JOINT SERVICES COMMAND AND STAFF COLLEGE

COMPONENT STUDIES ESSAY

TO WHAT EXTENT IS THE RAF ABLE TO MEET THE JOINT OPERATIONAL CHALLENGES OF THE FUTURE?

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'The technique of warfare is always changing, sometimes drastically'.[1]
Lord Tedder

Since its inception on 1 April1918, the RAF has more than any other of the UK's Armed Forces been at the forefront of change and adaptation. This is in no small part due to air power's association with technology, and the fact that technology waits for no man. It was only fifteen years before the formation of the RAF that the Wright Brother's made their historic flight in North Carolina, and nine years earlier that the first officially recognized flight was accomplished in Britain. From the first concerted use of military air power in the First World War, through the policing of the Empire, the Second World War, the Berlin Airlift, the Malayan emergency, the V-Force nuclear deterrent, to today's expeditionary precision effects focus, the RAF has met the challenges placed before it. But is it able to meet the joint operational challenges of the future?

In order to answer the question posed, this paper will address the key issues in two parts. First, the joint operational challenges will be derived from historical trends, existing government policy and selected military doctrine. Second, analysis will be made of the RAF's ability to meet selected elements of the derived challenges. Through this analysis, it will be argued that the RAF is capable of meeting the joint operational challenges of the future, but that it must also beware of making equipment capability cuts to meet today's budgetary restrictions, without fully considering the associated long-term implications.

Arthur C. Clarke once said 'It is impossible to predict the future, and all attempts to do so in any detail appear ludicrous within a few years'.[2] This hypothesis may indeed be accurate, however, the planning horizon for the RAF is by necessity significantly greater than 'a few years'. By analysing historical trends it is possible to usefully predict the nature and scope of future challenges. Therefore, this paper will be limited to forecasting future challenges out to a period of approximately thirty years. Any further than this and estimations will certainly become less derived and more surmised. Additionally, it would be impossible to adequately address all of the future challenges facing the RAF within the constraints placed upon this essay. Therefore, this paper will concentrate on a number of key themes, noting that other major issues such as homeland defence and the increasing importance of cyber-space as an emerging battlespace have been omitted through necessity.

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[1] Tedder, '*Air Power in war'*, p.18
[2] Gray, C, *'Another Bloody Centaury'*, p.17

So what shape will the joint operational challenges of the future take? In 1998, a focused attempt to use foreign policy as a method of expressing security and defence needs was made in the Strategic Defence Review (SDR). This review utilized global strategic trends to set the context in which UK Forces would operate following the sudden ending of the Cold War. Its purpose was '…to reassess Britain's security interests and defence needs and consider how the roles, missions and capabilities of our Armed Forces should be adjusted to meet the new strategic realities'.[3] The review identified the complexity of the emerging environment and called for a capability based framework and expeditionary focus for the UK's Military. The Secretary of State for Defence stated in the review 'In the post Cold War world, we must be prepared to go to the crisis, rather than have the crisis come to us'.[4] It assessed that the likely threats to the UK's interests would come from Mediterranean Southern Europe, the Middle East and the Persian Gulf. Also of note is its inclination towards a comprehensive approach for dealing with security dilemmas, a significant departure from previous more military focused papers.[5] In general terms it was a ground breaking and insightful publication.

Events on 11 September 2001, however, found the SDR somewhat lacking in its assessment of asymmetric attacks and their potential strategic effect. As a result, a new chapter of the SDR was developed entitled SDR – The New Chapter (SDRNC). The updated defence policy paper was built on the foundations of the original work, as the basic assumptions were still considered valid. It did however introduce a wider focus, which included the potential for UK security threats to be global in nature. Similarly, Joint Operations Doctrine Publication 01 highlighted that conflict was likely to occur both in unanticipated locations and unpredicted circumstances.[6] Doctrine was essentially pointing towards an ever unstable world in which defence would play an increasing role.

