‘The Future of British Air and Space Power: A Personal Perspective’

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We are shackled by the past and never has the future been more difficult to divine. What we must do is to quite ruthlessly discard ideas, traditions and methods which have not stood the test… each of the fighting services must go for speed, mobility and economy, and develop the whole time with an eye on the other two members of the team in co-operation, not in competition.

Marshal of the RAF the Lord Tedder, Lee Knowles Lecture, 1947

Introduction

Lord Tedder's prescription for a 'united, efficient and economical armed force',[1] set within a context of fiscal stringency and strategic uncertainty, seems as relevant today as it was when he was speaking in 1947. In 2010, the United Kingdom will arguably reach a crossroads, where the defence green paper and the security review that is likely to follow a general election will force us to define our national level of ambition and determine our notion of Britain's place in the world. Inevitably, this will have significant implications for the size, shape and structure of our armed forces. Given this background, I feel it is important to provide a perspective on what this challenging strategic environment means for British air and space power, and set out my vision of the role that the Royal Air Force should play in the future security of the UK.

The Strategic Environment

Defence is currently facing two compelling strategic drivers: the first is the impact of ongoing operations in Afghanistan; the second is the pressure on government spending resulting from the global economic downturn.

Afghanistan, quite rightly, remains our main effort and the RAF's overriding priority. This is a war that we cannot afford to lose: for reasons of own national security, because of the potential knock-on effect on Pakistan and the concomitant effect on the diaspora in the UK; because of the consequences for our relationship with our most important ally, the USA; and, not least, because of the implications for the future of NATO. More broadly, I am also conscious of the impact of current operations on the credibility and reputation of the armed forces and indeed, on the popular perception of the utility of military force as a lever of national power. One of the deeper and more troubling legacies of our recent operational experience is that although at one level, public support for the military is very strong - witness the homecoming parades and the continuing media focus on Wootton Bassett - this may mask a lack of genuine understanding and there could now be an underlying belief that military action is too expensive - politically, financially, and in human terms - to be contemplated as a serious future policy option. The public reaction to the casualties, suffered during Operation *Panther's Claw* in the summer illustrate the point.

But this perception, if it does exist, is misguided. In some circumstances, military force will be the only tool of national power that is appropriate. Consequently, those of us involved in defence must engage the public more proactively, to help build a deeper understanding of the military and to explain the rationale for and legitimacy of the use of force. We in the RAF must also play our part by

continuing to adapt so that we can fulfil our mission: to project relevant and superior military air and space power to, if necessary, fight and win to protect the UK's vital interests. 2009 is the 200th anniversary of Charles Darwin's birth; a timely reminder of his famous assertion that:

It is not the strongest of the species that survive, nor the most intelligent, but the most adaptable.

We must adapt if we are to continue to provide a relevant and useful defence capability to policy-makers and here, the innate characteristics of air and space power are a real strength. Air power's reach, flexibility and ubiquity mean that if - and this is an absolutely critical prerequisite - if we can secure control of the air, we have the freedom to offer viable alternatives to the commitment of major land forces with the heavy cost that this invariably entails. We should not forget, for example, that the air policing of no-fly zones over Iraq by the USAF and RAF neutered Saadam Hussein's regime as a regional threat for eleven years, without the loss of a single coalition life, and at the combined cost of $1 billion a year. In contrast, the USA has suffered well over 4,000 service deaths since the start of major land operations in Iraq in 2003, and the financial cost has averaged $12.5 billion every month.[2]

Even where a significant presence is required on the ground as part of a joint campaign, air power is able to act as a force multiplier to dramatically reduce exposure. Ideally, the 'boots on the ground' required in a counter-insurgency operation will eventually be provided by indigenous forces after suitable training, as these are sensitive to local conditions and often more culturally acceptable than coalition land forces that can be easily portrayed as an alien, invading army. Air and space power can then be used in a more discrete manner, providing the higher-end technological capabilities, such as Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) capabilities that are difficult for local security forces to acquire and develop.

The second strategic driver is, of course, the economy. Defence will have to compete with other government departments in what George Osborne has described as an 'age of austerity'[3] and while I would not wish to second-guess the outcome of any future spending review, most analysts predict that whole government spending will have to fall in real terms by about 11% in the six years to 2016/17.[4] Whatever political choices are made in the future about governmental priorities, it is clear that defence will need to take account of the consequences of a fiscal squeeze and as a result, some very difficult decisions will have to be made about our future force structure and capabilities.

