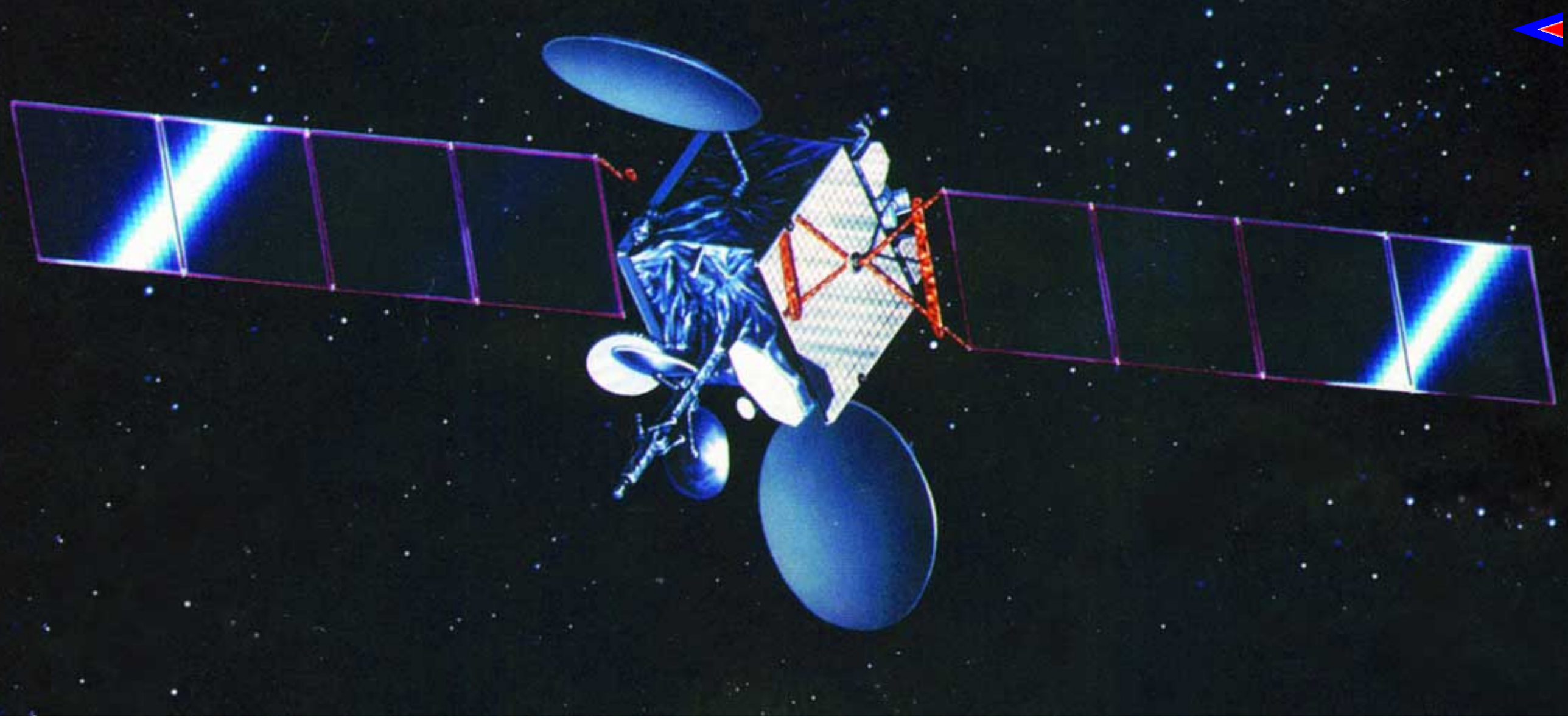


Air Power
or
Aerospace Doctrine 2010?