Global uncertainty is also a central theme in the latest Development, Concepts, and Doctrine Centre Strategic Trends Programme. It speculates that within the next thirty years 'every aspect of human life will change at an unprecedented rate, throwing up new features, challenges and opportunities'.[7] In this uncertain and undoubtedly complex world, it goes on to say that while states will become ever more interdependent they will also where possible strive to preserve

[3] Crown, *'The Strategic Defence Review'*, para 17
[4] Ibid, para 6
[5] Ibid., para 40
[6] JDCC, Joint Doctrine Publication 01, p.1-1.
[7] DCDC, p.1

their instruments of hard power.[8] The debate surrounding the continued threat of interstate warfare is one which is set to continue. Colin Gary puts forward the hypothesis that states will retain their instruments of hard power and if necessary use them in a classic state on state conflict. He points out that while western states are currently involved in wars of choice, history shows that the strategic environment will change which may in turn pave the way for future state centric warfare.[9] Michael Howard also states that 'archaeological, anthropological, as well as surviving documentary evidence indicates that war, armed conflict between organized political groups, has been the universal norm in history'.[10] Other commentators such as Thomas Barnett believe that wars have become obsolete and that armies no longer plan for major interstate conflict, instead focusing their attentions on rogue leaders.[11] Since large scale interstate conflict cannot be discounted, an armed force such as the RAF must be prepared to conduct its operations at either end of the intensity spectrum. The temptation to prepare solely for present day conflict, therefore, is something which the RAF must resist. Lord Tedder stated in 1947 that while the British could be rightly accused of preparing for the last war or even the last war but one, that this practice would prove fatal in the future.[12]

The UK's latest major defence policy paper is the 2003 Defence White Paper 'Delivering Security in a Changing World'. Building on previous reviews, it articulates the British Government's further analysis of the future strategic environment, the associated implications for defence, and what changes are required to meet the new challenges. Specifically, the White Paper identifies the following set of assumptions which are intended to underpin future planning: A global rather than a regional focus for operations in recognition of the growth of international terrorism;[13] the capability to deliver the eight strategic effects of – Prevent, Stabilize, Contain, Coerce, Disrupt, Defeat and Destroy;[14] continued exploitation of the advantages of Networked Enabled Capability (NEC), precision munitions and effects based operations (EBO);[15] an optimized force structure capable of supporting three concurrent small and medium scale operations, while retaining the capability to conduct large scale operations in conjunction with an enduring small scale task (large scale operations

[8] Ibid., p.4
[9] Gray, C, op. cit., p.36
[10] Howard, M, p.1
[11] Barnett, T, p.368
[12] Tedder, op. cit., p.19
[13] Crown, '*Delivering Security in a Changing World*', para 9
[14] Ibid., para 11
[15] Ibid., para 35

are assumed to be undertaken alongside the US);[16] and finally a need to ensure that the Armed Forces reflects the social conditions and aspirations of the twenty-first century.[17] These effects when placed into the context of an uncertain and globalizing world provide a number of specific joint operational challenges for the RAF to meet if it is to remain relevant and retain credibility. The challenges span the entire spectrum of conflict, from the hard and tangible delivery of effect, through to the less tangible but equally important social acceptance of air power.

Accordingly, the first challenge facing the RAF that this paper will address will be the enduring requirement for control of the air. Control of the air has been of central importance to joint operations since the first use of the third dimension for military purposes. History is littered with examples where air control has been achieved and subsequently provided the required freedom of manoeuvre to the remainder of the force. A recent example of the positive affect of air control comes from the 1991 Gulf War. Here, the degree of freedom afforded to the operation allowed coalition forces to execute their plan practically unhindered. In his autobiography, General Schwarzkopf states that by the end of January 1991 'the skies over Iraq belonged to the Coalition.[18] Conversely, during the campaign to retake the Falkland Islands in 1982, the required level of air control was never attained. Indeed, had Argentinean aircraft been more effective in their attacks on the Task Force's ships in and around San Carlos Water, the entire campaign may have ended differently. HMS Antrim, HMS Argonaut, HMS Brilliant, HMS Broadsword, HMS Glamorgan, HMS Glasgow and HMS Plymouth were all hit by weapons from Argentine aircraft, however, none were put out of action due primarily to the weapons failing to fuse.[19] Had the Task Force lost these seven ships the outcome of the conflict may have been significantly different. As such, the Falkland's campaign should be a salutary lesson for those who doubt the continued requirement for air control in warfighting.

