An example of combined air operations: A Tornado F3 refuels from a USAF KC-10 Extender tanker whilst a pair of US Navy F/A-18 Hornets stand by

What is is Meant by Harmonisation and What are the Implications for the RAF?

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Since the Second World War the RAF has enjoyed a long and close relationship with the US Army Air Force and latterly the USAF. This relationship has been given new momentum by CAS' strategic priority to harmonise the RAF's air power capability with US Forces. Using the RAF/USAF relationship as a foundation for research, this paper examines what harmonisation means in conceptual terms and will theorise that when combined with political will it allows forces to operate in new 'spaces' at the strategic, operational and tactical levels. Building on this thesis and using interviews, academic and official publications, and original research, it will investigate the implications of harmonisation for both the RAF and the USAF. By providing examples where harmonisation can be achieved, it will conclude that the RAF must maintain a balanced warfighting capability and that all lines of development must be harmonised if CAS' strategic aim is to be met.

One of CAS' Strategic Priorities is to Harmonize the RAF's Air Power capability, concepts and doctrine with those of the US Forces. What is meant by harmonisation and what are the implications for the RAF?

Introduction

In January 2007, Chief of the Air Staff (CAS) met with the Chiefs of the US, Canadian and Australian Air Forces in Williamsburg, Virginia. This meeting, reported as the first of its kind since the end of the Second World War[1], is the most public demonstration of a new chapter in the development of the RAF and USAF relationship. This relationship, which has long historical significance, has been given new momentum by CAS' strategic priority that the RAF is to: 'harmonise… air power capability, concepts and doctrine with those of the US Forces.'[2] Before considering the implications for the RAF, this Defence Research Paper (DRP) will examine what harmonisation means and explore its relationship to the concept of interoperability. The DRP will propose that harmonisation, when combined with the appropriate political will, can increase the effect achieved from interoperability by allowing forces to operate in 'spaces' at the strategic, operational and tactical levels that would otherwise be denied. The remainder of the DRP will concentrate on the implications of harmonisation for the RAF, where its fundamental thesis is two-fold. First, that the RAF must maintain a broadly balanced warfighting capability if it is to derive maximum benefit from harmonisation with US Forces. Second, that harmonisation will only be successful if pursued across all lines of development. Due to the word limit of this paper, the thesis will concentrate on the RAF/USAF relationship and will only refer to the RAF's relationship with other arms of the US military where it is necessary to do so.

To further this thesis, the DRP will examine the strategic UK/US relationship and argue that bilateral security cooperation, based on shared strategic interests, is the foundation upon which the 'special relationship' has endured. Developing the context further, the DRP will consider the historical and operational links between the RAF and the US Air Forces from their origins towards the end of the First World War to the present day. While it is not necessary to provide an historical narrative of events, it will demonstrate that while shared heritage and tradition have been consistent themes of the RAF/USAF relationship, combined air power operations have

evolved systematically from cooperation, through coordination, to integration. The DRP will then examine interoperability and consider whether harmonisation provides an evolutionary or a revolutionary pressure on this concept. By examining current doctrine and hypothesizing that political will is now an essential element of the interoperability concept, the DRP will argue that harmonisation, if properly applied, can maximise interoperability effect. However, it will also deduce that harmonisation is a continuous evolutionary process and not an end-state in itself – it is therefore unlikely that there is a specific point when harmonisation can be declared.

Having set out the historical and theoretical framework of the paper, it will describe the RAF's development from the Cold War to its present agile and expeditionary force structure as a means to meet the current security threat and conclude that constraints on its size and capability require the RAF to be interoperable and harmonised with the USAF in order to deliver air power effect within the multinational environment. Focussing on the operational and tactical levels, it will investigate what the RAF seeks to achieve by harmonisation and ask why it is important for the RAF to pursue this strategy now. It will also consider the US view in strategic and operational terms and consider whether harmonisation is mutually beneficial. However, it will reinforce the nature of the relationship and underline that the RAF remains the junior partner and that developing harmonisation is not unconditional. These conditions will be investigated in detail as the DRP focuses on the practical application of harmonisation. Developing its thesis that CAS's aim can only be achieved by harmonising across all lines of development, the DRP will argue that while harmonisation must be supported by conceptual and doctrinal development, it will be determined by the degree to which some technological parity and shared situational awareness is achieved in the battlespace. However, while underlining the importance of the equipment, doctrinal and information lines of development, the DRP will hypothesize that personal relationships and personality remain key. Using the Williamsburg meeting to emphasis its importance, it will examine the risk of personal relationships in maintaining the impetus of harmonisation. It will note that this risk can be reduced by strengthening doctrine and concepts, and postulate that confidence, trust and understanding must be built at all levels in the personnel component through exchange appointments and staff links. It will recommend that the RAF should create an Office of Air Power Integration to provide the necessary coherence to drive forward harmonisation across these lines of development. Importantly, the DRP will use the practical examples of harmonisation and consider how these could be used to provide analysis of achievement in harmonisation. Given the lack of statistical data available, the DRP will be unable to provide definitive analysis of whether harmonisation is being achieved or whether it will be achieved in the future.

Finally, the DRP will examine the challenges facing harmonisation. It will consider the implications of the RAF's NATO and broader European relationships and argue that harmonisation with the US is not necessarily a unilateral approach and may allow the RAF to provide the conduit for closer US/European air power integration. It will also examine the impact of the UK Defence

Budget and procurement decisions and consider, in light of Joint Strike Fighter (JSF), the implications to the RAF of the difficulties, perceived or otherwise, and implications of technology transfer. The paper will show that the most likely constraint on harmonisation will be cost rather than politics and that this provides the most significant risk to maintaining the broad and balanced capability upon which harmonisation with the USAF ultimately depends.

F-15 Strike Eagles from 48th Fighter Wing, RAF Lakenheath

The UK/US 'Special Relationship' – Legacy or Opportunity?

To understand why the RAF seeks to harmonise its air power capability, concepts and doctrine with USAF, it is necessary to examine the underlying relationship between the UK and the US and the importance of the shared RAF/USAF heritage. The paper will argue that since the Second World War, the so-called 'special relationship' between the UK and US has been fuelled and reinforced by defence cooperation and that this relationship has endured and has been enhanced despite fluctuations in the strategic and political 'special relationship'. The enduring nature of the defence relationship, which CAS seeks to enhance and develop still further, is therefore less likely to be influenced by short-term shifts in political focus and emphasis from either side of the Atlantic. Although Cooper identifies that, 'Every…country defines its strategy in relation to the US'[3], Dumbrell argues that the US and UK are 'united primarily by values and habits of outlook and attitude.'[4] Values such as the rule of law, religious tolerance, freedom of speech and governance, dominated by social democratic capitalism, underpin the Anglo orientation of the US political, academic and cultural elites. While these values are shared with other, mainly, western-style democracies, the roots of the 'special relationship' have been reinforced by a common history and a shared language.[5] Lady Thatcher described this link as the 'ties of blood, language and culture.'[6] Nonetheless, Dumbrell draws attention to a recent growth in anti-US sentiment in mainland Europe, driven in part as a reaction to Bush's unilateralist and interventionist foreign policy, but also by a sense of greater and more unified European identity.[7] Despite this dynamic, and a sense that Iraq, like Vietnam, only serves to fuel 'anti-Americanism', the UK/US 'special relationship' remains strong, albeit that both countries are not always in political agreement.[8] The 2006 US National Security Strategy emphasizes that, 'Our cooperative relations are built on a shared foundation of shared values and interests….Just as in the special relationship that binds us to the United Kingdom, these cooperative relationships forge deeper ties between our nations.'[9]

Despite the fluctuations in the 'special relationship', such as the Suez Crisis,

the UK and the US have retained close bilateral security cooperation.[10] This cooperation, originating during the Second World War and developed via NATO during the Cold War, has been the most enduring aspect of the 'special relationship'. Highlighting the Second World War as a critical enabler, Dimbleby and Reynolds suggest that 'No modern allies have fused their war efforts so successfully. The ties of language and culture…..allowing deep personal friendships to develop whose importance lasted well after 1945.'[11] Throughout the Cold War era, the 'special relationship' broadly developed around both countries' commitment to shared security within NATO, intelligence sharing, and specifically around the use of the UK as a base for the US strategic deterrent and bilateral cooperation on nuclear security. Although this close relationship has persisted beyond the end of the Cold War, the current complex, multi-dimensional and dynamic international security system has created a new synergy in the US/UK relationship. In simple terms, although both countries take a global perspective on security,[12] the UK finds it increasingly difficult to pursue its security objectives without the military capacity and capability of the US.[13]

Some of these themes will be explored in greater detail later in this paper. However, this shared security perspective provides the context within which defence cooperation has developed. The former Secretary of State for Defence, Hoon, commented that, 'it is highly unlikely that the UK would be engaged in large-scale combat operations without the US, a judgement born of past experience, shared interest and our assessment of strategic trends.'[14] More recently, the UK Government's Policy Review document, 'Building On Progress: Britain in the World', describes how its approach to strategic partnerships will be based on shared interests and values and a 'strong alliance with the US.'[15] Given the commonality of security interests and the expected longevity of the security threats, particularly the threat of international terrorism,[16] it is highly likely that defence cooperation will remain the cornerstone of the 'special relationship' for the foreseeable future.

