass the start line. This issue is important; if it's symptomatic of a more general lack of understanding in the public – and a consequent undervaluing - of the absolutely key role that air power plays, in its many guises, in all roles of military and security operations. And this matters, because – as I'll explain today - air power is equally fundamental to success in the full gamut of military operations from counter-insurgency operations, whether they be historic such as in Malaya in the 1960s, Northern Ireland during the troubles there, or on Operation Herrick today in Afghanistan; effective airpower is essential to all scales of medium or high-end warfighting. Often it has been and will continue to be the advantageous asymmetry that air power has given the UK and our allies that has been the determinant in giving the force or the coalition the battle, nay war winning capability and advantage.

Our combat operations over the last two decades demonstrate how air power has consistently evolved; it has been adaptive and it has developed. But where are we today, as the consequence of those lessons from our recent history and what are the drivers that are shaping our current thinking and decision-making? And equally importantly, what defines our immediate future requirements as well as our longer-term insurance premium – well that is, of course, the focus of the forthcoming Strategic Defence Review, a requirement on which all the major political parties agree. Whatever, the resulting conclusions, one thing is certain, and that is that we will want and need to unlock the fullest potential of air and space power in the coming years and deliver affordable and agile capability as part of this country's joint defence and security forces – and that is of course wherever they are deployed, whatever the nature of future

operations, whenever they're needed. But to do this effectively and add to our asymmetric advantage over potential adversaries – whether they be state or non-state - we will need to invest significantly in putting 'real meat on the bones' of our National Network Enabled Capability.

Now the themes that go through this – agility, capability, and asymmetric advantage – will run through everything I say today, and they are an integral part of my vision for the Royal Air Force. But for reasons that will become clear, I'm also going to emphasise another characteristic. Amongst other significant anniversaries, 2009 marks Charles Darwin's 200th birthday. You recall that he observed that:

'It is not the strongest of the species that survives, nor the most intelligent. It is the one that is most adaptable to change.'

Consequently, I believe that adaptability – in our organisation, people and equipment – is the key to ensuring that the RAF continues to make the critical air power contribution to the UK's defence mission, as the strategic environment evolves over the coming years.

Recent Operations

So let me turn to what contemporary events show us about military requirements. It's worth reminding ourselves that over the last twenty years, the RAF has been continuously involved in combat operations across the entire spectrum of conflict. We have conducted top-end warfighting against technologically capable opponents - where we have had to fight hard for that critical and fundamental requirement in any military operation – that of control of the air. We have had to find ways to overcome sophisticated, integrated air defence systems - on at least four occasions in that time: during the Gulf War of 1991, in the Balkans in 1995 and again in 1998 and, as recently as six years ago, in the Iraq war of 2003. To use a military term, we have then 'transformed in contact' with our adversaries, to switch to intense counter-insurgency operations in Iraq and Afghanistan. At the other end of the scale, we spent eleven years flying low intensity – but highly cost-effective - air-policing of the no-fly zones over Iraq, interspersed with timely focussed interdiction operations without the need for major long-lead time and costly deployments or reinforcements. At the same time we conducted numerous, rapidly arising, humanitarian relief operations such as that in Somalia and Sri Lanka and military interventions, such as Sierra Leone and East Timor. Throughout this period, we have continued to deploy significant force elements to cover permanent commitments, notably the air defence of the United Kingdom, support to the Strategic Deterrent and overseas in the Falkland Islands. So the RAF has been very busy – and continuously over a very long period. But what are the broader implications of this experience?

The first point to make is that the development of military aviation, supported by emerging technology, means that air power has been consistently developing and maturing over the last twenty years in particular, and can now make the critical, precise and designed impact that theorists such as Douhet, Mitchell – and, of course, Lord Trenchard - have envisaged since the dawn of aviation. Western air forces can now deliver precise, proportionate firepower with extremely high levels of assurance, in virtually all weather conditions. This means that in conventional, force-on-force encounters, air power may have primacy in the joint campaign, with the land component effectively 'fixing' the enemy to be neutralised from the air. We saw the genesis of this in the Gulf War of 1991, when largely unseen and unreported, the air campaign neutered the fifth largest army in the world and, in so doing, set the conditions for that army to be utterly defeated in a land battle that lasted just 100 hours. This was of course at an absolutely minimal cost in coalition casualties. By the time of the Iraq War of 2003, modern air power was decisive, and, according to a recent RAND study, with over seventy-five per cent of the 20,000 major military engagements being primarily prosecuted by air power.