The RAF, through both the Future Air and Space Operational Concept (FASOC) paper and the Chief of the Air Staff's Strategic Vision 2006, acknowledges the continued importance of control of the air to future joint operations. In particular, the FASOC highlights the importance of stealth in achieving an acceptable level of control as a result of the proliferation of ever complex and capable surface-to-air missile (SAM) systems.[20] While stealth will no doubt be an important facet, it should

[16] Ibid., para 31
[17] Ibid., para 59
[18] Petre, P and Schwarzkopf, N, p.421
[19] Middlebrook, M, p. 399-402
[20] Crown, *Future Air and Space Operational Concept*, para 24

not be considered the final word in air control. First, the primary aircraft in the RAF inventory for establishing air control in the next 25 years will be the Typhoon. This aircraft will be an extremely potent multi-role aircraft for its service life (out of service date approximately 2030) and will be more than a match for future adversary combat aircraft. However, its lack of stealth will severely limit it in the face of the more potent SAM systems which are likely to proliferate in the future. Second, there is no reason to suppose that current stealth technology as employed in the RAF's Joint Strike Fighter programme will remain potent against future systems. Historically, as soon as a system gains an advantage, a counter to that advantage is developed and deployed. The practice of placing faith in one technology is potentially short sighted. So will the RAF be able to provide an acceptable degree of air control in the future? The answer to the question is a qualified yes, the qualification being that in the face of higher-end SAM systems such as the Russian S400 and derivates of such, it will be reliant almost completely on an edge provided by stealth technology. Should this technology be successfully countered then the ability to provide an acceptable level of air control could prove to be somewhat limited.

The next joint operational challenge this paper will address, is that of developing a global focus, something which in essence is nothing new for the RAF. In December 1919, Winston Churchill stated to Parliament, 'The first duty of the RAF is to garrison the British Empire', a role which it fulfilled admirably.[21] It could be argued that the level of expeditionary capability has ebbed and flowed since those days, potentially reaching a low during the Cold War when the RAF needed very little in the way of a deployable capability. Uncertainty in today's world coupled with the policy of meeting threats at their source has once again highlighted air power's attributes of reach and speed. The FASOC paper introduces rapid global mobility as one of its six core air and space power roles. It defines this as 'operations to move and support men, materiel and assets at speed over strategic distances'.[22] Rapid global mobility forms the core of expeditionary operations which are central to the successful execution of current defence policy. The effects required may range from limited support for smaller scale evacuation operations, through to larger scale humanitarian or disaster relief operations. The RAF's ally of choice, the USAF, is also placing significant effort in its ability to project global effect, albeit on a different scale. In its Global Mobility concept of operations it highlights the positive effect that

[21] Crown, *'A Brief History of the Royal Air Force'*, p.62
[22] Crown, *Future Air and Space Operational Concept*, para 31

a focused response to a global crisis or contingency can have and that central to this will be its Air Mobility capabilities.[23]

To provide the required degree of rapid global mobility, the RAF's plans include an expansion of the C-17 Globemaster programme, the introduction of the A400M tactical and strategic lift aircraft, and the replacement of its ageing air-to-air tanking fleet with the Future Strategic Tanker Aircraft. These programmes, if delivered to the specified performance, time and cost parameters will substantially improve the UK's ability to project rapid effects. For example, the A400M will replace the C130K Hercules one for one; however, the new platform will have approximately twice the cargo capacity of the C-130.[24] They will compliment the tactical intra-theatre airlift capabilities provided by the C130J Hercules aircraft and the Joint Force Helicopter Command's rotary assets. The importance of rapid global effect should not be underestimated, as J.F.C. Fuller said'…the history of war has shown again and again, a handful of men at a certain spot at a certain hour is frequently a far more powerful instrument of war than ten times the number on the same spot twenty-four hours later'.[25]

Concurrent with the ability to project a joint force is the equally important aspect of sustaining it. Global sustainability is central to the concept of global influence and the RAF's capability in this area will directly affect the nature of any future joint operation. Joint force sustainability will be provided by a combination of the RAF's rapid global mobility and the Royal Navy's flexible global reach concept. The former providing rapid, timely, and precise logistics support, and the later providing slower but greater capacity of support to deployed forces. The two concepts are therefore compatible and provide a synergistic effect for the joint force commander. In essence, the air transport and air-to-refuelling fleet will provide a joint force commander with the flexibility to position and sustain a force worldwide in future operations. There will be limitations of scale when compared to those of the US, however, the RAF's contribution will be remain impressive when compared to most other nation's capabilities.