Consequently, I welcome the impending defence green paper - and the likelihood of a subsequent defence and security white paper - as an opportunity to engage in a national debate about the role that the UK sees itself playing in the world, so that we can understand both the contribution defence will be expected to make, and learn what resources the nation is prepared to commit to fund this vision. Only then can we make sensible decisions about capabilities and future force structure. This means that, inter alia, we will

have to decide what military tasks are non-discretionary - for example, I would suggest that it would never be publicly acceptable to cede primary responsibility for the air defence of the UK to an ally or alliance - but also, what spread of other military capabilities are required over and above this threshold, to buy the level of influence we determine that we need internationally, particularly within coalitions and alliances.

Any white paper following the general election next year is likely to review security in the round, rather than concentrating on defence alone. Consequently, we must be much more forward-leaning in understanding and developing our capability to provide what Joseph Nye has termed 'smart power', rather than just 'hard power'.[5] I would contend that air power has always provided much wider influence beyond coercion based on the delivery of kinetic effect, but we have never been particularly good at articulating our ability to contribute 'soft power' capabilities, because of our traditional emphasis on the harder edge of the air power domain. However, we must give serious consideration to the ways in which we can contribute to the security of the UK more broadly, especially within the context of the recently published second edition of the National Security Strategy.[6] I have already mentioned the air defence of the UK, and this remains an essential task: the London Olympics in 2012 will throw this particular requirement into sharp focus. But I believe there are many other ways in which the RAF can play a more significant role in the wider security of the nation, notwithstanding the cultural, legal and constitutional constraints that will have to be overcome.

A Language and Lexicon of Air Power for the Twenty-First Century

Understanding and articulating the vital contribution that air and space power can make across the whole of the defence and security sector is therefore important, especially at this particular moment in our history. But this is challenging, when the RAF has been primarily operating in support of land-based, counter-insurgency campaigns for the last six years. While air power has been absolutely essential - in fact, none of these operations could ever have been contemplated without it - because of the understandable focus on operations on the ground, the critical contribution of the air component is in danger of being overlooked. The lay observer may be able to understand intuitively what a soldier is doing, when he or she sees media imagery of a foot patrol moving through a village in Afghanistan.But because it is largely invisible and therefore intangible, they will almost certainly not realise or understand those soldiers' total reliance on air and space power, from the Chinook that inserted him into the zone, through the persistent ISTAR he is receiving from a constellation of air and space assets, to his assurance of on-call, heavy firepower support from combat air elements 'over the horizon'.

As airmen, we have not always helped ourselves. We are fascinated by technology, and this makes it easy for us to get caught up in the jargon and acronyms that are part and parcel of our profession. This has

sometimes made it difficult for us to understand each other properly, let alone explain air power's utility to soldiers, sailors, politicians and other decision-makers. Consequently, all of our major doctrinal publications have now been reviewed to provide the basis for a simpler and more coherent conception of air and space power centred on just four, vital roles.[7] These make sense and are easy to explain and understand; it means we will all be equipped to give air power a much clearer and more credible voice in the ongoing defence and security debate.

The Four Air and Space Power Roles

The fundamental roles are: Control of the Air and Space, Air Mobility, Intelligence and Situational Awareness and Attack. Together, they explain how air and space can be used 'to project power to influence the behaviour of people or the course of events'.[8] The key here is to understand how the air power roles can be used holistically to create influence - and invariably, as part of a joint campaign within an inter-agency, comprehensive approach to crisis resolution.

Control of the Air and Space remains the most important role of any air force. The RAF was established as the world's first independent air force ninety-one years ago to maintain the integrity of the UK's airspace, and this remains our most important responsibility today. Equally, when we deploy on expeditionary operations, Control of the Air is critical, because it guarantees freedom of manoeuvre for the entire joint force, while denying it to our adversaries. We only need to recall the images of *Sir Galahad* burning at Bluff Cove during the Falkland Conflicts in 1982 to understand the consequences of a failure to secure control of the air on expeditionary operations. Our adversaries will always contest our freedom to use the air, even if - like the Taleban - they do not possess an air force. Instead, they will use small arms fire and rocket propelled grenades against slow-moving aircraft and helicopters, booby traps and mortar attacks on our airfields, or even propaganda about civilian casualties to attempt to deny our freedom to use air power - our own asymmetric advantage - as we choose. There is a danger that it is generally perceived that the current level of Control of the Air that we enjoy can be assumed. This is a mistake; Control of the Air will always be contested, and we will always have to fight to maintain it, and sometimes in unexpected ways and in unexpected arenas, such as within the information domain.