The implications are profound. In the first place, as the then CGS announced here at RUSI last year, the Army has been able to plan its transformation into a uniform and lighter brigade structure, because of its 'increased confidence of delivery of effects from the air'.

The resulting breaking up by The Army of its traditional armoured and mechanised brigades is something that we would do well to remember in future discussions about force structures across the whole of defence, because, in essence a cheque has been written that air power must ultimately retain the ability to cash and pay to UK Land Forces on behalf of The Nation.

More fundamentally, our adversaries have also recognised the asymmetric advantage of air power – witness the significant effect that even the overflight or noise of a fast-jet or helicopter has on Taliban fighters as just one example, and this has driven them of course to develop their own asymmetric strategies to try and negate it. In this sense, understanding air power is critical, if we are to understand how - and why - the nature of conflict itself is changing and evolving.

While air power has proved to be the dominant force in conventional warfare during recent operations, it has also provided the key enabling capabilities, particularly of course in support of the land component, in irregular and counter-insurgency warfare. The mobility, ISTAR capability and heavy firepower support delivered by air power are absolutely essential, not least in minimising the footprint on the ground. As Colin Gray has put it:

‘Airpower is about mobility and power projection. It is about bringing fire to bear on the enemy, be he far or near; about inserting and extracting friendly troops; about surveillance and reconnaissance, and other forms of intelligence gathering; about supply and its movement.’

However, because our opponents understand the importance of air power, they will contest our control of the air with every possible means at their disposal. In the Balkans and the two Iraq wars, sophisticated air defence systems were employed against us, but even if our enemies lack an air force, they will still use shoulder-launched missiles and small arms to attack our air transport aircraft and helicopters. They will set booby-traps at known landing sites and attempt to mortar or rocket our aircraft on the ground. All of these tactics have been adopted by the Taliban in Afghanistan and, in this context, force protection and the role of the RAF Regiment is as much a part of the battle for control of the air as more familiar and ‘traditional’ capabilities, such as the offensive and defensive counter-air operations that were flown in the two Gulf Wars.

If all else fails, the enemy will seek to neutralise our asymmetric advantage by using propaganda to attempt to influence the media, putting pressure on our freedom to exploit air power capabilities to the full; again, this ploy has been used in Afghanistan, where one of the most significant challenges that we currently face - particularly as our land forces are so reliant on air support - is to make sure that we can counter the allegations that the majority of civilian casualties are caused by air attack. We all deeply regret innocent civilian casualties in war, but the growing perception that all civilian casualties are caused by air delivered weapons is far from the truth. Where mistakes are made, then lessons must be learned and procedures amended. However, we need to guard against immediately assuming that every allegation is substantive. The allegations are often unfounded, whilst the media will seek to sensationalise all occasions, we have to be far more agile and proactive in demonstrating the discretion and proportionality that is used whenever air weapons are employed.

Such decisions are founded on the sensitivity and discipline of the airmen and airwomen involved at every step of the targeting process, and I am always impressed by the quality and resolve of our airmen who are involved in targeting and aviation, often under extreme pressure.

I suggest that this very brief review of our operations over the last twenty years reveals two defining characteristics above all others: first, their variety, and second, their unpredictability. As we have seen, the RAF has operated across the entire spectrum of conflict,

transitioning from top-end warfighting to low-intensity air policing and back again, before switching to intense counter-insurgency operations. Few of these operations were envisaged beforehand, and some, such as the 1991 Gulf War, represented real strategic shocks. To my mind, this only reinforces the need for us to continue – within sensible resource constraints - to retain as balanced a force capability as possible, so that we can field relevant capabilities to confront the requirements of today's 'Main Effort' in Afghanistan, yet retain the ability to adapt to the future contingencies that we know will be difficult to predict.