Provision of the eight strategic effects of – Prevent, Stabilize, Contain, Coerce, Disrupt, Defeat and Destroy will be analysed next. The FASOC paper states that EBO in combination with a NEC will drive both air and space operations in the future. Indeed, the RAF's ability to deliver effects by developing and exploiting current NEC is now articulated as one of the Chief of the Air Staff's strategic priorities

[23] US DoD, p.42
[24] Crown, '*Royal Air Force Strategy:2006',* 2006, p.23
[25] Crown, *'Air Warfare: AP 3002'*, 2006, p.97

for the next five to ten years.[26] Therefore, the key enablers of NEC, precision munitions and EBO should be considered integral to the particular challenge of delivering effect.

Delivery of effect from the air is in itself nothing new. Significant effect was delivered during both the policing of the colonies and the Allied bombing offensive over Germany during the Second World War; however, was it the desired effect? It is only in the development of recent thinking that EBO has become more formalized. EBO are designed to be complementary to the wider Comprehensive Approach which is being developed across government with the aim of dealing more efficiently with the increasingly complex operations the UK is finding itself involved in. Joint Doctrine Note 1/05 defines EBO for military forces as: 'The way of thinking and specific processes that, together, enable the integration and effectiveness of the military contribution within a Comprehensive Approach'.[27] The importance of the cognitive domain in this respect is highlighted as one of the Chief of the Air Staff's strategic priorities. This requires the RAF to provide a training system capable of producing 'well motivated, highly trained and adaptable warfighters'.[28] Therefore, on the assumption that the RAF will deliver on the Chief's edict, it should be in a position to at least conceptualize the elements required for an effects based approach.

The cognitive element of EBO is, however, only part of the equation. The required effects must also be delivered, and the previously defined effects cover a broad range of outcomes. The RAF's contribution to the delivery of these effects will vary depending on circumstances; therefore the underlying theme is for flexible platforms which can provide the desired effects in a potentially non-linear battlespace. A central element of this flexibility will be timely information gathering, processing and dissemination enabled by NEC. In the increasingly complex battlespace of the future, information will become vital for the joint force to gain and maintain the required edge over an opponent. This will be especially demanding where the opponent is behaving asymmetrically. Even the most non-traditional of adversaries will display fleeting symmetrical and therefore detectable behaviour. For example, an asymmetric adversary may use a mobile telephone to pass instructions to personnel or indeed use transport to move location. It is at these symmetrical moments that the most illusive of opponents becomes detectable, and therefore targetable.

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[26] Crown, '*Royal Air Force Strategy:2006'*, p.5
[27] Crown, Joint Doctrine Note 1/05, para 106
[28] Crown, '*Royal Air Force Strategy:2006'*, p.5

To take advantage of these fleeting opportunities at the operational level, the RAF primarily utilizes its Information Surveillance Targeting Acquisition and Reconnaissance (ISTAR) capable assets. Air and space based assets are ideally placed to generate and disseminate comprehensive combined and joint operational pictures.[29] In scenarios where it will be impossible to predict when an adversary will exhibit detectable behaviour, continuous area coverage may well be required. It is here that one of air power's limitations, persistence, becomes a significant constraint. One way of addressing this shortcoming is through air-to-air refuelling and indeed the RAF's fleet of E-3D Sentry and Nimrod ISTAR aircraft are equipped with this capability. In a significant recent decision the soon to be in service Sentinel aircraft, which forms part of the Airborne Stand-Off Radar (ASTOR) capability, has had this facility removed as a cost saving measure.[30] This move may have strategic consequences for UK Defence in the future because it has removed some of the very flexibility that is called for within both the FASOC and the RAF's Strategic Vision. Some will certainly argue that with its ten hours plus endurance that it never really needed an air-to-air refuelling capability. This contradicts empirical evidence which suggests that flexibility and adaptability are essential, since forces are frequently used in roles for which they were not intended.[31] This decision highlights a significant disconnect between the RAF's strategic aspirations and its ability to fund them. It should therefore serve as both a continued indication of the financial realities manifest in modern day defence procurement, and as a reminder that decisions should be taken based on long-term requirements rather than short term budgetary constraints. The practise of capability reduction to accommodate defence inflation must be resisted for the RAF to retain the required level of flexibility and adaptability that will be needed to meet an uncertain future. If flexibility is required of the RAF's systems then it must be built into them rather than assuming that it will be there when it is needed.[32]