If the UK has a 'special relationship' with the US, then it is equally accurate to describe the RAF as having a 'special relationship' with the USAF. Like its strategic cousin, the relationship between the RAF and the US Army Air Forces (the USAF was formed in 1947) is long, mutually beneficial and has been interspersed with periods of tension and disagreement. However, like the 'special relationship', both the RAF and the US Air Forces have sought to overcome these tensions in order to achieve decisive effects in the battlespace.[17] Meilinger notes that, 'USAF leaders trust the proficiency and dedication of the RAF' and that, 'common language, culture and tradition make it easier (for the USAF) to work with the RAF.'[18] This sense of shared tradition and professionalism, enhanced by shared operational experience, serves only to reinforce the view of this paper that the RAF has a 'special relationship' with the USAF. This relationship has developed over ninety years and where once the RAF was the dominant partner, now the USAF fulfils this role and will continue to do so. From its origins during the First World War, the RAF and the US Army Air Force and latterly the USAF have enjoyed a strong partnership that has evolved during operations from cooperation to coordination and, most recently, to a degree of integration. Not

only has this shared history cemented the 'special relationship' between the RAF and the USAF, it also provides evidence of how coalition operations have evolved to the extent, and as this paper will argue, that harmonisation can be viewed as a means to improve and maximise the effect gained from interoperability.

Although commentators[19] highlight collaboration between the UK and US during the Second World War as the origins of military synergy, the history of RAF and US Air Forces cooperation can be traced back to the First World War when between 900 and 1,100 US personnel flew with the Royal Flying Corps on the Western Front.[20] Joining the war in 1917, the US provided much needed momentum to the allied effort, although relied heavily on UK and French operational experience to improve US combat capability. This experience and the deliberations between Lord Trenchard and Billy Mitchell on the use of air power typified a relationship built on mutual cooperation.[21] The importance of the strong links created between the RAF and the then US Army Air Corps (embedded as part of the US Army) in the First World War would not be truly recognised until the Second World War. Nonetheless, Cox reminds us that the relationship which began with the RAF as the dominant partner in the First World War has endured over a number of generations and conflicts since, albeit those roles have since been reversed.[22]

Like the First World War, the RAF and the then US Army Air Forces (AAF) used the period before the US entry into the war to develop and reinforce the relationship and allowed the AAF to view first-hand air combat operations. Following the US entry into the war, initial difficulties were exposed in the choice of air component commanders with both the RAF and AAF concern that their air forces were under the operational command of officers from the other service. This became particularly apparent in the control of tactical air forces, when Patton complained that despite the majority of air assets being provided by the US in the Mediterranean, the RAF continued to push for integrated air commands merely as a means to retain leadership and control.[23] Despite the potential of integration between the allied air forces built on common purpose, political realties would frustrate this aim and Hughes notes that the allies did not create a mechanism to centrally conceive, plan, and execute their air campaign.[24] While there were examples where tactical air forces were combined, integration was the exception rather than the rule. Despite these differences, the mutual respect and understanding conceived during the First World War was strengthened and the foundations of unity of command and unity of effort in delivering air power were created.

These themes were to feature again in 1990 and 1991 when during the first Gulf War the Coalition Air Commander, Horner, permitted RAF representation in his command headquarters in Riyadh; other than Saudi personnel, RAF officers were the only foreign representatives in the Headquarters.[25] Air operations during Operation DESERT STORM also provided evidence that the RAF had the capability to reinforce its 'special relationship' with the USAF. Despite the growing technology gap between the USAF and other Air Forces, the RAF had maintained sufficient capability to enable it to operate in US composite air operations. Meilinger points out that throughout the air campaign, the RAF

dropped more precision-guided munitions (PGMs) than the US Navy and US Marine Corps (USMC) combined. The air campaign also provided evidence that the RAF had specific capabilities, such as laser target designating and offensive counter-air operations, which could be used to enhance (rather than just support) the overall coalition air effort.[26] These two trends would be repeated over the Balkans in 1995, when again the RAF dropped more PGMs that the USMC. In subsequent operations, the RAF maintained its role as the most significant partner to the USAF, delivering additional capability in the Combat Support area by providing 80% of the European air-to-air refuelling (AAR) assets over Kosovo and a similar capability for carrier-borne US Navy aircraft in the Afghanistan theatre.[27] Throughout this period, the RAF and USAF, involved in 4,000 days of continuous air operations enforcing the Iraqi No-Fly Zones, created a level of integration and trust that proved invaluable during Operation TELIC.[28] This integration and trust provided the foundation for air operations during the 2003 invasion of Iraq and allowed RAF personnel to gain insight, understanding, and influence within the US planning and execution of the air campaign. By deploying specific capabilities, such as counter-air, AAR, ISTAR and the ability to deliver PGMs, the RAF were able to configure their assets to meet US requirements. As the MOD's First Reflections report commented, 'the UK contribution was taken into the US plan where it could best complement and enhance US capabilities, both politically and militarily.'[29] By providing the appropriate capability, the RAF not only achieved a degree of integration with the USAF, it also secured 'an effective place in the political and military decision-making process.'[30]

Harmonisation – Revolution or Evolution for Interoperability?

The critical question that this paper seeks to resolve is the role harmonisation plays in the concept of interoperability. This will not be straightforward despite RAND's assertion that, 'interoperability...(is) simply a measure of the degree to which various organisations are able to operate together to achieve a common goal.'[31] Interoperability is multi-dimensional, is subject to different interpretation, and is achieved by different means at different levels. The purpose of this paper is not to arrive at a comprehensive definition of interoperability. It will examine the current strategic security climate to explain why interoperability is a necessary function of defence policy. Having explained why interoperability is necessary, the paper will seek to broadly define the concept and consider whether harmonisation is a revolutionary or evolutionary influence and the potential this might realise to increase the effect that interoperability can deliver. In their 2000 report on coalition air operations, RAND identified that, 'interoperability…must be understood in the context of the international security environment that affects coalition operations.'[32] RAND argues that the change in the security environment since the end of the Cold War has resulted in a broader level of threat and a wider range of contingencies to which forces must respond.[33] Not only does this require more agile forces to respond to such threats, it also introduces a new strategic dynamic. Where the Cold War was dominated by alliance based strategic defence, where conflict would be an act of necessity rather than choice, the current security environment reverses this trend. The less predictable, but more complex and diverse security threats, require a range of responses and

are most likely to be multinational in nature. As potential coalition partners will have the choice as to whether they engage or not, multinational operations will rely more on flexible 'coalitions of the willing' and less on long-standing, and more rigid, alliances prevalent during the Cold War.[34]

'Coalitions of the willing', by definition, add a degree of uncertainty and complexity to the use of the military instrument. Coalitions of the future will comprise of different nations, many constrained by political will and the level of military capability and effect that they can deliver. Given this unpredictability, the UK's response is to maintain broadly self-sufficient and capable Armed Forces with a deliberate focus on agile and expeditionary capability. However the cost of maintaining and engaging this military instrument remains under significant budgetary pressure and Defence Planning Assumptions already assume that, for example, UK involvement in large-scale operations will be part of a US-led coalition. As JWP 3-00 states, 'the most likely scenario for military action by UK forces at the medium and large scale operations will be as part of a coalition, perhaps under NATO or EU leadership, but increasingly US-led. Implicit in this statement is the recognition that the UK will provide a military coherent and capable force, self-standing and self-sustaining.'[35] This assumption allows defence planners to take risk against certain capabilities, and while this will be examined more closely in respect of the air environment later, it is sufficient to recognise that multinational operations will continue to rely on a degree of capability burden sharing among coalition partners. These strategic drivers, the nature of military operations and the sharing of the capability burden, require both integration and interoperability to achieve the desired effect in both political and military terms. However, the political dimensions of future conflict, the complexity of the operation, and the degree to which coalition partners can interact[36], all impact on the level of interoperability that can be achieved. Interoperability, however defined, is therefore both complex and multi-dimensional.