This principle is understood across the political domain. The Secretary of State has already announced that he intends to sponsor a full and open discussion on the future defence requirements based on the forthcoming Green Paper and how it identifies the short, medium and long-term potential needs of the UK's foreign and security policies and ambitions. Equally, the Shadow Secretary of State, Liam Fox recently said:

'of course, the main challenge here is between equipping our forces to succeed in our current conflicts without failing to prepare for any future contingencies'

And, although the National Security Strategy rightly emphasises the primacy of current operations, it also notes the requirement to:

'to invest in a broad range of capabilities for the long term'.

This is important, because there is a perception that future wars will only be fought, as Rupert Smith has put it, 'amongst the people', with Western military interventions being limited to failing or failed states, where the opposition will be confined to ill-armed militias, criminal gangs and terrorist groups, and the overriding requirement is for 'boots on the ground' to provide stability and security. A development of this line of thinking of course is Frank Hoffman's conception of 'hybrid warfare', where low-tech terrorist tactics are mixed with higher-tech capabilities, often obtained through a state-sponsor. It has been argued that as these are the wars that are being fought now, they are the only wars likely to be fought by the West in the future and that we should, therefore, dispense with 'irrelevant' high-tech, 'Cold War', equipment.

This is a somewhat futile discussion. Although the emphasis may have changed, there is nothing particularly new, or radically different, about the contemporary operating environment; and insurgencies are as old as warfare itself and mixing conventional and unconventional capabilities as 'hybrid warfare' is a strategy that has been adopted across history, from the Boer farmers of the High Veldt in South Africa at the beginning of the last century through to Hizbullah in Southern Lebanon at the beginning of this century.

These sorts of conflicts will undoubtedly continue, and may even proliferate, but highly credible trends analysis and many important strategic thinkers predict that the days of state-on-state conflict are also far from over. Many of the likely future sources of conflict, such as competition for water and energy resources and the impact of climate change, can only be resolved at the level of sovereign states and their interaction within the international system. Russia's willingness to use force on the margins of Europe itself, in Georgia last year, is a good indication that 'conventional' warfare is still very much a fact of international life and of course it's important to remember the four inter-state conflicts I've mentioned that the British armed forces have been involved in over the last twenty years. This demonstrates the essential uncertainty of the strategic environment and reinforces my conviction that it would be irresponsible of me – as Chief of the Air Staff - to stake the RAF's future on the belief that we will not have to fight a foe with access to high-technology, conventional military capabilities at any time in the foreseeable future. Our recent history suggests that this would be a very dangerous assumption indeed.

This leads me directly to the question of legacy, or 'Cold War', weapons systems. I've made it clear why I believe we need an air force with a balance of capabilities, and this may be particularly true as we transition from a period of undisputed American hegemony to a more multi-polar world, where we may have to operate in unfamiliar or unexpected coalitions, and possibly without the same level of access to US combat power that we have assumed and benefited from in the past.

But there are some very unhelpful misconceptions about exactly what 'a balanced force' really means. The key is adaptability and, if we get this right, we're not necessarily in an 'either-or' situation, where force elements can only be used for conventional warfighting and not irregular warfare, or indeed, vice versa. The relevance of a piece of equipment is determined by the capability it enables and how adaptable it is to future operational needs, not just by its date of procurement and whether it was planned before or after the fall of the Berlin Wall. For example, the soldier with a rifle in his hand is a Cold War weapon system whose equipment and training has been adapted to ensure that he is absolutely relevant and capable in current conflicts; equally, multi-role Tornado - which entered service in 1982 as a strike aircraft, optimised for low-level use in Europe against the Warsaw Pact - has been readily adapted for highly effective use across the widest spectrum of operations from intense warfighting in Bosnia, Kosovo and Iraq, through low-cost, low-intensity but highly effective deterring, air policing, precise attack and reconnaissance operations over Iraq from 1992-2003, right through to its current counter-insurgency deployment to Afghanistan this year.