Another way of addressing the ISTAR persistence problem is through the use of Unmanned Air Vehicles (UAV). With no requirement for life support systems, these platforms are able to maximize their available payload and are already completing missions in excess of thirty-six hours.[33] UK Defence is making belated inroads into operations involving UAVs with a limited purchase of the Predator B system. Although the UK's UAV programme has been slow coming to fruition, it is

[29] Crown, *Future Air and Space Operational Concept*, para 34
[30] Pocock, C, (2006), [Accessed 14 Feb 07].
[31] Gray, C, op. cit., p.46
[32] Cameron, N, p.7
[33] Ratheon, [Accessed 10 Feb 07].

now providing critical ISTAR coverage in both Iraq and Afghanistan, and its product is being exploited throughout the joint environment. In recent developments, British Predator UAVs have entered a new phase of unmanned operations by prosecuting kinetic strike operations with the same Predator systems, proving further utility and flexibility of the system.[34] This initial step into the world of Unmanned Combat Air Vehicles represents a significant jump in the RAF's ability to shorten kill chains and thereby make a significant contribution to joint effect.

Currently, only space based assets can provide the complete answer to the lack of persistence inherent in traditional air power and even this comes with significant limitations, not least of which is cost. The UK is far from the forefront of space exploitation, however, the MOD is validating the utility of wide area and persistent satellite coverage via the small satellite demonstrator programme TOPSAT.[35] Time will tell what level of genuine engagement the UK and therefore the RAF has in space. One thing is certain, space power and specifically space based surveillance will become increasingly important in future operations. If the RAF desires guaranteed access to space and its products, rather than rely on allies and or commercial providers, it must make practical steps to fund its space based requirement.

On balance, the RAF can and will provide a credible ISTAR capability to a future joint operational commander. However, since these assets are central to the generation of the joint operational picture, it is unfortunate that ASTOR has had some of its flexibility taken away in a short sighted cost saving measure. Only time will tell how significant this decision will become.

Once information has been gathered and processed it has to be disseminated for it to be of practical utility. NEC is the vision which should provide near real-time information access, however, when discussing NEC it is important to remember that it is purely an enabler and not an ends in itself. At present, the RAF generated ISTAR product is only available to certain recipients who have compatible equipment. For a true NEC to be realized, all capable sensors should contribute to the operational picture and all interested parties should have access to the product thereby assisting decision making at all levels.[36] Much has been achieved by UK Defence and the RAF in their quest to become evermore networked. Despite this, it is apparent that the US is forging ahead at a rate which is becoming increasingly difficult to maintain pace with. Since the US is considered the UK's ally of choice,

[34] Richardson, D, p.14
[35] Crown, '*Royal Air Force Strategy:2006'*, p.22
[36] Crown, *Future Air and Space Operational Concept*, para 36

remaining compatible with their forces must remain a high priority for the RAF. Spurred on by the failure of high level strategic communications at key moments during the fighting phases of Operation Telic in 2003, the MOD has elevated NEC to one its highest priorities with an annual research and technology programme budget of £55 million.[37] Additionally, in 2005 the MOD issued its first NEC handbook which aimed to foster a wider understanding of NEC and describe the route map to full capability.[38] Therefore, as UK Defence has a credible and more importantly funded plan to deliver the NEC vision it can be surmised that the RAF will rise to the joint network related challenges of the future. The major challenge for NEC and the RAF will be remaining interoperable and compatible with the advances of US systems, while remaining interoperable with its others allies such as non-US members of NATO who may be less advanced.

In the preceding paragraphs, the contribution of ISTAR and NEC to delivering future joint operational effect has been examined. The final part in this particular jigsaw is therefore the delivery of effect. As has been previously mentioned, the eight defined strategic effects span the full range of defence roles. The extent to which the RAF will contribute to these effects will vary from operation to operation; however, the growing requirement for precision at the kinetic end of the spectrum will provide some of the most demanding challenges for the RAF in the future. In today's battlespace, the RAF is able to deliver kinetic effect in terms of a target's spatial position with great accuracy. In the increasingly complex battlespace of the future, precision effect must be deliverable in space, but also at a certain time and at a scaleable quantity if it is to offer the joint operational commander a significant degree of flexibility.[39] So is the RAF addressing the future problems of timeliness and scaleability of effect? The answer to the timeliness question is yes as it is mostly reliant on the capabilities provided by NEC and ISTAR, which as already been discussed are at least planned to deliver the required capabilities. With respect to scaleability, at one end of the spectrum the RAF is yet to procure any weapons with truly adjustable effect. The procurement of Paveway IV will go some way to providing this capability with its adjustable fusing and smaller explosive yield than its predecessors. However, since its explosive yield cannot be changed it will fall short of a truly scaleable weapon. At the non-kinetic end of the effects spectrum, however, significant research is being carried out into deriving the coercive effect of presence, demonstration of intent, and shows of force. The initial findings of this study are