The second air power role is **Air Mobility and Lift**. This has been critical in recent operations in Iraq and Afghanistan. Without strategic air lift - enabled, of course, by Control of the Air - it would have been impossible to deploy and sustain our forces in theatre in the first place. And on a day-to-day basis, tactical lift, provided by support helicopters and Hercules transports, means that we can still move our forces around freely, even when movement on the ground is difficult, either because of the terrain or the threat of road-side or suicide bombs. Air lift is a real force-multiplier, because it means we can operate effectively with far smaller ground forces than would

otherwise be the case, especially as air power also provides the heavy firepower that would have to be generated by artillery and other land-based systems. Finally, in the context of counter-insurgency operations, air lift operations can be as important, in terms of influencing the overall course of the campaign, as more 'traditional' uses of air power. Flying a regional governor to a *Loya Jurga*, or moving an Afghan Army *Kandak* back to its home province for leave, are good examples of the unglamorous, but absolutely essential, contributions that air power is making towards establishing proper governance in Afghanistan.

The third air power role is **Intelligence and Situational Awareness**. Military action has traditionally been explained as four functions: Find, Fix, Strike and Exploit. In the Cold War, 'Find' was relatively easy, as it was difficult to conceal an entire Soviet Shock Army. The problem was to 'Fix' and then 'Strike' it, when it was protected by a sophisticated, Integrated Air Defence System (IADS). So we invested heavily in Control of the Air and precision strike capabilities to do just that. As a result, modern western air forces now have the ability to attack targets very precisely, whatever the weather. In recent, conventional 'force-on-force' conflicts, such as the wars against Iraq in 1991 and 2003, air power has become the prime tool of military force, with the land component effectively fixing the enemy to be struck and destroyed in detail from the air. This primacy has been acknowledged across defence; the decision to restructure the British Army into lighter, more uniform brigades, breaking up traditional mechanized and armoured formations, was taken on the basis of the assurance of air support - and this assumption, the cheque that air and space power is expected to be able to cash, should be acknowledged and taken into account in future discussions about force structure.[9]

The overwhelming advantage conferred by modern air power has obviously driven the asymmetric approaches adopted by insurgents in current operations. The problem is now very different: although we can 'Strike' very effectively, the challenge is to 'Find' exactly where we need to apply force, when our enemies are elusive and fleeting, and often operate in a boundless and borderless battlespace 'amongst the people'. If commanders are to formulate sound military plans in this environment, they need to build their awareness through access to the most comprehensive, all-source, intelligence picture possible. Consequently, the RAF has invested heavily in the 'Find' function over the last decade, procuring a wide spectrum of collection capabilities. At one end of the scale, we have acquired a 'non-traditional' ISTAR capability by fitting high-resolution targeting pods to combat air elements, such as the Harrier, Tornado and Typhoon, which can be employed to produce 'pattern of life' full motion video, data-linked in real time to forces on the ground. And at the other, we have invested in specialist systems, such as the Reaper Uninhabited Air System (UAS) and ASTOR wide-search stand off radar, which are both currently being used to huge effect in Afghanistan.

The challenge is to use these impressive collection capabilities

to their full potential by directing them, analysing the data gathered and disseminating the intelligence produced as effectively as possible, and this is the focus of our current efforts. Our ISA capability can only be fully exploited if we use a developing Networked Enabled Capability (NEC) to build a truly comprehensive intelligence picture, fusing data from all sources. For example, in Afghanistan, wide area search assets, such as ASTOR, are routinely used to cue fast jets with high-resolution, but narrow field of view, sensors on to points of interest for tactical exploitation; the analogy is searchlight to flashlight to spotlight.