This level of adaptability is provided by the Tornado's innate design and configuration concept, which highlights the dangers of relying on more limited, niche capabilities, narrowly configured for one type of warfare. For example, it has been argued that a small, turbo-prop, aircraft would provide a cheap attack capability in Afghanistan. But its utility, and arguably survivability, would be markedly reduced in comparison with fast jets, such as the Tornado and Typhoon, because of increased vulnerability to less sophisticated enemy weapon systems, their reduced speed would limit response across the battlespace, and their more limited weaponry options and payload would reduce the deliverable effect at the precise time and place they were most needed. More importantly though, any such aircraft could not be used in other sorts of conflict with any confidence in their survival, such as when our Tornados and Harriers were called upon to operate against highly effective and integrated air defence systems in the Balkans and Iraq. Our relatively small size means that we simply cannot afford to implement specialised procurement strategies that establish force elements that are appropriate only for one sort of operation; the risk is that we end up equipped to fight the last operation or war and not the next.

Importantly, in this debate, the Typhoon is providing huge and adaptable capability today. As one of the world's leading fighter aircraft, it guarantees our ability to control our own skies; last year, for example, our quick reaction fighter-force was scrambled on just under one hundred occasions to intercept unidentified aircraft entering the UK's airspace including, within recent weeks, renewed incursions by Russian bomber and maritime aircraft. But the Typhoon also has an impressive and expanding, precision ground attack capability that is utterly relevant to current counter-insurgency operations and, just like the Tornado, also has the ability to use its sensors to provide, high resolution, full motion imagery of action on the ground, data-linked to troops in the field, providing a critical, real-time, ISTAR capability as well. The interest that is being shown in Typhoon by other air forces around the world indicates its value: they realise that this level of capability is essential, when states such as China and Russia are exporting very capable, fifth generation fighter aircraft and sophisticated, 'double-digit' SAMs across the globe, often to states and albeit, indirectly, in the case of shoulder-launched SAMs to non-state organisations representing a tangible threat to future global security and our freedom of movement in potential hotspots in which UK forces may have to operate.

The Strategic Environment

I've spent some time discussing the implications of our recent operational history, and offering some thoughts about how this background highlights some key characteristics and requirements for shaping our future capabilities and force structure. However, defence clearly doesn't exist in a vacuum so let me turn to some of the broader challenges currently facing us. While it's tempting to think that we're living through uniquely difficult and demanding times, this particular occasion today reminds me vividly of the problems that faced Lord Trenchard in 1919 and which were so well captured nearly thirty years later when Air Chief Marshal The Lord Tedder wrote:

'We British are often accused of preparing for the last war, or even the last but one war. The rate of technical development is now so rapid, and the effects of changes in techniques so far reaching, that it may well be fatal to lag behind. For our own security we must think in terms of modern war. The last war is not modern it is out of date!'

We are not in the same parlous situation now, but defence in general is facing some compelling strategic questions and drivers. I would suggest that there are two factors in particular that will have a profound impact in the years ahead:

The first is the pressure imposed by our involvement in Afghanistan and the legacy of what – for the RAF at least – was nineteen years of unbroken combat operations in Iraq. Quite rightly, our main effort today is in support of current operations in Afghanistan and this remains our overriding priority and largely drives our contemporary planning and activities. This is a 'war', a comprehensive campaign that we cannot afford to lose: for reasons of own national security that is, and because of the potential impact on our national standing and credibility across the globe, not least, because of the implications for the future role and employment of NATO and other coalitions of 'The Willing'.

The consequences of failure for the credibility and reputation of the United Kingdom's armed forces and indeed, on the perceived utility of military force as a lever of national and international power, should also not be underestimated. One of the deeper, and potentially more troubling, implications of our experience in Iraq and Afghanistan is their impact on a generation of the populous that may now be convinced that military operations are prohibitively expensive in every sense: politically, financially and in human terms. The press and public reaction to the casualties suffered during Operation Panther's Claw in July and August this year, and the media focus on Wootton Bassett, and the continuing actual and potential impact of coroners' inquests all illustrate the point amply.