[37] Skinner, T, p.20
[38] Ibid.
[39] '*Precision Strike Weapons and Net-Centric* Warfare', p.57

providing some promising results. Therefore, when the non-kinetic and kinetic options are combined the RAF will provide the future joint operational commander with some limited options of scaleable and coercive effect.

Another major challenge for the RAF in the future will be its ability to operate alongside coalition forces, primarily those of the United States. Joint and multi-national operations are nothing new for the RAF. The pervasive nature of the air environment has meant that airmen have invariably needed to abide by some form of international agreement or co-ordination. The SDR and SDRNC assumption that the UK will invariably operate along side US forces has until now provided no truly insurmountable challenges. UK and US personnel have worked alongside each other right from the day when Samuel Franklin Cody made the first flight in Britain in British Army Aeroplane No.1, to operations today in Iraq and Afghanistan.[40] However, if this is to remain the case for the RAF of the future, significant decisions will have to be made.

US forces, especially the USAF, is undertaking significant change under the title of Transformation. Commentators disagree about the degree of revolution which is taking place, however, the fact that change is happening is not disputed. The change that is taking place has been precipitated by the whole scale integration of the computer in modern warfare, with the goal of defeating symmetric and asymmetric opponents.[41] The USAF transformation 'Flight Plan' of 2004 defines its transformation plan as '… redefining standards for military success by accomplishing military missions that were previously unimaginable or impossible except at prohibitive risk and cost'. It further expands this concept saying 'Eventually such efforts will render previous ways of warfighting obsolete and change the measures of success in military operations for ever'.[42] If the UK's major ally is changing to the extent that previous ways of fighting will become obsolete, what is the RAF doing to remain compatible? This issue is more than just conceptual; Peter Gray points out that revolutionary change in concepts, doctrine and technology may provide the capability to defeat an opponent; however, they may also render allies practically and conceptually incompatible.[43] One of the key elements of the transformational vision for the USAF is for the ability to execute rapid global strike, allowing the US to project power globally without the requirement for forward deployed forces or overflight approval. UK Defence is unable to fund such utopian security goals with current and

[40] Crown, *'A Brief History of the Royal Air Force'*, p.1
[41] Gray, C, op. cit., p.51
[42] US DoD, op. cit., p.9
[43] Grey, P, p.108

projected defence budgets. Therefore, for the RAF to remain relevant in this future battlespace it must where possible align its concepts with those of the US, and attempt to provide flexible and effective capability where it can. The RAF's strategic priorities acknowledge this requirement and state that the RAF should 'harmonize our air power capability, concepts and doctrine with those of the US Forces'.[44] Only time will tell if the initiatives put in place by the RAF to remain compatible with its major ally are successful, however, some difficult decisions lay ahead just to retain a level of compatibility.

Having inspected some of the key challenges facing the RAF, this paper will finally look one of the potential constraints it will be facing in the future, namely the continued social acceptance of air power. One of the major and enduring criticisms of the use of air attacks is the allegation of disproportionate amounts of civilian and non-combatant deaths resulting from its employment. This judgement probably has its genesis in writings and statements from inter-war commentators such as Stanley Baldwin and H.G. Wells. Baldwin's often quoted 'The bomber will always get through' was followed by the less well known 'The only defence is in offence, which means that you have to kill more women and children more quickly than the enemy if you want to save yourselves'.[45] Similarly, H.G. Wells offered in The Shape of Things to Come the prospect of 'blowing to rags the bed rid grandmother and the baby in the cradle'.[46] Images of decimated towns following the bombing offences of World War II only served to re-enforce this perception, as did television news footage from campaigns such as Vietnam. Furthermore, the notion that being on the receiving end of an air attack merely serves to strengthen morale is open to debate. Despite British propaganda to the contrary, bombing is now known to seriously depress morale, and engenders the psychological effects of defeatism, fear, hopelessness, fatalism and apathy.[47] The popular image of air power has therefore unsurprisingly been of one overmatch and disproportionality. Indeed, the major conundrum for politicians is associated with restraint rather than employment.[48]