Both UK and US doctrine describe interoperability as, 'The ability to operate in synergy in the execution of assigned tasks.'[37] UK Air Power doctrine develops this further and using the NATO definition defines interoperability as, 'The ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.' [38] Both definitions concentrate on the ability of equipment and personnel to work collaboratively to achieve greater effect than otherwise would have been the case if interoperability was absent. To achieve this effect, interoperability relies on a degree of standardisation[39] between doctrine, procedures and equipment and the ability to deliver effect in the operational context.[40] However, despite standardisation efforts within the NATO context, a growing capability gap exists between the US and other NATO air forces. Reporting on Operation ALLIED FORCE, RAND noted a, 'a widening gap in capabilities between U.S. and other NATO air forces.... Moreover, despite fifty years of standardization efforts, NATO forces still exhibited significant interoperability problems.'[41] While this paper will examine the capabilities gap later, the evidence suggests that standardisation efforts have failed to achieve

an appropriate level of interoperability effect. The failure to invest and procure technologies that enable interoperability, particularly in respect of the air environment dominated by technologically complex and networked aircraft, underlines the importance and impact of political will on interoperability. Doctrinal orthodoxy fails to address this paradigm which, in addition to the 'wars of choice' effect this paper suggests now exists, can influence the overall effect of interoperability. For example, the degree to which a nation's forces can undertake multinational operations across the spectrum of conflict relies not only on standardisation but on the political will of the nation's government to follow this course.[42] Political will in the 'coalition of the willing' scenario is a combination of three factors. First, the strategic will to use military forces for specific operations; usually determined by national caveats and rules of engagement and based upon culture, ideology and political resolve.[43] Second, the strategic will to align procurement strategy in order that standardisation can be achieved. Third, the will at component level to commit to strategies and policies that aims to achieve a degree of standardisation or, in this case, harmonisation.

Currently there is no UK doctrinal definition of 'harmonisation'. However, US joint doctrine describes harmonisation as, 'The process and/or results of adjusting differences or inconsistencies to bring significant features into agreement.'[44] The Oxford English Dictionary describes 'harmonisation' as 'to make or form a…consistent whole' and 'to produce harmony'. In turn, 'Harmony', is described as 'agreement'.[45] Using these literal definitions describes a process which aims to achieve more than merely standardisation. In other words, standardisation allows capability, concepts and doctrine to be brought to a standard necessary for interoperability, while harmonisation allows capability, concepts and doctrine to be brought into agreement to enhance the effect that can be achieved by interoperability. Using a musical analogy, a choir can be standardised to ensure that it performs the same song at the same time, but the effect and impact of the choir is greater if harmony is also applied and achieved. In interoperability terms, political will, when combined with harmonisation has the theoretical potential to increase the maximum achievable effect than when combining political will with standardisation, as Figure 1 illustrates:

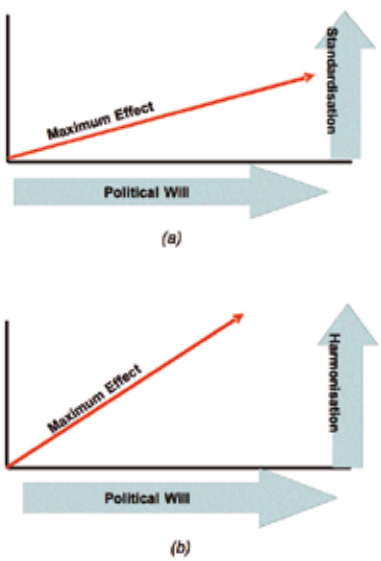

Figure 1. Diagram showing the theoretical maximum interoperability effect when combining political will with standardisation (a) and political will with harmonisation (b).

As a result, harmonisation does not represent a revolution beyond interoperability. Instead, it provides an evolutionary

means and process by which capability, concepts and doctrine can be brought into agreement in order to enhance the effect beyond that which would normally be achieved from interoperability based on standardisation only. However, achieving and measuring harmonisation is potentially complex. As RAND notes, 'much of the value is intangible… and not easily measured or quantified.'[46] Simply put, what is the end-state for harmonisation and how do you know when you have achieved it? The ability to harmonise is complicated by the nature of the current security environment. Each operation (and therefore coalition) is different, the strategic context is dynamic (unlike the Cold War) and USAF and RAF are undergoing transformation; therefore the ability to harmonise will also need to evolve accordingly. These factors suggest that harmonisation is a continuous evolutionary process and that there is no measurable end-state or a point at which harmonisation between the RAF and the USAF can be declared. As a result harmonisation can be more accurately described as a journey rather than a destination.[47] Nonetheless, it should be possible to measure progress in achieving the aim. This paper will identify specific areas where progress towards harmonisation can be measured. Before doing so, it will examine why the RAF is seeking to harmonise its air power capability, concepts and doctrine with the USAF at this time.

Why Now? Why Air Power?

Since the end of the Cold War, successive UK Defence Reviews[48] have attempted to re-align military capabilities to meet the changing and complex nature of the post bi-polar world. The Strategic Defence Review (SDR) New Chapter, published in 2002, articulated the evolutionary change towards a capabilities approach to defence planning[49] by stating that, '… given the wider changes in the strategic and operational environment…we need to continue the evolution of force structures away from the legacy systems more suited to the Cold War and towards the capabilities that are optimised to meet the new threats and challenges.'[50] As a result, the period since the end of the Cold War has been one of change and adjustment for the RAF.[51] In order to meet complex and multi-dimensional security challenges, the RAF has re-structured and re-orientated its force structure towards joint expeditionary operations[52] whilst retaining a broad and balanced air power capability. This approach is supported by Sabin who argues that: 'The best way of maintaining security is…to pursue a broad and balanced approach…'[53] and reinforced by Defence Strategic Guidance 05 (DSG 05), which highlights that, 'Futures analysis is..an inexact science…developments in the international scene are increasingly uncertain…the (DSG 05)…underpins the maintenance of a broad range of capabilities …and agility necessary to respond to an uncertain future.'[54] As a result, the RAF has developed an agile and adaptable force structure that is configured to meet the most frequent operations (small and medium scale), while retaining the capability to meet the most demanding operations (large scale). Nonetheless, there remains capability gaps and, as this paper will show later, this forms part of the rationale for CAS to pursue greater harmonisation with the USAF. The SDR, the 2003 Defence White Paper, and Defence Planning Assumptions (DPAs) all recognise the constraints on the size and capability of the UK Armed Forces.[55] As Clarke argues, '..the UK emerges as the 'second military expeditionary power' in the world; a long way

behind the US, but probably better able than any other power in the world…to project and use effective military force.'[56] The challenge and conclusion for the RAF is that it must be able to operate and deliver effect in the joint and multinational environment and, to achieve the desired effects in large scale operations, it must be interoperable and harmonised with the USAF.

To appreciate how the RAF can deliver effect in the multinational context, it is critical to understand the characteristics of air power. Although air power is not the same as Air Force,[57] the RAF is the primary exponent of air power in the UK military. Air power is a technological activity[58] and is inherently joint, combined and multinational in nature.[59] Moreover, and as Tucker highlights, 'air forces are already better harmonised… than most maritime and land forces', and 'English (as the language) of the air makes communication between air power partners inherently easy.'[60] In joint and multinational scenarios, air power is critical to land and littoral manoeuvre and through its core attributes (height, speed, reach and ubiquity) can provide decisive effect in both the land and maritime environments.[61] In addition, air power offers precise and increasingly persistent capabilities[62], has the ability to deliver effect from the strategic to the tactical levels,[63] and has the ability to deliver effects across the political, economic, military and information instruments of power.[64] These attributes provide both an opportunity and challenge for the RAF. The opportunity rests with the potential of harmonisation with the USAF to improve the capability and effect that the RAF can to deliver in the future. However, the RAF must continue to develop agile, adaptable and networked 'high-end' warfighting capabilities[65] if it is to grasp this opportunity.

USAF Lockheed Martin F-22A Raptor

CAS considers the USAF to be the premier Air Force in the world and highlights the long and enduring shared heritage and operational history as a primary reason for developing closer doctrinal, capability and conceptual links.[66] Additionally, and following the completion of 4,000 days of continuous integrated operations in policing the No-Fly Zones over Iraq, CAS is keen that the RAF and USAF do not drift apart.[67] While CAS has focused on harmonisation as a main priority of his tenure, it would be wrong to suggest that this is the only bilateral relationship of importance to the RAF. For example, following CAS' visit to Australia in March 2007, a number of RAF/Royal Australian Air Force (RAAF) visits and liaison meetings are planned or have already taken place. Moreover, the RAF continues to develop its contribution to the UK's joint operational capability through initiatives as Networked Air/Land Integration (NAiL), Rapid Global Mobility (RGM) and the Effects Based Approach (EBA). Harmonisation with

US Forces is one of 12 RAF strategic priorities and while the focus of this paper will underline the importance of this approach, it should not disguise or minimise the importance of other lines of strategic development and priority that the RAF are currently pursuing.[68]

RAF/USAF Harmonisation – Mutually Beneficial?