But I remain convinced that there will always be occasions when military force is the appropriate tool, if not indeed the only option, to deal with particular crises and that - whatever their preferences and prejudices - future decision-makers will have no choice but to use it in certain circumstances. Therefore, it is the duty of all of us involved in defence – and again, I am conscious of the role that RUSI plays here - to engage with opinion formers and decision makers more generally - to help to build their understanding of the military lever, so that they can provide a more compelling explanation to the public of the rationale - and legitimacy – for the use of force when it is appropriate. This is the only way that we can begin to repair the relationship between that familiar Clausewitzian trinity of the government, the people and the military, and re-build the popular consent that will be necessary for future interventions.

As the military, we have our part to play in ensuring that we continue to adapt, so that we can provide the most relevant and useful defence and security capability as a policy tool. Here, air power is particularly important, because if - and this is absolutely critical - if and only if we can continue to secure and maintain control of the air whenever and wherever the Government commit the armed forces, we will have the freedom to offer different options to our leaders. In some circumstances, these may include alternatives to the deployment of major land forces, and the political commitment, and cost in blood and treasure, that this will always result. We should not forget, for example, that the air policing of no-fly zones over Iraq by the USAF and RAF, and for part of this time the French Air

Force, neutered Saddam's regime as a regional threat for eleven years, without the loss of a single Coalition life, and at the combined relatively low cost of less than a \$1 billion dollars a year.

Even where a significant presence is required on the ground, air power can act as a force multiplier to dramatically reduce our exposure within the construct of a joint campaign. General Karl Eikenberry, the Commander Combined Forces Command Afghanistan in 2007, made exactly this point when he wrote:

'Without air and space power, 500 to 600,000 troops would be needed in Afghanistan to achieve the same effects as the 40,000 soldiers, sailors and airmen we have there today. Air and space power provides the asymmetric advantage over the Taliban such that no matter where they choose to fight, coalition forces can bring to bear overwhelming firepower in a matter of minutes. Moreover, putting 500 to 600,000 troops into the country may achieve the same military effect, but it could have a negative impact on the population; such numbers could appear as an occupying force, rather than a security assistance force. In short, there is no substitute for effective air and space power.'

This last point is of course particularly key. Ideally, the 'boots on the ground' required in counter-insurgency operations will eventually be provided by indigenous suitably trained forces, as these will be more sensitive to local conditions and often more culturally acceptable than foreign forces who may be portrayed and perceived as occupiers or invaders. Air power can be used to provide the supporting, high-end, technological capabilities, such as ISTAR and combat air that are more difficult and take longer for local security forces to develop.

The second strategic driver currently challenging defence is, of course, the economic downturn and its social and political consequences. Although there are encouraging signs that the economy may be bottoming-out, the long-term impact on the national exchequer has been significant and defence spending will have to compete with other government departments in what the shadow chancellor, George Osborne has described as an 'age of austerity'. While I would not wish to second-guess the outcome of any future comprehensive spending review, most analysts predict that whole government spending will have to fall in real terms by about 10% in the six years to 2016/17. Whatever political choices are made in the future, it is clear that defence will need to take account of the consequences of a fiscal squeeze, and this means that some extremely difficult decisions will have to be made.

Consequently, I welcome the defence Green Paper and look forward (as much as is possible!) to a subsequent Defence Review. We now have the opportunity to engage in a debate – which I firmly believe must be as wide-ranging as possible - to define what the United Kingdom's future role in the world should be, what contribution defence should make and what resources the Nation is prepared to commit to delivering this vision. We must also continue to resource the absolutely critical insurance policy – the so-called standing defence tasks - that underpin the first priority of any government, that of protecting its people. Only then can we sensibly determine the size, shape and structure of our forces. RUSI has already made an important contribution in this vital area through the ongoing programme of conferences it is running to address exactly these issues. However, I believe that this discussion is too significant to be confined just to the military, policy-makers, media commentators and academics; it must be held in the wider public too.