Attack - precise, proportionate and discriminate - is the final air power role. Attack may be non-kinetic as well as kinetic, and an opponent's will or understanding may be attacked as effectively as his physical capabilities. For example, on many occasions in Afghanistan, the frightening and disorientating effects of a 'show of force' - a low and extremely noisy fly-past by fast jets - have been hugely effective in dispersing a mob or buying time for own forces to act, especially in those circumstances when it would be inappropriate, or counter-productive to use heavy weapons, because of the danger of civilian casualties or collateral damage. Attack remains one of air power's most important roles and our demonstrable capability to hold an adversary at continuous risk is an important aspect of deterrence and coercion; it provides a key component of the UK's 'hard power' capabilities, which are necessary to underpin the 'soft power' tools that form part of a whole-government approach to crisis resolution.

The Pre-eminence of Information and the Growing Importance of Space

All current trend forecasts emphasize the increasingly fragmented and disparate nature of conflicts and crises. In the coming years, the UK will need to deal with a multiplicity of sub-state threats and actors, but may also have to confront traditional states with similar high-technology capabilities to ourselves, either directly or through proxies in 'ungoverned spaces'.[10] Our adversaries in this future battlespace - both state and non-state - will therefore be highly agile, and are likely to have access to sophisticated capabilities. In this sort of environment, 'time is a weapon', and we need to respond by leveraging air power's potential to exploit the fourth dimension so that we can operate within our opponents' decision cycle. This is critical, as opportunities are likely to be fleeting, and we must be ready to take advantage of them as they arise. Future success will therefore depend on effective decision making, based on accurate and timely information, underpinned by the agility delivered through flexible and adaptive capabilities. In particular, space and cyber-space will become increasingly important to all military operations, and I would contend that the RAF's core values as an institution make us particularly well-suited to lead defence in the exploitation of these domains.

The provision of accurate and timely information has always been critical to the effectiveness of all military activities, and the importance of the information domain will only increase as societies become more networked.

The exponential growth in the availability of information means that we must understand how to deliver and protect our national interests - which may depend as much on perceptions as on hard realities - in the cyber domain. This means that we must grow a cadre of people who understand and can manage the modern networked environment, and are comfortable with the concept of treating information as a capability in itself. Here, our organizational culture is a real strength: the RAF is steeped in a history of information management and network operation, and this is a domain that we find intuitive. Fighter Command's air defence system during the Battle of Britain was a classic example of early NEC, where information from radar and observers was collected, processed, fused and disseminated to provide battle-winning decision-superiority to Park and Dowding, the two primary RAF operational commanders. This tradition of networking, driven by the particular requirement of air operations for timely information, has continued to the present day, forming the basis, for example, of the strategy that is being developed to create the best possible intelligence picture to counter the proliferation of Improvised Explosive Devices in Afghanistan.[11]

Consequently, one of the greatest challenges presented by NEC for the RAF is not the concept of enabling networks itself, or even the interconnected application of air power, as we have been operating in this manner for many years, but rather improving our ability to fully integrate and synchronize our capabilities, at speed, with the other services, government departments and coalition members that we will encounter within the comprehensive approach. Additionally, as we enhance our own network capabilities, so we increase our susceptibility to computer network attack[12] and computer network exploitation;[13] indeed, in a world where information is pre-eminent, it could also quickly become our critical vulnerability. Set against a backdrop of a dynamic and proliferating threat,[14] an effective computer network defence[15] capability is therefore essential. This means identifying and addressing risks as early as possible in the capability development process, while developing tactics, techniques and procedures to provide resilience where networks are contested or compromised.

Space is similarly vital to both our military operations and wider society. All nine sectors of the UK's critical national infrastructure[16] depend to a greater or lesser extent on space and networked operations, and there is a growing awareness across government of what a 'bad space day' might look like, in terms of both military effectiveness and the economic viability of the UK as a functioning state. Up to 90% of all military capabilities depend on space, from surveillance to navigation and targeting and, most fundamentally, the accurate position and timing functions which are vital to nearly all of our activities.[17] Inevitably, we will have to continue to rely on alliances and partnerships for access to space, leveraged through influence and specialist knowledge - the US's freedom of orbit is particular important in this respect - but prudence dictates that we cast the net

as widely as possible to guarantee the access we require, and also remain open to the technological developments that may offer the means for us to acquire an affordable indigenous space capability - nanotechnologies enabling small satellites are one example. What is certain is that despite treaty constraints, space will become an increasingly contested domain, and we must develop a concept of operations to deal with this. The US's Operationally Responsive Space Initiative provides one potential model for how flexible space capabilities may be delivered in short timescales in such an environment.[18]