Goulter notes that, 'in an uncertain world…flexibility comes from having a full spectrum of capabilities, unless you are certain of your alliance partners and their ability to assist you.'[69] In these terms, there are significant advantages for the RAF in pursuing harmonisation with the USAF. Although the RAF seeks to maintain a broad and balanced air power capability and force structure as possible, there remain some capability gaps against which a degree of operational risk is taken. Moreover, the RAF also holds a degree of risk in the quantity of air power capability it can deliver. The key for the RAF is to determine the level of risk in capability terms against the scale and nature of operations that it is planned and resourced to undertake. In simple terms, the RAF retains its balanced capability and force structure in order to meet the requirement of DPAs to support a UK-only or UK-led coalition operation, at either small or medium scale. Nonetheless, there is also a recognition that the UK is only likely to engage in a medium or large scale operation as part of a wider multinational coalition and that the RAF can afford to take a degree of risk in capability areas provided from other forces. The SDR articulated this approach as, 'Britain will usually be working as part of a NATO…force, or an ad hoc 'coalition of the willing'. This means that we (the UK) do not need to hold sufficient national capabilities for every eventuality.'[70] CAS highlights capabilities gaps in the RAF's Suppression of Enemy Air Defence (SEAD) and provision of stand-off jamming, for example. In this respect, it is likely that the full spectrum of SEAD and jamming capabilities will only be required in large-scale operations where DPAs assume that the UK would be engaged as part of a US-led coalition. Therefore, this risk can be potentially offset by USAF capability. As Goulter notes, 'Because of the high cost of SEAD technology, Britain may have to be content with her dependence on the US.'[71] This approach would suggest that the focus of harmonisation is unilateral and that there is no reciprocal benefit for the USAF. As this paper will show, this is not the case.

Despite its global reach and significant margin of superiority over other Air Forces, the USAF can also benefit from harmonisation.[72] Currently, the USAF is faced with a significant enduring operational tempo as it engages in the 'War on Terrorism', an ageing fleet[73] and increasing budgetary challenges driven in part by the cost of maintaining its legacy fleet and by the cost growth of new platforms such as the F-22 and F-35 to replace them.[74] Through harmonisation, the RAF can augment and plug capability gaps within the USAF force structure. This paper has already highlighted the RAF's role in Operation DESERT STORM in providing offensive counter-air capability and the provision of AAR assets in the Kosovo[75] and Afghanistan theatres. During Operation IRAQI FREEDOM, the RAF provided Tornado F3 aircraft to augment the USAF's counter-air capability and Tornado GR4 to augment the USAF's tactical reconnaissance capability. In this latter role, the USAF have already indicated

that the RAF's Airborne Stand-off Radar (ASTOR) capability, to provide long-range target imaging and tracking radar, will significantly enhance coalition tactical reconnaissance capability and interoperability with the JSTARS[76]

Sentinal R1, No 5 Squadron

ground segment will be delivered to enable this. The provision of advice and operational experience by the RAF Regiment as the USAF develops an organic force protection capability provides further evidence of a mutually beneficial relationship.[77] These relationships are important because it reinforces the importance of the RAF maintaining an air power capability that does not exclusively concentrate on the investment of 'high-end' warfighting platforms. While the USAF retains a significant and pre-eminent capability in this respect, the evidence of recent coalition operations suggest that it will continue to use the RAF to augment and fill capability gaps, particularly in the combat support and enabling area, such as AAR, tactical reconnaissance, and force protection. In capability terms, therefore, both the RAF and the USAF can use harmonisation to maximise their strengths and minimise their weaknesses. By providing a capability that otherwise would not be available or by enhancing an existing capability, harmonisation has the potential to deliver greater effect across the spectrum of conflict.[78] General Moseley underlines the point by commenting that, 'the ability to plug coalition forces together…on the battlefield, provides a significant force multiplier effect.'[79]

While this approach suggests significant benefit for the RAF in investing and specialising in the enabling capability of air power, there is also a strong case for its retention of a 'high-end' warfighting capability to provide the commitment, credibility and influence in its relationship with the USAF. Clarke argues that, 'nothing conveys military commitment…as much as combat risk-taking and the ability to deploy…units for combat.'[80] By investing in fifth generation fighter technology, that can deliver precise effect in potentially high air threat environments, the RAF is able provide the US with the ability to augment their own 'early-entry' capability. The decision to procure JSF is evidence of this approach. By being able to operate alongside the US and deliver 'high-end' warfighting capability from the outset of an operation, the RAF is able to provide the commitment to share both political and military risk. However, to be able to maintain this capability, the RAF must ensure that its procurement requirements meet a minimum baseline for undertaking harmonised and integrated operations in high air threat environments. This should include, for example, defensive aid suites, combat identification, common data links, and secure communications as standard for all organic RAF air platforms. This approach would minimise risk within the operational environment and provide the necessary confidence to the USAF that the RAF are able to fight and

deliver effect without unnecessary constraint. Moreover, while the overall risk that the RAF is able to assume may be comparatively small given the number of assets it can deploy, the influence and goodwill that this generates can be disproportionately high. The degree to which RAF personnel are permitted to operate alongside and be embedded within US Headquarters during conflict is evidence that the RAF can deliver greater influence to the planning and execution of a campaign than the size of the RAF contribution in platform numbers and personnel would otherwise suggest. Meilinger points out that several USAF officers consider, 'that it is easier to work with the RAF than it was with the US Navy or USMC.'[81] This synergy also provides USAF planning with a different perspective and reinforces the point that harmonisation is mutually beneficial. It is essential therefore that the RAF recognises that the ability to undertake air campaign planning and execution and operational analysis is also a capability and that it must invest in and develop this capability if it is to remain relevant and credible in the USAF context. It will also need to recognise, as this paper will explore later, that this relationship is often underpinned by personality rather than merely process. Gardner advises that during Operation IRAQI FREEDOM, 'the military contribution the UK is able to make…means that we secure an effective place in the political and military decision-making process.'[82]

Since the end of the Cold War, the US foreign policy approach to the international system has been characterised and simplified as a choice between multilateralism and unilateralism. The US response to the terrorist attacks of 11 September 2001 has only intensified this debate. While the Bush Doctrine in which the policies of 'military pre-emption' and the 'mission determines the coalition' serve to reinforce the unilateralist approach, they also ensure that the US will not be restrained by the policies and interests of others when its National Security interest is at stake. Kagan claims that the US is increasingly unilateralist because it is less inclined to work through international organisations, less likely to work with other nations to pursue common goals, and is content to work outside of international law, where it is in their interests to do so.[83] While this approach, combined with the view that the US is 'at war', has shifted the emphasis of US foreign policy away from a grand strategy based on alliances, multilateral institutions, and cooperative security during the Cold War, there is still evidence that the US seeks to build international consensus through 'coalitions of the willing' to pursue its National Security interest. Since the invasion of Iraq in 2003, there is a growing view that US influence and leadership in the uni-polar world could be better achieved by pursuing legitimacy for its use of military force.[84] Similarly, Jentleson argues the US should act as a fulcrum rather than a foil for multilateralism.[85] This approach has been reinforced by the 2006 National Security Strategy, which makes no fewer than 68 specific references to international cooperation and the importance of international institutions. This acceptance of legitimacy, both moral and political, as source of power and an appreciation of the use of multilateral military force as a means to achieve legitimacy now provide the foundation of US military policy and doctrine. However, important differences still exist with UK Defence Policy. While UK Defence acts in the liberal

traditions as a wider 'force for good in the world'[86], the US military, implicitly, is a force for good for the realist US interest and is a mechanism for delivering US sovereign power. More fundamentally, the US considers itself 'at war' in the fight against of global terrorism, while the UK has yet to view its approach in similar terms.

In doctrinal terms, the focus on coalition operations and interdependency recognises that US operations will be multilateral.[87] Both the US National Security Strategy and the Joint Vision 2020 underline the importance of multinational operations to further US strategic aims, with Joint Vision 2020 highlighting the premium on, 'the successful integration of multinational…partners and the interoperability of processes, organizations and systems…as the foundation of future US military operations.'[88] In focussing doctrine and policy on coalition operations, the US seeks to achieve a number of effects. At the strategic and operational levels, coalitions provide a greater degree of political and moral legitimacy than a more unilateral US approach would otherwise achieve and provides benefits such as access to overseas basing and over-flight. Similarly, it allows the US to the share political risks of operations with its coalition partners. UK doctrine reinforces this point by underlining that multinational operations are the, 'prevalent reality at the operational level of war because it reflects the political necessity of seeking international consensus and legitimacy for political action.'[89] In other words, by pursuing a strategy of coalition and multinational response to security threats, the US aims to provide both political and campaign legitimacy for its use of military force. Finally, and arguably, by pursuing a coalition-based strategy, the US may be seeking to support and stimulate military transformation and modernisation among its allies as a means to improve interoperability and integration in the battlespace. This paternalistic approach responds to criticism, particularly within the NATO context, that some allies are unable or unwilling to maintain interoperability in respect of capability, common data links and secure communications, for example.[90] The US National Military Strategy highlights the importance of working with other militaries in order to, 'help establish favourable security conditions and increase the capabilities of partners (my emphasis).' and 'enabling multi-national partners' …(to support) combatant commanders' plans to ..undertake operations over great distances and in sometimes overlapping conflicts.'[91] General Moseley underlines the importance of coalition operations by stating that the USAF is, 'looking to better fight this joint fight, this coalition fight, and looking for ways to more quickly win this global war on terrorism, and be able to dominate the next war should deterrence and dissuasion fail.'[92]