Military doctrine is by definition historical

Professor Richard Overy[1]

Professor Overy went on to postulate that doctrine tended to become an end in itself, rather than a means to an end. He graphically describes doctrine as tending "to solidify, like a slowly moving lava flow"[2]. It could therefore be argued that, at best, doctrine is examined on an occasional basis to see if the latest minor conflict has washed up any earth shattering revelation that necessitates a review; otherwise events are shoehorned into the existing mantra. At worst, the body of doctrine becomes so old that it is rendered totally meaningless, worthy neither of being taught (the simple dictionary definition of doctrine) nor useful as a broad based source of reference. This state of affairs is by no means impossible to reach. Any lengthy period of stability could result in a force becoming stultified, both in terms of its equipment programme and its thinking. In such circumstances, redundant legacy equipment and doctrine become less and less relevant: complacency reigns.

Historical examples of this state of affairs abound. The Royal Air Force, in the inter-war years, owed its existence to the doctrine of the strategic bombing offensive. Under the charismatic leadership of 'Boom' Trenchard, air power was considered to be an exclusively offensive weapon; the best, indeed only, way to defend the United Kingdom was to attack the enemy on his airfields, in his factories and in the heart of his homeland. The development of fighter aircraft (and doctrine) was eschewed as being neither practical nor necessary. Even when the Spitfire, Hurricane and Radar (then RDF) appeared on the scene, their effective deployment was mired in dogma.[3] This was in marked contrast to the flexible approach to doctrine adopted by the Luftwaffe.[4]

Professor Overy suggests that doctrine must therefore be the subject of almost perpetual review – it is not 'inscribed in stone' (successive authors of AP 3000 probably, however, have it inscribed on their hearts). It is incumbent on us all to play an active part in this review process; we must all apply constant and critical interrogation. This paper contributes to that debate. It is not, however, an attempt to predict the future, nor even to build a series of semi-convincing scenarios. Nor does the paper attempt to enter the debate on the existence, or otherwise, of the so-called Revolution in Military Affairs. Neither doctrine nor the ensuing debate should presume to tell

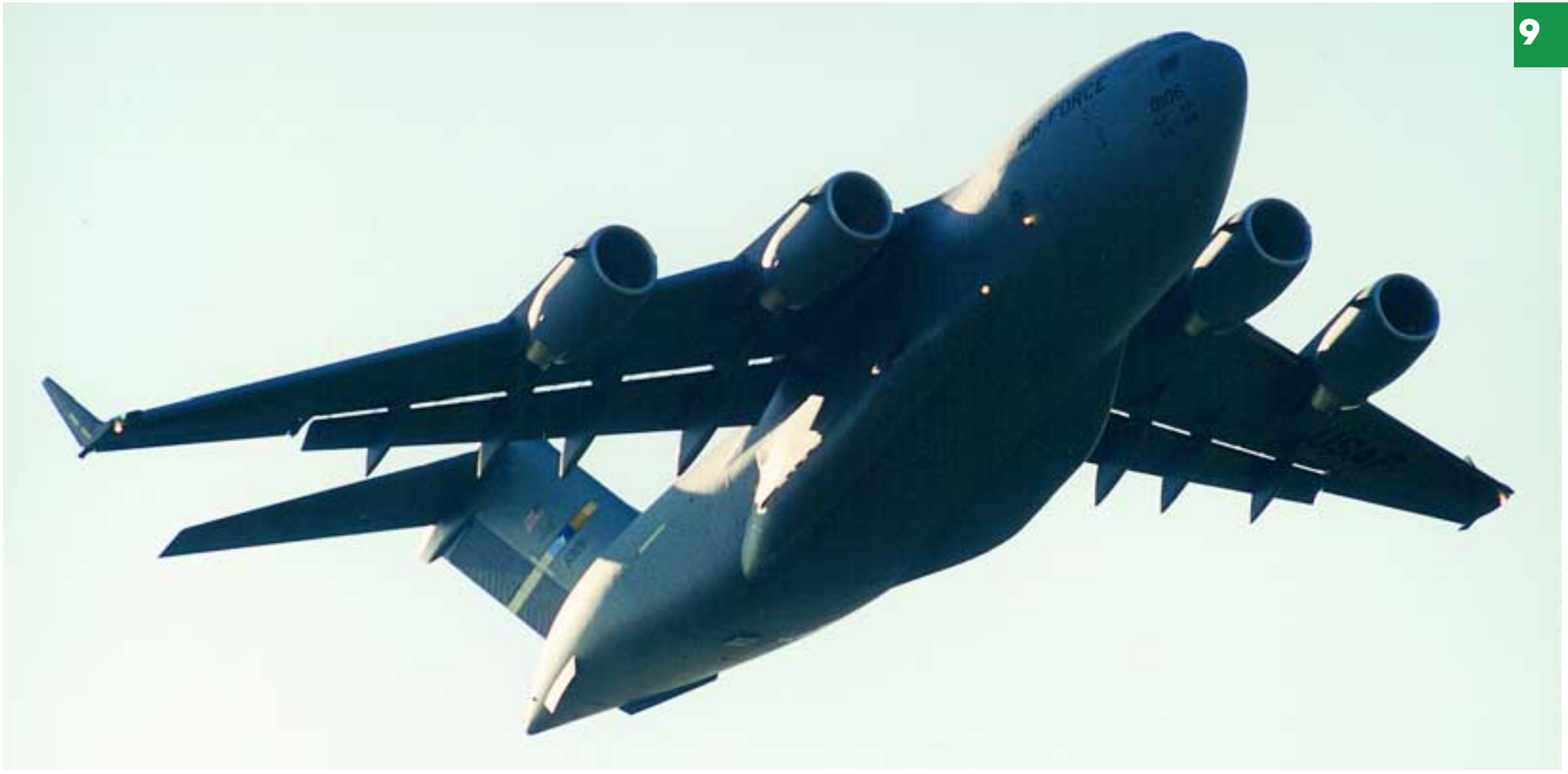
elected governments the way in which they should organise defence policy. Rather, the paper looks at how warfare **may** develop over the next decade, and how the armed forces of the United Kingdom may be called upon to react. For reasons of coherence, this section has been structured around the main Defence Missions outlined in the Strategic Defence Review.[5] The paper then goes on to look at the main core capabilities of air power as evolve to match the potential changes in the challenge detailed in AP 3000, British Air Power Doctrine[6] outlining how doctrine may have to of tomorrow. The possible doctrine that emerges does not, in a paper of this length, cover all possible eventualities or attempt to re-write AP 3000.