The Future of British Air and Space Power

I have provided a personal perspective of the current strategic environment and its consequences, and outlined what I consider to be the key issues pertaining to the four air and space roles. I have also indicated why space and cyber will play an increasingly significant part not only in UK military operations, but also in the essential infrastructure of national life. I suggest that this all demonstrates that air and space power is more essential to defence than it ever has been before, either as the prime agent of force in conventional warfare, or as the key enabler in counter-insurgency operations; and that it will have a growing part to play across the wider security sector, especially in the space and cyber domains. But how can we develop our capabilities and continue to provide superior and relevant military capability in an atmosphere of real fiscal stringency? The answer lies in our vision of 'an agile, adaptable and capable twenty-first century Royal Air Force' - but I would like to unpick this strap-line to tease out what it really means in practice, before offering my thoughts on our path into the future.

It is clear that we need to balance our force structure so that we can deliver relevant capabilities across all four air power roles; and in the space and cyber domains too. Accomplishing this will not be easy, because of the variety, unpredictability and uncertainty of the threats we will face in the future. This is where agility and adaptability - in our equipment and in our people - will be vital. We must continue to seek out innovative solutions if we are to deliver affordable capability, and the novel partnership arrangements we have developed with industry to sustain our aircraft fleets, and on projects such as the future tanker and strategic aircraft programme, indicate how substantial savings can be made - although the implementation of these structures has required real commitment to overcome the sometimes painful adjustments required of our people and for our processes. However, I am absolutely determined that the traditional excellence of our flight safety regime is not compromised by the adoption of any of these initiatives; the twin pillars of airworthiness and flight safety lie at the core of the RAF's operational effectiveness and they must be given the attention they deserve, above all other considerations.

One of the RAF's enduring institutional strengths is its readiness and capacity to embrace emerging technologies and, in the relatively

near-term, technical solutions are in prospect that may offer ways for us to square the circle between capability and cost. For example, the development of simulated and synthetic training technologies will enable us to enhance the quality of the learning experience while, as a by-product, driving down the cost - not least the environmental impact - of flying training. More fundamentally, the emergence of directed energy weapons may mark a revolutionary step-change in air power capabilities, potentially offering a low collateral alternative to the employment of more traditional and very expensive capabilities, such as low observable or stealthy platforms, as a means of, for example, securing control of the air by taking down a sophisticated IADS in conjunction with cyber-attack.

Consideration of a balanced force is not, therefore, just a question of numbers of platforms and the proportion of fast jets to helicopters or transport aircraft. Instead, it is the overall balance of capabilities. The key areas we need to take a judgement on include the balance between manned and unmanned systems; capability versus mass; directed energy weapons in relation to low observable or cyber capabilities; high technology versus low technology; and Intelligence and Situational Awareness against Attack, the traditional 'Find-Strike' debate I described earlier. In all probability, none of these issues are 'either-or' choices. For example, UAS will contribute significantly to our future capability; they offer a very attractive and cost-effective option for 'dull, dirty and dangerous' tasks at minimal risk to their operators, and with impressive persistence. However, within the bounds of near-term technology, manned aircraft retain significant advantages in terms of speed, payload, flexibility, discrimination and situational awareness over UAS and their remote operators. Additionally, the legal and ethical implications of UAS operation in civilian controlled airspace, and the role and status of their operators, are all important concerns that are yet to be fully resolved. Nevertheless, as the subject matter experts, the RAF needs to lead in addressing these issues to ensure the coherence of the UK's UAS capability on a pan-defence basis.