Clarke reminds us that US air power is the standard 'against which all other forces must measure themselves.'[93] To that end, when considering its relationship with the USAF, it is important that the RAF retains a sense of perspective in what harmonisation can deliver and what it can achieve. The relationship is not unconditional and while this paper has highlighted the mutuality of the benefit harmonisation can provide, the RAF remains the junior partner. Consequently, it should recognise that harmonisation will have greater emphasis to the RAF than it will to the USAF. In other words, while both will benefit, the RAF has more to gain from harmonisa-

tion than the USAF has to lose by not harmonising. While it would be overly simplistic to suggest that the USAF supports a strategy of coalition operations because it should, rather than because it has to, it implicitly sets conditions for entry into the premier league of air power integration. Simply put, to maintain relevance and credibility, the RAF must, as a minimum, procure a fifth generation fighter capability[94], it must have Tactical Targeting Network Technology (TTNT) to download aircraft sensor data[95] and have the ability to achieve Air Command and Control (Air C²) interoperability. This paper will examine these issues and other areas where harmonisation can be developed. In doing so, it will examine the concept of harmonisation as a capability and will consider it in respect of the UK Defence Lines of Development (DLOD) model. The word limit on this paper does not permit a detailed analysis of all aspects. However, by using examples from four DLOD, (Equipment, Concepts & Doctrine, Information, and Personnel) the paper will argue that harmonisation with the USAF can only be delivered if these areas are also aligned. It will also return to its earlier theme and consider how these examples might be used to measure the progress of CAS' aim in achieving harmonisation.

Harmonisation in Practice – The Importance of Harmonising across Lines of Development

This paper has argued that harmonisation can only be achieved if the RAF retains a balanced air power capability and that it maintains and develops its 'high-end' warfighting capability through procurement of fifth generation fighter aircraft such as JSF. Both UK and US military doctrine recognise that control of the air is a necessary condition of coalition and joint expeditionary operations providing both protection for the deployed force and force projection.[96] However, the development and proliferation of counter-air capabilities and the evolution of advanced multi-role combat aircraft pose a significant threat to this condition. Statistically, the greatest threat to aircraft has originated from the ground and Meilinger notes that since the end of the Second World War, more aircraft have been lost to surface to air missiles (SAMs) and antiaircraft artillery fire (AAA) than from other aircraft.[97] The UK plans to procure around 138 of the F-35B variant of JSF with an in-service date around 2015, at a cost of approximately £10 Billion.[98] Able to operate from land or via Carrier Strike, JSF can carry a range of diverse weapons, such as Stormshadow, and can operate in the counter-air and precision attack roles on the same mission. Moreover, using stealth technology, the JSF can threaten an adversary's centre-of-gravity and create strategic effect. While this would suggest that JSF is confined to traditional conflict and 'high end' warfighting, its utility in the non-traditional and non-linear battlespace should not be overlooked. General Keys, Commander of the USAF's Air Combat Command commented that, 'With the F-35, you have the ability to get in where people don't see them, the ability to listen where people don't know your listening, and to find things that people don't want found out.'[99]

However, JSF procurement presents challenges for the RAF. On entering service, adversary counter-air capabilities, either in modern multi-role aircraft with sophisticated air-to-air missiles (AAMs) or ground based air defence systems equipped with counter-stealth capabilities may be such that JSF may not retain the technological advantage to penetrate non-permissive air environ-

ments that it theoretically can today. While the FASOC recognises that equipment must be sufficiently flexible to meet threats and technology that can evolve faster than the UK can acquire resources to meet that threat[100], it fails to address the explicit implications for JSF. For example, how does the RAF ensure that the JSF retains its effectiveness and technological advantage when it enters service in the next decade? Critically, the RAF must balance the need for operational sovereignty[101] of its JSF capability while ensuring that it retains appropriate access to US research and development technology. In December 2006, the MOD signed a Memorandum of Understanding (MOU) with the US Defence Department covering the production, sustainment and development of the JSF programme. Although the MOD has received assurances from the US that the UK would receive information in order that JSF can be operated independently, the House of Commons Defence Select Committee (HCDC) voiced concern over the lack of detail in the assurances provided.[102] Importantly, the HCDC were concerned that technology transfer occurs throughout the life of the JSF programme and that the UK will be able to operate JSF independently from the US. In response, Lord Drayson advised the HCDC that the MOU assured that, 'UK citizens will be in the chain of command to deliver operational sovereignty, unbroken, no US citizens in that chain of command.'[103] Therefore, the JSF programme provides a key test for the development of harmonisation with USAF. At one level, it would seem counter-intuitive for the USAF to place JSF capability as a 'condition' for harmonisation, while the US government retains rigid technology transfer rules. Moreover, the issue has wider significance for UK Defence in general and the RAF in particular. The issues are two-fold. First, if the RAF intends to continue to operate alongside the USAF in high air threat environments from the outset of operations, it must ensure that its systems and capabilities are compatible and integrated. Second, the evolution of future security threats demand that the RAF is able to operate, maintain and upgrade equipment procured from the US.[104] Failure to provide timely technology transfer will place both these requirements at risk and will ultimately undermine harmonisation. Testifying before the Senate Armed Services Committee, Lord Drayson underlined the importance of operational sovereignty to the UK Government.[105] The UK Government's response is to reach a framework agreement with the US, which will provide greater efficiency over the inter-governmental and inter-industry technology transfer process and underline the defence relationship between the UK and the US. In response to HCDC questioning, Lord Drayson advised that, 'I hope that 2007 is a year when that framework is put in place such that we have not got to address things on a project basis…but we have a more overarching agreement which makes the whole process more efficient.'[106] If successful, timely technology transfer will be a key enabler in harmonisation and underlines the importance of political will in aligning procurement strategies. However, a commitment to harmonisation, when combined with a closer relationship, can create its own momentum in easing the path towards efficient and timely technological transfer. With this in mind, Bruce Lemkin, Deputy Under Secretary of USAF, describes JSF's advantages not only in capability terms but as a means to facilitate broader Air Force to Air Force relationships.[107]

Harmonisation of equipment, although driven by technological factors, will need to be supported by closer conceptual and doctrinal alignment. Currently, the RAF's capability is supported by the interaction between the Effects-Based Approach (EBA) and Social Network Analysis (SNA).[108] EBA is the means by which Defence can interact with other instruments of power within the Comprehensive Approach.[109] While historically EBA has been applied to the traditional battlespace, SNA provides the conceptual framework for the non-traditional battlespace. To address these concepts, the FASOC considers a range of 'engagement capabilities' that can be used to influence potential adversaries.[110] These capabilities determine the RAF's contribution to the future operations and incorporate activity within the kinetic and non-kinetic domains. Additionally, there is a growing body of opinion in both the RAF and USAF that the Industrial Age battlespace has been overtaken by the Information Age battlespace. Mason argues that: 'technology has transported air power from the industrial to the information age…'.[111] In conceptual terms, the Information Age is more than the evolution of technology. As war and conflict is a political and a social institution, the Information Age concept suggests that the character of conflict may change as society and politics change. While the USAF is currently seeking to integrate air capabilities across mission scenarios that are relevant to the current security threat (CAS in the urban environment, time sensitive targeting, homeland defence and humanitarian relief) and is in the process of creating a Cyberspace Command to exploit the electromagnetic spectrum, both conceptually aim to use the Information Age to deliver the full range of military effect.[112] While the USAF approach to Network Centric Warfare (NCW) and the RAF approach to Network Enabled Capability (NEC) will be considered later, harmonisation of doctrine should recognise that adversary action against networks will degrade the ability to sustain Information Age warfare. As a result, conceptual development and harmonisation needs to appreciate that destruction and domination, the bye-words of Industrial Warfare, remain essential for strategic success. Importantly, the USAF recognises the conceptual need to defeat a traditional and conventional state adversary. General Keys highlights that while the USAF is spending time, 'trying to find one white SUV racing down the road (in Iraq). When you get to Korea, your problem is not finding one white SUV your problem's going to be 1,000 tubes of artillery (and) four tank armies.'[113] While the 'Information Age' and the network provide a degree of sophistication to the use of force, it needs to be relevant to the nature of warfare. Both the RAF and the USAF will recognise the enduring conceptual conflict of aligning capability to fight today's conflict whilst planning for tomorrow's conflict.