There will be some critical questions that we cannot afford to shy away from. These range from the future scale, readiness and nature of military forces over the next ten years or so that the nation is prepared to train, deploy and sustain, through the affordability of some of our planned major defence procurements, to our role in multinational operations and the nature of our defence relationships with both the US and Europe. We also need an honest assessment of what constitutes the 'credible military threshold' that is required

to give us the level of influence in various forums that we believe is critical to the UK's right to have a seat at the particular international tables.

Imagination and innovation will be needed to maximise the capabilities that can be provided. For example, the radical partnering arrangements with industry that we have adopted to support our aircraft fleets are on track to yield some two billion pounds worth of savings over the next five years. This demonstrates what can be done with a real will to embrace change and a genuinely innovative approach, but implementing this degree of revolutionary change has not been simple or easy, either in terms of our people, our processes and our potential ability to respond to unforeseen requirements and as someone once said, 'events, dear boy, events'! This may mean that we have to accept having fewer fleets of aircraft, vehicles and ships and using some of them, such as our larger Air Transport aircraft, in what might academically be judged inefficiently at times. However, the major cost driver in equipment terms is the through-life costs and that means that having fewer individual fleets is much more cost-effective than salami slicing each fleet. I would hope - and expect therefore - that there will be a similar appetite for decisions, some of which will be painful but necessary, across the rest of UK defence, if we are to wring the most out of every last defence pound.

Similarly, our Future Strategic Tanker and Transport Aircraft programme is another ground-breaking, world-leading initiative, which aims to deliver affordable capability through a joint military-civilian enterprise that will share spare capacity with the civilian sector, necessitating operation by a mix of service and reservist personnel. Again, there is a whole raft of issues that will need to be addressed as the programme is implemented, but – as I've emphasised already - we must be prepared to continue to adapt, if we are to deliver critical relevant capabilities that otherwise would simply not be affordable.

I believe that a truly comprehensive defence review must also consider the wider military contribution to the security of the UK homeland, especially within the context of the National Security Strategy. At this stage, with a nod to Lord Trenchard again, I should point out that it was the threat of air attack, at that time on Great Britain, which ultimately led to the formation of the Royal Air Force as an independent service, following the publication of the Smuts Report some ninety-one years ago. This still remains our *raison d'être* – albeit, no longer exclusively in the UK - and I've already mentioned the activities of our Typhoons on quick reaction alert both in the UK and, later this week, they will be beginning this task in the Falkland Islands. While maintaining the integrity of the United Kingdom's airspace will continue to be our most important task, not least during the London Olympics in 2012, I believe that there are other - and broader - ways in which the RAF can play a meaningful part in homeland security, notwithstanding the cultural, legal, historic and constitutional constraints that will have to be overcome.

The Pre-eminence of Information: the only Certainty of an Uncertain Future

I've made it clear why air power matters to defence, and explained how a capable air force, with a balanced spread of capabilities, is essential in providing the United Kingdom's armed forces with an edge in combat operations not just in war-fighting but across the entire spectrum of operations from deterrence to conflict. I've also highlighted some of the strategic factors that may affect the delivery of this capability. I'd now like to drill down into a little more detail, by offering some thoughts about how we can secure, enhance and exploit this asymmetric advantage that air power can deliver.

As I've explained, air power is capable of, and must be prepared to, provide a broad spectrum of military response options to counter potential state and non-state adversaries, who are themselves likely to be equally agile, adaptive and innovative in often unexpected ways. Consequently, we must be able to take advantage of fleeting opportunities, and future combat success will depend almost entirely on our ability to make effective decisions, at pace, in an uncertain and complex environment. Network Enabled

Capability – NEC – is by now a far from new concept; in fact, it has almost become a cliché, but I will suggest that it remains the key to securing air power's and our broader military and security advantage in the future.

The provision of accurate and timely information has always been critical to the success of any military activity. Although in itself, this cannot guarantee victory, history suggests that victory is impossible without it. Equally, information overload, where commanders are deluged with information, but starved of real knowledge, must be avoided. We have made some promising progress in both these areas. In Afghanistan, investment in information and communications technologies has enabled air command and control mechanisms to be developed that have permitted us to employ kinetic and non-kinetic effects at a high tempo, and across all levels of the operation. This has allowed us to be much more flexible in the way that we use capabilities so that, for example, what were previously considered to be purely strategic assets, such as NIMROD R1 SIGINT aircraft, have often been employed to support tactical engagements right down to platoon, or even section, level.