EVOLUTION OF WARFARE

One of the inherent requirements for the armed forces of any country is defence against strategic attack. SDR phrased this task as being in the NATO context.[7] It is not unreasonable to assume that NATO will remain in existence until at least 2010, possibly (indeed probably) enlarged even further. Strategic attack was not in prospect in 1998 when the Review was published and there is little to suggest that it will be any more likely in 2010. As the realities of an open market continue to ravage the Russian economy, the chances of sufficient funds becoming available merely to maintain force levels let alone re-equip appear minimal. China may grow to become a peer competitor, but is unlikely to present a threat to NATO. Even apparent truisms such as this must be regularly reviewed. Recent press articles suggest that China is well advanced in its development of anti-stealth technology with long term implications for allied capabilities wherever they may be deployed.[8] It will therefore be incumbent on any government to maintain a full cross section of the main military capabilities from which larger scale forces can be generated. Maintenance of the nuclear deterrent will continue to fall within this category.

Regional Conflict within NATO remains a distinct possibility with Article V action the most likely mechanism. Russian adventurism on a large scale has already been effectively dismissed. But border incursions, or more likely, spillover from ethnic conflict in almost any of the minor republics that border NATO cannot be ruled out; this is particularly pertinent on the borders of Turkey where conflict would take place on and over difficult terrain. The United Kingdom will almost certainly maintain a full range of capabilities to support NATO operations in anticipation of such a contingency. The most frequently required force package will increasingly consist of a relatively light, mobile force that could be deployed quickly. The fastest way of demonstrating offensive military capability will be by air and it is obviously through this medium that early entry forces will travel. This will have ramifications on the force structure of all three services as will be discussed in due course.