The media has a central role in highlighting the actualities of war to the general public, unfortunately it also has a propensity to major on anecdotal and sensational news rather than statistical evidence.[49] The RAF must therefore continue its proactive engagement with the world's media and the British population,

[44] Crown, '*Royal Air Force Strategy:2006'*, p.28
[45] Young, G, p.174
[46] Wells, H.G., p.54
[47] Lambert, A, p.85
[48] Grey, P, op. cit., p.1
[49] Gates, D, p.34

and importantly it must not be afraid to extol the virtues and capabilities of current and future air power. This requirement is not missed in the Chief of the Air Staff's Strategic Vision, which states that one of the priorities for the next five to ten years is to 'further enhance the image and reputation of the RAF with the public as a means of maintaining their public support'.[50]

Despite the perception that air power is in some way unjust and unfair, it has been and often remains the instrument of choice for governments wishing to minimize risk to their own military forces. Air attacks will never completely obviate the potential for collateral damage, however, there is a persuasive argument which states that the amount of unintended damage caused is significantly lower than would be the case if ground forces were employed.[51] The fact is that increasing levels of accuracy available from today's precision guided munitions mean that air power is entering a realm where significant levels of collateral damage are becoming a thing of the past. The future challenge for the RAF is to promote this more clinical and efficient way of providing effect to its public, without overselling the capability. One way to achieve this is to expose the consequences of other types of leverage available to a state. The noted air power theorist Phillip Meilinger makes a useful comparison of modern precision air effect and sanctions to illustrate this point. Opponents of the use of military force frequently sight the use of sanctions as an alternative means of achieving political goals. The realities of such actions are often not attributed to their use. Evidence suggests that as a result of UN sanctions placed upon Iraq between 1991 and 1998, half a million infants have died. Conversely, Iraqi officials claimed that two thousand three hundred civilians were killed during the six-week coalition air campaign of 1991; this in a campaign when the majority of ordnance use was non-precision.[52] No-one would suggest that the loss of just over two thousand civilians is insignificant. When the figure is set against the realities of other more supposedly humane activities, however, it does highlight modern air power's relative capabilities.

So, to what extent is the RAF able to meet the joint operational challenges of the future? The future will remain complex and that the challenges the RAF will face will be wide ranging. History remains the primary guide to the future global strategic context, in that it warns of what the future may bring and importantly that major surprises will occur.[53] From its inception, the RAF has evolved to meet to challenges

[50] Crown, '*Royal Air Force Strategy:2006'*, p.5
[51] Mason, R, p.122
[52] Meilinger, P, p.79
[53] Grey, P, op. cit., p.371

of the time and it must continue to do so if it is to remain relevant and credible. This paper has shown that today's RAF is capable of meeting the primary joint operational challenges of the future, but also that it must retain adaptability and flexibility in order to meet the potential shocks which may be just over the horizon.

The key themes noted in this paper are the inevitability of joint and multi-agency operations for the RAF, which result from ever complex global challenges. Additionally, global complexity will necessitate that the RAF of the future must be prepared to conduct operations at all points on the intensity spectrum. Within this, since inter-state warfare cannot be ruled out, the enduring requirement to provide control of the air against a well equipped adversary will remain. Furthermore, as the diversity and location of threats increases, the ability to project rapid effect on a global scale will be critical to the RAF's continued relevance. The key enablers of ISTAR and NEC will remain pivotal elements to meeting the challenges of tomorrow, as will improving platform persistence. Finally, a continued education of both the media and the public on air power's capabilities across the entire spectrum of conflict will be critical to the continued social acceptability of its employment.

Ultimately, there are two major areas of development which must be tackled if the RAF is to meet the joint operational challenges of the future. First, as US forces are to remain the RAF's ally of choice, care must be taken to ensure that the respective force elements remain at least interoperable and preferably complimentary to each other. Second, the RAF must match its aspirations against real world budgetary constraints. Crucially, it must not allow short-term savings measures to affect its core capabilities without considering the long term effects of such decisions.

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