Currently, UK/US doctrine is aligned through NATO or via specific bilateral arrangements. For example, bilateral cooperation on the US Shaping Concept, or Defence Contributions to Cooperative Security, aims to align US thinking with the UK's work on 'Influence' and soft power in the battlespace. While harmonisation can be enhanced with doctrinal and conceptual convergence, it would be inappropriate for the RAF, given its size and capability, to merely copy US doctrine. To do so would erode the ethos, heritage and unique perspective that the RAF is able to bring to the air environment. Nonetheless, strong links need

to be maintained and the newly formed RAF Concepts, Doctrine and Experimentation Committee (CDEC) provide an appropriate means to do so. Routinely chaired by the Directorate of Air Staff (DAS), the CDEC aims to evaluate and support air power capability development, provide oversight to the development of air environment doctrine, and identify and coordinate air and space requirements to joint doctrine.[114] Part of the CDEC's remit will be to develop concept and doctrinal links using USAF and RAF exchange officers in DAS and the Pentagon respectively as the primary interface. However, US doctrine is developed in joint terms by J7 staffs within Joint Forces Command (JFCOM) and Department of Defense Central Staffs, while single service doctrine is developed by the individual services. This provides a challenge for the RAF in identifying the most appropriate path for doctrinal development and whether it should use the UK Development Concepts and Doctrine Centre as the means to achieve the understanding and alignment it seeks. The CDEC should provide the appropriate focus for this work and should also aim to provide earlier engagement with US staffs in order that the appropriate influence and perspective can be provided for conceptual and doctrinal development. However, while CDEC provides potential in this area, it will only routinely comprise of 10 RAF personnel who will undertake CDEC responsibilities in addition to their existing primary duties. The Australian Air Force has 20 personnel who are employed full-time on doctrinal and conceptual development and the RAF initiative, while positive, appears modest in comparison.

To offset this modest approach and provide broader coherency to harmonisation lines of development, the RAF should create an 'Office of Air Power Integration' with responsibility for advocating and coordinating its relationship with the USAF and other Air Forces. This office would also have responsibility for the integration of air power and capabilities within the UK joint context and would follow the lead taken by the USAF when they merged the Office of War Fighting Integration with the Office of the Chief Information Officer in 2005.[115] The USAF model seeks to coordinate and synchronise capability and achieve network-centric solutions, and a similar approach in the RAF would also have the benefit of providing coherency to such concepts as Networked Air Land Integration which is critical in the RAF's operating capability with the British Army and the USMC. Currently, responsibility for the various lines of development this paper has highlighted as critical in harmonising with the USAF fall to different organisations in DAS, Air Command, the Air Warfare Centre, the Air Attaché in Washington DC, and the Defence Concepts and Doctrine Centre. An 'Office of Air Power Integration' would bring a consistency and coherency of approach and provide alignment across this broad area of responsibility to the RAF Strategy and Development Plan. The organisation would also provide a single and credible point-of-contact in which the USAF and other Air Forces can interact with the RAF. Whether the organisation is based within DAS or Air Command will depend on manning offsets being found in organisations that have both been drawdown as part of wider efficiency savings. However, formation of the office would reinforce the RAF's commitment to air power integration and the importance of the air environment in the joint and coalition battlespace.

CAS highlights networked enabled air capability (NEAC), shared situational awareness, and Air C² as the fundamental building blocks upon which coalition and interoperable operations are built.[116] The demand for information superiority, when combined with the ability of technology to create a faster tempo to operations, creates a challenge. While effective information acts as a force enabler, too much information is inefficient, delays decision-making, and reduces appreciation of the battlespace. In order to support harmonisation, it is essential that the RAF develop information management and NEAC across ubiquitous and interoperable networks and architecture. However, this will depend as much on technology as it will on the ability of its personnel, their training, and doctrine to be responsive to this challenge.[117] This view is supported by General Moseley who reinforces the need to, 'break down the existing security and communication barriers – to affect not only the way we talk but the way we fight.'[118] However, the conceptual and doctrinal difference between NEC and the US NCW creates a potential challenge for the RAF. UK NEC is defined as, 'Linking sensors, decision makers and weapon systems so that information can be translated into synchronised and overwhelming military effect at optimum tempo.'[119] Conceptually, NEC aims to deliver an evolutionary change to operational capability through deliberate and incremental changes in doctrine, equipment and processes.[120] Rather than the evolutionary change favoured by the UK, the US Office of Defense Transformation identifies NCW as the core concept in joint military transformation.[121] Therefore, in seeking to harmonise the network the RAF should be cognisant of the emphasis of US NCW, which seeks to share information across the Joint Force, and ensure that like the USAF, it only develops capabilities that can do likewise within the UK context.[122] The FASOC would seem to address some of these issues and provides a longer-term view of the potential change that NEC can deliver to the RAF's operational capability. However, this long-term view fails to address the short-term issues. Specifically, how NEC can address the specific demands of the air environment, how coherence can be provided to the development of NEAC, and how interoperable systems with the US can be developed in order to enable fully networked Air C² and TTNT.[123]

While the security classification prohibits this paper from conducting a detailed analysis of NEAC requirements, progress is required across a number of fronts. Management tools to enable shared situational awareness and decision superiority, via US JADOCS[124] for example, require appropriate 'gateways' across network architecture and a procurement decision to extend the ability to exchange imagery and intelligence products from the US DCGS[125] are two such examples. However, while these are equipment centric, the development of NEAC and interoperability with the US also requires a cultural and organisational change. Greater emphasis and coherency is now required in developing the RAF's NEAC capability to ensure that the requirements of the air environment are not marginalised. The RAF has already recognised that a realignment of personnel within relevant staff appointments may be required and that the USAF should be represented at the appropriate level within a focused and empowered NEAC organisation if an essential enabler of harmonisation is to be realised. Importantly, appropriate

training and experimentation with the US of NEAC capability will also be required and progress along these lines of development can form the basis of measurement towards CAS' strategic aim.[126] However, the challenge facing the RAF is the relative priority it gives to NEAC interoperability with the USAF when compared to developing NEC in the joint UK context. Importantly, interoperability only provides the means to share information – networked capability will only be genuinely achieved if there is also a cultural desire to share information in the first place.

Whilst acknowledging that development of capability, concepts and doctrine is important, the ability of personnel to operate within, and appreciate, the USAF environment is equally so. Like equipment, personnel must be interoperable, networked, and harmonised. Moreover, trust and confidence, built on shared understanding and common goals are essential ingredients if the RAF is to develop the harmonisation it seeks. Although greater emphasis is now being placed on improving the cultural understanding of potential adversaries, it is equally important that cultural understanding of potential coalition partners is also achieved. In 2004, and to develop a closer working relationship with the USAF on personnel matters, the Air Member for Personnel co-sponsored a joint work plan between Headquarters Personnel and Training Command and the USAF Air Education and Training Command (AETC).[127] As a result of this work, close working relationships were developed between RAF and USAF recruiting and flying training staffs and the RAF Leadership Centre at RAF Cranwell established links with the USAF Strategic Leadership Office. Latterly, visits by RAF training policy and personnel management staffs to the USAF Air War College and Air Force Personnel Centre have served to reinforce and sustain the working level engagement that are now routine. While these informal links have served to enhance shared experience and understanding across a range of personnel and training related issues, the increase in the number of RAF personnel engaged in exchange appointments[128] within the US military is particularly relevant. Table 1 shows the increase in the number of RAF personnel in exchange appointments, by US component, from 2003 to 2007.[129]

Location/year	1 March 2003	1 March 2007
US Army	1	1
USAF	39	51
US Coast Guard	1	1
USMC	3	3
US Navy	8	9
Total	**53**	**63**

Table 1. **The increase in the number of RAF Exchange Appointments in the US by component on 1 March 2003 and 1 March 2007**

While this increase is indicative of a closer relationship between the RAF and the USAF, of more relevance is the nature and level of exchange appointments that RAF personnel are now filling. For example, an RAF Group Captain is currently undertaking a Divisional Chief appointment within the Pentagon and is the first non-US officer to do so. The reciprocal arrangement has resulted in a USAF Colonel working within the future concepts area of the DAS in MoD. In addition, RAF pilots currently fill posts on the FA/22, B2 and F117 aircraft and RAF personnel of No 1115 Flt are embedded as a UK national element within the USAF's UAV 57TH Operations Group and UAV

battle laboratory. Within the training environment, in addition to places on the USAF Staff Course at Maxwell Air Force Base, the RAF now selects officers for the Joint Advanced Warfighting Course and the School of Advanced Air and Space Studies. Moreover, RAF participation on exercises such as Red Flag serves to further develop integration and understanding of air power. Although RAND argue that, 'there are limits to which any nation is willing to trust another',[130] the increase in joint exercises, the enhancement of exchange appointments, in both numbers and the influence it can deliver, and the level at which liaison is now commonplace, underlines the importance of shared understanding, confidence building and developing mutual trust between the USAF and RAF. As General Moseley argues, 'strong habitual relationships forged between…coalition partners provide the vital foundation of communication and trust that enables interdependent operations.'[131]

While relationships at the working level are important, it is critical that cooperation and the will to achieve harmonisation also exist at the highest level. In January 2007 the Air Chiefs of the USAF, RAF, RAAF and Canadian Air Force met at Williamsburg for meetings and presentations to discuss issues facing their respective services. While the fact that the Air Chiefs met may be more significant that the discussions themselves, CAS commented that, 'The conference provided a unique opportunity to discuss the challenges faced by our respective air forces and highlighted how much we have in common.'[132] CAS highlighted the future environment in which air power must deliver effect, considered capability shortfalls in the RAF, and underlined the point raised in this paper that the UK's role in future operations is likely to be contributing rather than leading. General Moseley introduced 67 initiatives for the USAF ranging from reinforcing joint and interdependent operations and developing the USAF's personnel component. Importantly, General Moseley underlined the importance of refocusing Air Force to Air Force relationships and the need to increase in exchange postings which this paper has highlighted. A further meeting of Air Chiefs is due in December 2007 and is the clearest evidence of a desire and commitment to improve, 'overall operational capability and the desire for truly integrated air operations.'[133] This commitment responds primarily to an evolving paradigm where security threats are engaged in a complex and non-linear battlespace by air power delivered as part of an integrated coalition force in a joint environment. Without the long-term leadership and strategic intent of the Air Chiefs, the integration that this new paradigm demands is unlikely to succeed. It is therefore critical that this 'high-level' relationship continues and is not undermined by changes in personnel.