Regional conflict outside NATO is the most probable contingency of any great scale in which United Kingdom forces are likely to become embroiled. The Gulf is almost certain to remain central to national political and economic interests. And it is unlikely to have become more stable by 2010. By the same token, conflict in North Africa or the Near East could generate sufficient



heat for our vital national interests, or those of our allies, to be affected. These potential threats to stability would again require the early deployment of mobile, combat capable forces. As ever, the quickest 'bang for your bucks' would be through the immediate use of air power. For this to be effective, maximum use would have to be made of ISTAR assets, appropriate support aircraft – all preferably coordinated with allies. With the growing importance of, and authority for,[9] opposed humanitarian intervention, the future force structure will need to retain the capabilities necessary to fulfill a wide range of possible missions.

It is almost inconceivable to imagine that United Kingdom participation in *peace support and humanitarian operations* will have significantly diminished by 2010. Whilst it may sound somewhat cynical to suggest that we will not have found our way out of either Bosnia or Kosovo by then, the realities of the Balkans are that only a massive boost to the individual economies will assuage the bitterness of the recent decades. Black market economies run by mafia-style organisations do not inspire confidence or movement towards stability unless considerable IMF assistance is used to change the whole system; Russia is an unimpressive example. A combination of factors such as the proliferation of media interest, the increasing desire of the

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United Kingdom government to be a force for good in the world and a widening worldwide poverty gap will ensure that 'small scale contingencies'[10] will remain high on our agenda. SDR was predicated on our force structure supporting one full scale or two medium scale operations (one of which would be war fighting and not rouled – i.e. less than six months duration).[11] It may be that by 2010, the United Kingdom's involvement in small scale contingencies will have a far greater impact on force structure with assets such as strategic lift, satellite communications equipment (and the necessary staff), electronic warfare systems and so forth forming the critical path. Remedying such shortfalls obviously will not be cost free. But the alternative course of action – opting out of participation in conflict resolution in a particular theatre – may not be reconcilable with UK foreign policy objectives.

Defence Diplomacy will remain an important means of achieving the Government's foreign and security policy objectives. It includes, at present, an enhanced arms control programme, outreach, education and training. It may well be that air and space reconnaissance assets will be increasingly used in the first of these areas. Note, for example, that the USAF uses satellites and a modified Boeing 707 aircraft for atmospheric testing[12] in support of Open Skies monitoring. The definition of defence diplomacy as being conflict prevention, offered by Secretary of State, George Robertson, will remain as valid in 2010 as it was during the SDR process.

Support for wider British interests, along with maintenance of the *Security of our Overseas Territories*, will ensure that world wide deployability will remain integral to force structure planning. The impact of multiple operations – real or potential – will continue to stretch our forces.

Peacetime Security embraces a wide range of tasks from supporting strike-bound civilian fire services through counter-terrorism to activities such as counter narcotics operations. By 2010, this will almost certainly include defensive, and probably offensive, information operations.[13] These extend far beyond the 'bogeyman' computer hacker threat that flares periodically in the popular press. Damage can be done to information storage systems, to the equipment itself and to the wider community at large. The scale of the potential damage to a nation's financial system is so great that state sponsored information operations could easily lead to retaliatory action – either by force or in kind.[14] Inter-departmental co-operation in this field will be vital. A further, and not inconsiderable, threat to peacetime security is the growing risk of asymmetric warfare.[15] The theory of this is that Western (i.e. predominantly US) superiority in conventional weaponry, technology and assets leaves the third rate foe – who may well not be a state actor – with no means available to join the contest. The foe therefore exercises leverage through terrorist style

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attacks, possible on the homeland. These attacks could conceivably include the use of Weapons of Mass Destruction.[16] Countering the manifold manifestations of such a threat is, of course, hugely difficult – assuming that it is possible at all. Increased emphasis again on ISTAR assets appears inevitable. Furthermore, the armed forces would need to retain the ability to cope with the aftermath of any attack from the wide spectrum of aggression available to asymmetric warrior.

AEROSPACE POWER

The 2010 definition of Aerospace power could be as follows:

The ability to achieve politically desired effects by the projection of military force in space or in the air, by or from a missile or platform operating above the surface of the earth. Air platforms are defined as any aircraft, helicopter or unmanned air vehicle. Space assets are differentiated from air platforms by being non-air breathing.