However, while these networks have provided situational awareness, the complexity of the situation on the ground, where clan and family allegiances mean that each village may require a campaign in its own right to secure, means that commanders increasingly require shared situational understanding. Moving from awareness to understanding implies knowledge of motivations, fears and perceptions as much as force dispositions, capabilities and intentions; this cannot be achieved purely through the technical collection of intelligence, but requires a much more comprehensive fusion of information from all sources. I believe that the RAF is uniquely well-placed to take centre-stage in this process, because we have operated in a 4-dimensional battlespace for many decades, where NEC, and information management, have always been a key feature.

This means that our people are steeped in a tradition which promotes an intuitive and instinctive awareness of the importance of information, the potential of networks, and an understanding of their operation. This week is, of course, the anniversary of the Battle of Britain and next year will see the seventieth anniversary of that battle, and of the vindication of Fighter Command's integrated air defence system – itself based on a networked concept dating back to 1917. This critical system of systems remains a classic example of the way that data - from Radio-Direction Finding (radar) stations and Observer Corps posts – was collected, filtered, fused, analysed and disseminated, in this case using a network of land-lines and ground-to-air radio. The result was to enable air command and control and efficient battlespace management through shared situational awareness, providing battle-winning even war turning decision superiority for Dowding and Park - the two principal RAF commanders - and their battle staff. Of course our current Air Defence Ground Environment is a lineal successor of the 1940 system, but has been many times upgraded.

During the early stages of Operation Enduring Freedom, the RAF was involved in the first attempt in history to create a truly comprehensive and persistent Intelligence, Surveillance and Reconnaissance (ISR) umbrella, providing an 'unblinking eye' capable of detecting all enemy activity. This was formed by a constellation of overlapping, multispectral, manned and unmanned air and space-based sensors, including our own E3-D, NIMROD R1 and Canberra PR9 reconnaissance aircraft at the time.

The RAF has built on this experience by developing our potential to exploit NEC. As I speak to you today, RAF REAPER unmanned aircraft, while ostensibly engaged in the direct tactical support of land forces using secure data and video links twixt soldier and pilot operator, are also at the same time being cued onto emerging threats by wider search assets such as the ASTOR system or NIMROD surveillance aircraft: the analogy here is searchlight to flashlight to spotlight. This sort of integration increases the utility of particular systems and the potential of other systems such as the soon-to-be-introduced Watchkeeper to contribute to this operational level knowledge is significant here.

It is exactly this kind of evolutionary approach that we are developing to meet contemporary challenges, not least in increasing our contribution to the counter-IED battle, which you will be only too aware is a real focus for current work inside and outside Ministry of Defence (MoD). Coalition and RAF air platforms are being increasingly integrated and cross-cued to down-link, process and disseminate vital information including change-detection imagery, Full Motion Video and near-real time radar data on a common bearer for easy access. This shared information is enhancing responsiveness today and has much more promise, so that officers can use this tool not only to respond to what is happening, but also as importantly by involving air-minded individuals in planning, for example, convoy missions.

This illustrates that the importance of NEC for the RAF is not just in the development of enabling networks, or the interconnected application of air power per se – I've described how we've already been operating in this manner for many years now. Rather, it's in the potential that it now provides for us to fully integrate and synchronise our capabilities and activities, at speed, in the Joint environment, with other government departments and agencies and with coalition members to achieve a shared understanding.