Different Air Chiefs and their successors will usually seek to define their leadership and tenure with shifts in focus and strategy and there is a risk that the RAF/USAF 'special relationship' may receive less emphasis in the future than is currently the case. This paper has highlighted a range of areas where the relationship is strong and introduced a number of initiatives where it continues to develop – there are many others. Nonetheless, there is a risk that momentum may be lost if those at the higher levels of each Service do not build on the foundations of the Williamsburg meeting and similar working level engagements. While the harmo-

nisation of air power will depend on equipment, concepts and doctrine, working relationships and professional understanding at all levels will provide the personal and intellectual horse power to drive harmonisation forward. Importantly for the RAF, relationship building is a relatively low-cost option when compared with the price of equipment integration. Whilst its effect is difficult to quantify, the development of harmonisation can be measured against the frequency of integrated training and exercises and the number and type of exchange appointments, with additional weighting being placed on those appointments that deliver the most influence. The RAF faces a challenge in this respect. As this paper will show later, the RAF faces continued budgetary pressure and the natural and appropriate reaction is to protect the front-line capability by seeking savings and efficiencies in other areas such as manpower. As the pressure on the manpower ceiling and costs increases, so the flexibility to provide personnel for appointments and training in the US reduces. It is therefore necessary for the RAF and USAF to conduct a 'strategic' review of exchange appointments so that posts where the best value and influence can be gained are identified. Thereafter, the exchange process with the US should be operationally focussed and subjected to appropriate Air Rank supervision in order to provide the relevant coherence and scrutiny across the harmonisation lines of development. While the exchange process should continue to be managed by the Chief of Staff Personnel area within Air Command, oversight should be provided by the 'Office of Air Power Integration' that this paper suggests should be created.

Harmonisation – Politically Acceptable and Affordable?

While the Williamsburg meeting was important for what was discussed, it was also important in respect of the Air Forces represented. As this paper has suggested, the drive towards harmonisation with the US, and other RAF initiatives with the RAAF, is indicative, in part, of a new strategic emphasis on flexible 'coalitions of the willing' in response to global security threats. Importantly, no other European Air Force was represented at Williamsburg and this may support the view of Kagan that, strategically, US and European perspectives are diverging.[134] While CAS' strategic priority may suggest that the RAF sees its future divorced, or at least separated, from the European defence environment, CAS denies that harmonisation with USAF is 'anti European' and underlines the role that the RAF can play by bridging the gap between USAF and European Air Force integration.[135] The inter-relationship between the evolution of NATO, the development of a European Defence and Security Policy (EDSP) framework and the role of the US is not straightforward and the emphasis on these relationships continues to change and evolve. From the St Malo Declaration and Helsinki Agreement to transatlantic rifts over the invasion of Iraq in 2003, to the NATO Istanbul Summit in 2004, the political impetus in the UK for greater European Defence cooperation has waxed and waned. Despite this, European defence cooperation at the operational and tactical levels has been maintained with the RAF and German Air Force cooperation in the SEAD capability area, the formation of the European Rapid Reaction Force (ERRF), the provision of European Strategic Airlift, and the development of the European Air Group.

This paper does not propose to debate whether the RAF should make an either/or choice between closer integration with the USAF, or integration within a regional European context in order to pursue Garden's vision of a European Air Force.[136] Garden's focus on closer European Union (EU) air integration is motivated primarily, but not exclusively, as a means to improve capability and minimise the increasingly prohibitive costs of defence inflation. While these arguments are relevant, the discourse has been polarised into a debate as to whether integration of an independent EU military force is necessary to rival US hegemony (the French vision) or whether military integration is a means to make Europe a strategic partner of the US (the UK vision) and to create a European pillar under NATO.[137] Both these views recognise that the EU lacks the capability, such as PGMs, Air C², AAR, strategic lift, and secure communications,[138] to project credible military power and both seek to influence the US, albeit using different means to do so.[139] These capability deficiencies were seriously exposed during Operation ALLIED FORCE and have led the US to demand progress on closing the 'capabilities gap' between the US and Europe before the latter can be treated as an equal strategic partner. This desire is borne out by O'Hanlon who considers that, 'The strengths, capabilities, and cohesion of the members of the NATO alliance therefore have important global implications for the US.[140] This paper has already argued that the US Military Strategy seeks to 'enhance the capabilities of partners' and despite NATO and EU initiatives such as the Prague Capability Commitments, Helsinki Headline Goals, the NATO Response Force and the ERRC, the gap between the US and its European allies continues to grow.[141] Comparison of relative defence expenditure only serves to underline the problem. NATO Europe spends around $12 billion annually on defence research and development, while the US spends up to $70 billion annually.[142] Nonetheless, there has been progress and the US Joint Forces Command has established strong ties to NATO in order to develop new operating concepts and the 2004 Istanbul Summit led to agreement on developing the expeditionary capability of military forces.[143] However, with the capability gap comes a credibility gap and if the European allies are to play a substantive role in future US-led coalitions they must deliver the necessary capability and interoperability rather than merely making declarations of longer-term intent. Furthermore, Kagan argues that Europe's military weakness has also resulted in a lack of political influence with the US.[144] Harmonising with the USAF implies a vision of the future RAF as the 'partner of choice' for the USAF rather than as the dominant partner in the European context. However, this view over simplifies the debate. The RAF can assume both roles and harmonisation with the USAF enables the RAF to set the benchmark against which other European Air Forces can align their capability with the US. This paper does not accept the view of Clarke that, 'NATO is struggling to remain relevant to the US…..and the changed strategic landscape may cause soul-searching in Washington over the way in which it operates with allies'[145]. Nonetheless, the RAF is right to pursue air power integration with the USAF because it is this approach that delivers the full range of air power effect while allowing the RAF a unique position of influence within the USAF planning and execution mindset. By doing so, it reinforces its credibility in the European context. Dumbrell

argues that, 'for British foreign policy, closeness to Washington serves always to enhance, not to destroy, other dimensions of international British influence,'[146] and the RAF should view its relationship with the USAF and other European Air Forces in similar fashion. However, it may be necessary for the RAF to reinforce its European credentials in order to dispel any concern or misunderstanding that harmonisation with the USAF may create.

As this paper has already argued, the RAF must maintain a broad and balanced capability not just to satisfy the requirement of UK Defence Policy but also to provide a credible 'high-end' warfighting capability which can be harmonised with the US military. However, the single largest challenge facing the RAF in pursuing this approach does not come from Europe, but from Whitehall. One of the key drivers of RAF transformation since the end of the Cold War has been the reduction of UK defence spending as a share of GDP. Even if defence spending remains level in real terms, its share of GDP will have declined from 5.3% in 1982 to 1.3% by 2020.[147] Moreover, the share of government departmental expenditure for the MOD has dropped from 17% in 2000 to 12% in 2005, with the difference absorbed from the Health, Local Government, and Education Departments.[148] Although overall government expenditure has also risen, the political battleground and focus of government expenditure is likely to remain on the Health and Education Departments. This tension is likely to increase in the short-term with the Comprehensive Spending Review (CSR) 2007. Critically, while the FASOC underlines the RAF's desire to retain a balanced capability across the spectrum of operations, it does not address the degree to which the retention of this capability will be put at risk in the light of future budgetary constraints.