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Military force includes all of the civilian elements such as contractor support that are required to sustain air or space operations. At present, the United Kingdom's equipment programme suggests that an extension of operations into space is still some way off; it is, however, a reality in the US.

The successful employment of aerospace power is predicated on two related, but distinct, theoretical loops. The first of these is based on the all-encompassing notion of effects based warfare – which by 2010 will be fundamental to our thinking at all military levels. This notion will have moved on from the concept of effects based warfare which holds, for example, that a power station can be closed down with a precise strike on the control room as effectively as if it were to be obliterated.

Historical concerns over the need to minimise friendly casualties, reduce the potential for collateral damage, avoid wanton damage to enemy property and even to guard against unnecessary enemy casualties are accentuating the dominance of effects based warfare. Prior to US involvement in Somalia, domestic audiences were relatively ambivalent to the possibility of casualties. Scenes depicting US servicemen's bodies being dragged through the streets of Mogadishu led to immediate presidential and domestic revulsion, followed by rapid withdrawal. This, combined with an apparent arcade game lack of reality in the presentation of air power, has resulted in a public expectation that all operations could be achieved with clinical precision.

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This perception will be enhanced by the advent of further high technology weapons systems such as the Airborne Laser (ABL) which will be used to detect and shoot down ballistic missiles in their boost phase; the potential deployment of space based weapons systems will reinforce this trend. By 2010, much of the emotion surrounding the weaponisation of space will have receded. In 1999, General Joseph W Ashy, former commander in chief US Space Command, stated:

> 'It's politically sensitive, but it's going to happen. Some people don't want to hear this, and it sure isn't in vogue... but – absolutely – we're going to fight in space. We're going to fight from space and we're going to fight into space.'[17]

More detailed examples of the extent to which the 'sanctuary' of space will have been militarily utilised by 2010 are covered below as extensions to the core capabilities sections.

If we assume that total war is unlikely to re-emerge in the conventional arena (i.e. non nuclear exchange between peer competitors), it is improbable that decimation of enemy territory en bloc would be envisaged. In limited conflicts it is quite feasible that coalition partners will seek to have a truculent leader either coerced or replaced. Damage done in the process would almost certainly have to be made good by the attacker and the erstwhile target population would become tomorrow's market, trading partner or ally. Notwithstanding the international legal or ethical considerations, it is therefore incumbent on those responsible for formulating the campaign to reach a suitable conclusion as quickly and as painlessly as possible. The only way that this can be achieved is by evaluating the required effect that the commander wishes to have on the target regime. An accurate assessment of the enemy's weaknesses must therefore be made first. This may be the enemy's centre of gravity in classic Clausewitzian terms. Equally it may be the seams between elements of his organisation – targeting these may result in paralysis of his structure or dismemberment of command and control. It is vital that this analysis is conducted with regard to the enemy's own perceptions: the early days of Rolling Thunder were littered with examples of planning a campaign based on Western perceptions rather than those of the enemy. For example: planning to concentrate attacks on the North Vietnamese industrial base had minimal effect on the country as whole and on the people in particular;[18] the North Vietnamese leadership did not ascribe the same degree of worth to its industry as the West would have done in similar circumstances.