Adaptability can help to resolve force-balance dilemmas and genuine multi-role capabilities - particularly in terms of manned and unmanned Combat ISTAR - mitigate some of the problems. For example, over the last two decades the Tornado has been used in everything from full-blown combat in the Gulf (twice) and the Balkans, through low-intensity air policing over Iraq to its current role as a Combat-ISTAR counter-insurgency platform in Afghanistan. Consequently, I am determined to continue to promote and enhance adaptability by focusing our thinking on the provision of capability in the round, rather than continuing with the more platform-centred approach of the past. This encourages a much more holistic conception of air power and permits us, for example, to see the F35 Lightning as primarily an ISTAR asset, but with hugely effective built-in Attack and Control of the Air capabilities. However, there are limits to the effects that multi-role adaptability can deliver, and we must be wary of putting all of our investment into a small number of highly

capable platforms; this is where the 'capability versus mass' argument comes into play. There is a danger, if we are not rigorous enough in our analysis or try to hedge our bets too far, that we will field a 'middle-weight' force structure, which is too sophisticated to fight low technology insurgencies in a cost-effective manner, but equally, is unable to be completely effective against the high technology equipment that future state adversaries - or their sub-state proxies - are likely to deploy.

So what will the RAF of the future look like? It is impossible - and would be inappropriate - to offer detail of a mooted force structure in advance of a strategic security and defence review, but the direction of travel is clear. I am convinced that the RAF needs to capitalise on air power's ability to acquire and process intelligence, and to strike with proportion and precision. We need to be able to both 'Find' and 'Strike', by continuing to develop a force with Combat ISTAR at its heart - this will be our core future competency. If as a nation, we continue to aspire to contribute to expeditionary operations, then there will be a continuing need to invest in favour of air lift and mobility assets, both fixed and rotary wing. And finally and inevitably, the unmanned element of our capability will continue to grow in importance, notwithstanding the caveats regarding their employment and the necessity for a sensible capability-mix.

In terms of people, the requirement for agility is clear, and this will increasingly demand strategic and operational thinking, in addition to the tactical proficiency that we have excelled at in the past. We need to institutionalise air power education, and nurture leaders who can deal with the complexity and ambiguity of the contemporary operating environment. This demands education, not just training, and will have to be delivered on a through-career basis, from initial air power schooling through to scholarships and exposure to post-graduate learning opportunities. It will be difficult to find the resources to support this adequately, and it will also be difficult to promote a cultural mind-set that properly values education in mainstream career terms. However, this is a necessary change and I am determined to make it happen; initiatives such as the Review of Officer and Aircrew Development and the CAS Fellowship scheme have been important steps in the right direction, but we need to go much further in developing the intellectual capital that is essential to guarantee our future institutional success.

Conclusion

The current strategic environment is extremely challenging. The impact of ongoing operations combined with the bleak economic climate has arguably put defence in the eye of 'a perfect storm'. Yet I remain very optimistic about the future of air and space power - and the service that I am proud and privileged to lead. The RAF's role in current operations is self-evidently vital, while in the future, we are best-placed to lead defence in the increasingly important domains of space and cyber. We must remain alert to the opportunities offered by potentially game-changing technologies, but while we will have to exploit the new and the novel,

we must ensure that we do not fall in thrall to them; there will be no silver bullets. We will continue to field a balanced force, but Combat ISTAR will be established as our core capability and unmanned systems will increase as a proportion of our battle order; this in turn means we will need to determine how to support and sustain this capability, and decide whether we need to establish a specialisation, with its own career structure, to operate it. Finally, our ultimate operational success as a fighting service will continue to depend - as it has done throughout the last ninety-one years - on our agility as an air force, based above all else on the quality and the education of the high calibre men and women who are proud to serve, and ready to meet the future military needs of the UK.

Ten Propositions Regarding British Air and Space Power

In the past, theorists and practitioners have advanced different notions and propositions regarding air power. In closing, I thought it might be useful if I summarised my thinking by offering ten of my own propositions about the future of British air and space power:

- **Air and space power is all about creating influence.** *Air and Space Power provides influence in support of the national interest: this is achieved through a holistic range of effects, including the kinetic and non-kinetic. The inherent flexibility of air power means that it will be a key component in the UK's arsenal of 'smart power' capabilities.*
- **Control of the Air and Space remains the paramount air and space role.** *Control of the Air and Space remains the RAF's first duty in both homeland defence and on expeditionary operations; it will continue to be contested whenever we engage in combat, but in different and unexpected ways to the past, including through information operations, cyber attack and, in the future, by the use of directed energy weapons.*
- **Air and space power is about the provision of capability, not the generation of platforms.** *Air and space power's role is to deliver capability; in the past we have too often focused on platforms. We need to take a more adaptive approach to creating desired effects through integrating and synchronising a range of capabilities and activities.*
- **Time is a weapon: air and space power offers the means to dominate it.** *The contemporary battlespace is complex, congested, and cluttered and opportunities will be fleeting. The inherent characteristics of air power, and its ready access to the information domain, offer the best prospect of creating decisive effect in this sort of environment.*
- **Combat ISTAR will lie at the heart of the RAF's future capability.** *A developing Combat ISTAR capability reduces the requirement for networking and increases resilience while underpinning flexibility and adaptability, thus mitigating force balancing issues. It will be the baseline capability and core competency of our combat air elements.*
- **Unmanned Air Systems are here to stay. UAS are an integral part of**

the UK's air power capability. *As the subject matter experts, the RAF needs to lead in coordinating, developing, supporting and sustaining a coherent and viable UK UAS capability.*

- **Space and Cyber are joint domains, but the air component is best-placed to lead in coordinating the defence effort in these arenas.** *The RAF has the tradition, expertise and people with the capability to lead defence in these two important domains.*
- **Technology and air and space power are synergistically related.** *Emerging technology will be vital in enabling the delivery of affordable and relevant air and space power in the future, but we must not rely on technology as a substitute for ideas.*
- **Agility and adaptability are the key to the delivery of capable, relevant and affordable air and space power in a complex and uncertain world.** *The successful employment of British air and space power in the twenty-first century depends, above all else on the agility of the RAF's people; this demands education, not just training, and we must get serious about investing in it and valuing it as institution.*
- **Network Enabled Capability is critical to unlocking air and space power's potential.** *As the information domain becomes increasingly important, NEC will be critical in fusing and integrating capabilities to unlock the true potential of air and space power.*

Chief of the Air Staff

Notes

[1] Marshal of the RAF the Lord Tedder[1] , *Air Power in War*, London: Hodder and Stoughton, 1947, p. 28.
[2] Joseph Stiglitz and Linda Bilmes, *Three Trillion Dollar War*, New York: Allen Lane, 2008.
[3] 'Tories Cut to the Chase as Osborne Heralds an Age of Austerity', *The Times*, 7 October 2009.
[4] Malcolm Chalmers, 'Preparing for the Lean Years', *RUSI Future Defence Review Working Paper Number 1*, July 2009, p. 1.
[5] Joseph Nye, **http://csis.org/program/smart-power-initiative**, last accessed 22 October 2009.
[6] *Security for the Next Generation, 2009*, available at **http://www.cabinetoffice.gov.uk/reports/national_security.aspx**, last accessed 22 October 2009.
[7] Notably *AP3000 'British Air and Space Power Doctrine' Edition 4*. 2009, available at **http://www.airpowerstudies.co.uk/ap3000.htm**, and *The Future Air and Space Operational Concept Edition 2*, 2009, available at **http://www.mod.uk/NR/rdonlyres/8373350E-6958-4928-A409-E9C24F2226FF/0/20090901FASOC_2009UDCDCIMAPPS.pdf**.
[8] *AP3000*, p. 3.
[9] General Sir Richard Dannatt, speech transcript, 'The Land Environment – Moving Towards 2018', *RUSI Future Land Warfare Conference*, 12 June 2008.
[10] *HLOC Framework*, page iv, para 6.
[11] Air Cmd "Strategy for NEC in the Air Environment" dated Dec 08.
[12] Software-base attacks against CIS intended to modify, disrupt, deny, degrade or destroy information or functionality (D/DTIO/PCS/03/01/08/01 dated 26 Jan 06 (Policy for CNA in support of Military Ops.
[13] Operations to produce intelligence from CIS. (GCHQ Paper - The UK Framework for Computer Network Operations dated 16 Mar 06).
[14] CDS Directive 06/08 - the number of detected deliberate attacks on MoD networks has increased over a 2 yr. period.
[15] Actions taken within an overall Information Assurance framework to deter, protect, detect, react to and recover from a CNA or CNE on MoD CIS.
[16] See:**www.cpni.gov.uk**.
[17] *FASOC 2009*, p.1-2.
[18] *Ibid*, C-1.
[19] See for example, Philip Meilinger, *10 Propositions Regarding Air Power*, Maxwell: Air University, 1995.