Pressure on government expenditure, such as the CSR, when combined with the effects of Defence Inflation[149] and the doubling of equipment costs every 7.5 years, will potentially affect the RAF's ability to maintain the balanced capability that is a prerequisite for harmonisation with the USAF. Difficult decisions will be required. Since the end of the Cold War, budgetary pressure has seen a reduction in force numbers and this trend is unlikely to change.[150] Moreover, this trend is unlikely to be reversed while the UK Military engage in operations overseas and where the link to the defence of national security, at least in the perception of the public, is tenuous at best. Even if this link is made, Defence is unlikely to join Health, Education and Pensions in the 'premier league' of government expenditure.[151] As a result, continuing budgetary pressure is likely to result in the RAF taking greater risk in the depth of its capability rather than removing a capability altogether. The Times reports that reductions in the Typhoon force, JSF, and FSTA are already being considered.[152]

Historically, policy-makers have sought to offset the gap between resources and commitments by pursuing a parallel approach of seeking greater efficiencies in defence spending while maximising effectiveness in Defence outputs.[153] This has been particularly evident in RAF spending, which has seen a significant increase percentage spend on its 'front-line' at the expense of its 'overheads' in the support area.[154] Analysis of the RAF's spending profile on capability areas, as a percentage of the RAF

Capability Area/Year	1976 %	1992 %	2002 %	2003 %	2004 %
AD/Strike/Attack/Recon	43	48	64	66	68
Maritime	5	4	12	8	5
Transport/AAR	9	11	13	14	16
Training/HQ/Suppoert	43	37	11	12	11

budget, between 1976 and 2004, is set out in *Table 2*.

***Table 2*. The percentage of the RAF budget spent on broad capability areas from 1976 to 2004**

The increase in percentage spend on the front-line is indicative of the RAF's desire to retain a 'high-end' warfighting capability, while the increase within the air transport and AAR areas is indicative of the development of Rapid Global Mobility. In contrast, in the period 1998 to 2006, the USAF spent 24% of its budget on joint combat forces (close air support, loitering indirect fires, and advanced air to ground munitions), 45% on joint force enablers (C4ISR, airlift and AAR), and 31% on overheads.[155] To maintain its balanced capability, the RAF has reduced 'overheads' in seemingly relentless drives for efficiency, re-organisation and rationalisation. Although most of the 'quick wins' have already been taken, continuing budgetary pressure will inevitably lead to further reductions in 'overheads'. Leaning, rationalisation, efficiency will remain a constant paradigm in the future RAF.

This essay has argued that the RAF must maintain its balanced, 'high-end' warfighting capability. To do so, in a technologically demanding environment and long procurement cycles, will require difficult decisions. While harmonisation with the USAF might suggest that it is more efficient and cost effective for the RAF to exclusively procure US equipment, this is an overly simplistic approach. This paper has already argued that the RAF is configured to undertake a range of operations without the US and the requirement for operational sovereignty requires UK industry to support, modify and sustain defence equipment independently.[156] This approach has been reinforced by the Defence Industrial Strategy (DIS) which, for example, sees no requirement for UK industry to design and build manned aircraft after Typhoon and JSF, although procurement must include some through-life 'value' for the UK defence industrial base.[157] This provides the opportunity for more efficient and economic procurement and the UK is likely to look to the US for its high technology defence assets. However, it will also require assurances on technology transfer and that key skills are preserved in order that the UK can retain operational sovereignty in maintaining and upgrading equipment. Despite the potential of the DIS, the balance between what capability it wants and what capability it can afford will remain a consistent aspect of RAF procurement issues for the foreseeable future. Much will depend on the outcome of the CSR 07 and a poor settlement for the MoD may result in a new Defence Review or the RAF taking its share of reductions in the Equipment Programme. Both outcomes may adversely impact on the capacity of the RAF to maintain a broad and balanced capability.

Conclusion

By seeking to harmonise its air power capability, concepts and doctrine with the US Forces, CAS is shaping a new chapter in the RAF and USAF relationship. Given the shared heritage and operational history of both Air Forces,

CAS' aim is neither revolutionary nor surprising, but it does recognise a new security environment, a new battlespace, the prevalence of coalitions to react to these challenges, and an appreciation that merely standardising capability is an insufficient response. As USAF military superiority will continue for the foreseeable future, CAS' aim is a realist and pragmatic approach to the current strategic and operational environment.

Harmonisation, as a concept is not well defined, and further research will be required to demonstrate its utility in doctrinal and conceptual terms. This paper has argued that while interoperability requires both equipment and personnel to work collaboratively to achieve an effect, harmonisation, when combined with the necessary political will, can achieve a demonstrably greater effect. This thesis is theoretical and its practical application is complicated by the nature of the security environment in which harmonisation must be delivered. Given the dynamic nature of security threats and the contrasting military responses to meet these threats, harmonisation is likely to be an evolutionary process and a means to an end rather than an end in itself. As such, harmonisation can be best described as a journey rather than a destination. Nonetheless, whilst at one level harmonisation is a force multiplier and enabler, it has broader implications for the RAF and the USAF. By minimising differences and maximising the combined effect of capability, harmonisation provides the potential for both forces to operate in 'spaces', at the strategic, operational and tactical levels which hitherto have been denied or restricted.

Despite the importance of the 'special relationship' between the USAF and

Bombing of Iraq cities by coalition forces

RAF, it is not unconditional and the RAF remains the junior partner. It would be irresponsible and wholly inaccurate to suggest that the relationship is equal and similarly incorrect to describe harmonisation as being equally beneficial to both the RAF and the USAF. In strategic terms, the UK considers its partnership with the US of critical importance and the US, chastened by its inability to turn military power into decisive influence, increasingly recognises that diplomacy and multinational cooperation are valid means to pursue its national interest. While the US military remains a realist force for good for the US, it is now more willing to seek greater legitimacy for its actions and to share political and military risk via 'coalitions of the willing.' In operational terms, this provides an incentive for the USAF to develop integrated coalition air operations and to increase the capabilities of its partners to 'join the joint fight.' Consequently, harmonisation is not a one-way street. While harmonisation benefits the RAF by allowing it to mitigate the capability

risk that it holds, the RAF can also provide reciprocal benefit to the USAF by plugging capability shortfalls as it did during Operation IRAQI FREEDOM. Indeed, there is evidence that despite its superiority in the 'high-end' warfighting spectrum, the USAF will continue to use the RAF to augment capability shortfalls in the combat enabling areas such as AAR, tactical reconnaissance, force protection, and air campaign planning. Despite this focus, the USAF implicitly places conditions on air power integration. In order to maintain its relevance, influence and credibility, therefore, the RAF must maintain a 'high-end' warfighting capability. It must also ensure that it retains a degree of technological parity with the USAF, via JSF for example, and procures air assets that can integrate and operate in high air threat environments. This will demand a minimum standard of capability from RAF procurement strategies and continued development of NEAC and fully networked Air C^2; it also requires the retention of the RAF's combat and combat enabling capability as a precondition for harmonisation.

Harmonisation can only be achieved by pursuing strategies across the appropriate lines of development, while maintaining coherence with the RAF Strategy and Development Plan. The formation of an Office of Air Integration could provide the necessary coherency to this work and deliver the necessary intellectual horsepower to make harmonisation a reality. While early and closer alignment of doctrine and concepts will be necessary, the RAF should ensure that it retains its unique experience and perspective of the air environment. This perspective has allowed the RAF to maintain significant influence in USAF air campaign planning where the RAF has much to offer. However, while the extent of harmonisation between the USAF and RAF will be supported by doctrinal and conceptual development, and determined by the degree to which shared situational awareness is achieved in the battlespace, its ultimate success will be dependant on building trust, understanding and confidence among the personnel component at all levels. The extension of the RAF/USAF exchange programme and an increase of integrated training and exercises, when combined with the will of Air Chiefs to enable harmonisation, can deliver the shared understanding, confidence, and mutual trust that will ultimately define whether harmonisation is successful.

A number of challenges lay ahead. Harmonisation with the USAF may be viewed as a unilateral act that seeks a definitive departure from closer integration of European air power. Such discourse can become politically polarised. Nonetheless, while CAS seeks to maintain and develop the RAF's position as 'partner of choice' for the USAF, this does not necessarily suggest that the RAF seeks to disengage from its European partners. Indeed, the opposite would seem to be the case and the RAF can act as the bridge upon which closer US and European air power integration can be encouraged. Therefore, while harmonisation with the US may be considered as a definitive move away from Europe, this overly simplifies the debate and fails to address the possibility that there is merit in pursuing one strategy as a means of developing the other. Nonetheless, appropriate reassurances to European partners may still be required. However, the single greatest challenge to harmonisation comes not from Europe, but from Whitehall. Since the end of the Cold War, the RAF has mitigated the

impact of declining defence budgets by drawing down its force structure and significantly reducing its overheads. Given the political focus on Health and Education, the defence budget will remain under pressure and the CSR 07 will provide the first significant challenge to CAS' aim. A poor settlement has the potential to affect the RAF's ability to maintain the broad and balanced capability that is essential to harmonisation with the USAF. It is therefore critical that the RAF continues to argue the case for combat and combat enabling air power as a relevant and affordable means to deliver integrated effect in the joint and coalition battlespace.

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