With its ability to be stealthy when required, the Joint Combat Aircraft will be able to conduct air-to-air, air-to-ground, close air support and ISTAR missions in passive or heavily defended airspace. The need to deliver air power support to tactical ground assets against a fleeting target will be instantaneously evident and rapidly coordinated, with mission changes to Air Tasking Orders replicated across the joint battle-space and immediately available for visualisation on the Common Operating Picture. The latest imagery, derived from say land-controlled tactical UAVs will be readily available, on and via the air tactical network, to the JCA cockpit and weapons system. This will enable fleeting and constantly moving targets to be found, re-acquired and tracked whilst threats are simultaneously avoided and suppressed. With positive target identification established, this does of course require a degree of coordination with an efficient joint targeting process for the aircraft to be authorised to engage when the pilot assesses that ROE collateral damage constraints have been mitigated. Follow-up battle damage assessment conducted by airborne sensors will be made available in near-real time for assessment by the command chain.

This sort of scenario is well within the limits of what is pragmatically possible in the near-term future, and illustrates how an evolutionary NEC approach can unlock the true potential of air power to deliver an agile and adaptable asymmetric advantage in combat. However, there is one note of caution that I should sound: as our reliance on networks increases so, clearly, does our susceptibility to both Computer Network Attack (CNA) and Exploitation (CNE). Indeed, in a world where information is becoming a capability in its own right, it could quickly become a critical vulnerability. This threat is dynamic and proliferating, and the RAF is taking it very seriously. Working with the MoD Chief Information Officer and his counterparts in other Government Departments, we are already operating a Computer Network Defence (CND) capability in parallel with the successful delivery of NEC, identifying and addressing threats as early as possible during the capability process. Cyber warfare is a reality today and we must invest appropriately if we are to continue to be able to build and rely on our networks and computer based decision matrices.

Conclusion

I've covered a lot of ground, from the strategic drivers and the context provided by our recent operational experiences right down to some of the tactical detail. Much of this, and the rest of our current thinking about the employment of air power, is encapsulated in the new edition of AP3000 – British Air and Space Doctrine. This substantial new edition will be launched formally here at RUSI in the next few weeks, but it's already available online, at the RAF and the RAF Centre for Air Power Studies websites. This new edition aims to demystify air power by describing it in simple, jargon-free language, explaining its utility in terms of just four key roles: control of the

air; air mobility and lift; intelligence and situational awareness; and attack. The emphasis is on how air power can contribute as part of a comprehensive, inter-agency, approach to operations, set within a framework of Joint Action.

While the new edition of AP3000 codifies a change in emphasis, it's apparent to me that the principles that underpin the RAF's delivery of the UK's air power were equally evident in Lord Trenchard's day. We often forget that his vision was for an independent air force, rooted in the concept of expeditionary warfare and the inherent jointness of air operations, stemming from his experience of the Western Front, and that he was very eager to embrace new technology as it emerged. Above all else, he had a deep-seated belief that the RAF's success would depend on its people. In all these respects, as I hope I've made clear, little has changed. The outstanding and highly courageous performance of RAF personnel, particularly those aircrew flying Royal Air Force Support Helicopters such as the Chinook and RAF Hercules aircraft and RAF Regiment Gunners working on the ground to provide the essential force protection specialist capability at the precious and critical airheads, bear witness to this everyday in Afghanistan. If the RAF is to continue to deliver an asymmetric advantage to the United Kingdom's combat and security operations, it needs to continue to be able to 'cash that cheque that Defence has signed it up to' and to be able to deliver the necessary air power in the future. To that end it is vital that the Royal Air Force continues to be capable, cost-effective and adaptable. But it can only do this, if it recruits, trains and retains physically and morally strong men and women with the innate courage and agility to adapt to a dangerous, complex and dynamic environment, especially as the information domain becomes increasingly pervasive.

The tradition established by Trenchard means that the RAF is culturally and technically adept, and that our people are intuitively comfortable working in the 'information space'. This, I believe, will be central to our success in the future, as we prepare to adapt to the new challenges that will face us, including cyber threats.

The last nineteen years of continuous combat operations has seen the RAF transform while 'in contact' with adversaries. Although it may be a smaller air force than the one that I joined, its ability to deliver battle-winning asymmetric combat air power has never been greater. I am proud and deeply honoured to lead an air force that is far more capable, combat-experienced and cost-effective across the whole structure than it has relatively been perhaps at any time in its history and certainly since the end of the Second World War.