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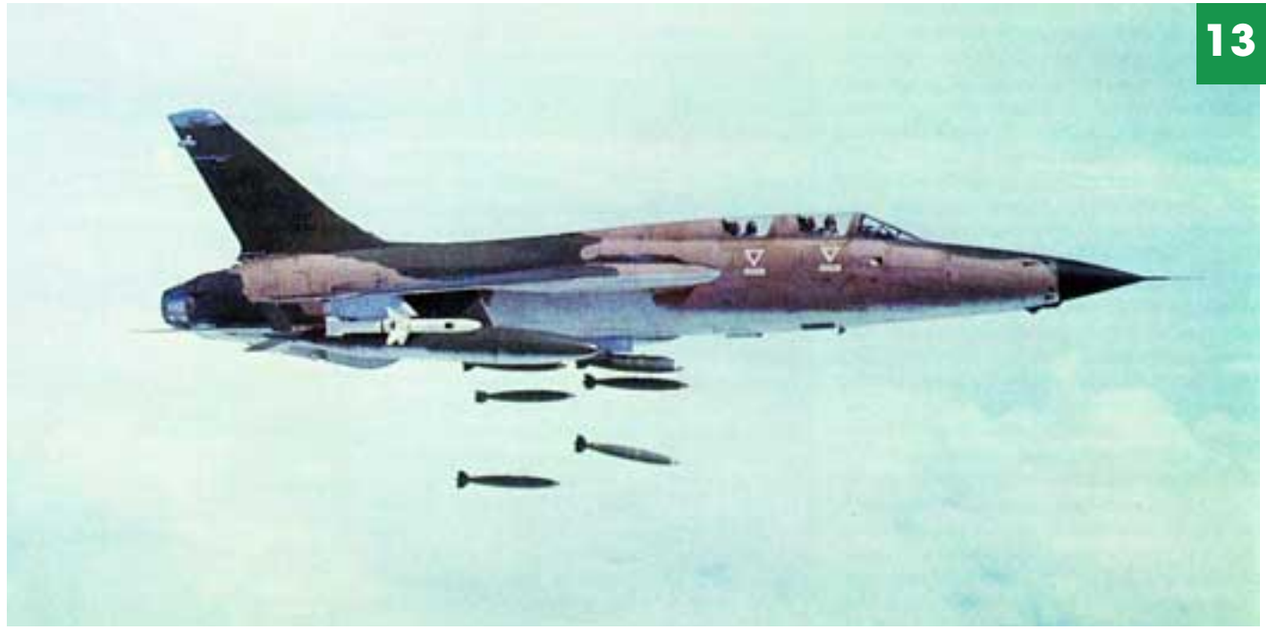
Having identified the effect wanted, the commander then has to analyse which target sets could be attacked, with the weapons available and within the Rules of Engagement, to produce this effect. The targets are in turn attacked and the effect assessed. It is critical that this analysis goes beyond mere counting the number tanks that have been 'plinked'. If the enemy has not reacted in the way that had been predicted, the commander and his staff must re-assess in that light and work a new way of achieving the desired effect. If the decision making cycle is to be kept to a minimum, the more that is known and understood about the target regime the better. Shifting rubble from side of a ruined car park to the other does not constitute attacking for effect – although this may be desirable, for example, for intra-alliance media consumption, or as part of information operations. As we may have a (single) centre of gravity at the strategic and operational levels, so this theory of attacking for effect is relevant at both levels. Indeed, it is also pertinent at the tactical level. But this is not new; in 1944, Liddell-Hart stated that 'the real target is the mind of the commander, not the bodies of his troops'.[19]

The second, and closely related, cycle with which we must be concerned is the classic Boyd OODA loop in which we Observe enemy movement, Orientate friendly forces, Decide on a course of action and then Act.[20] By 2010, the timescales within which we can complete this cycle will, hopefully, have contracted considerably. The ultimate ideal must be for friendly forces to get within the decision making cycle of the man with the machete! This cycle will always be dependent on the rules of engagement and any political constraints extant at the time.



Having identified the effect wanted, the commander then has to analyse which target sets could be attacked, with the weapons available and within the Rules of Engagement...

INFORMATION EXPLOITATION

From its inception, air power, and subsequently space assets, have provided the commander the opportunity of unique access to information

Throughout history, a combatant without knowledge of the whereabouts of his foe (and ideally his intentions) is doomed, at best, to impotence and more likely to annihilation. From its inception, air power, and subsequently space assets, have provided the commander the opportunity of unique access to information. This gives the commander the scope to observe the enemy's physical and electronic dispositions. The enemy's intentions may, by 2010, be increasingly vulnerable to allied inspection. The greatest challenge facing the commander in 2010 will be the need to fuse the information obtained from a plethora of sensors and ensure that it is made available to a range of recipients from planning staff through to the weapon systems operator in the shortest possible timeframe. This may be the pilot of a Joint Strike Fighter, the ground based operator of an unmanned combat air vehicle (UCAV), a laser operator through to a soldier on the ground. This is, and will continue to be, a multi-faceted problem. At one end of the spectrum, the JSF pilot's information requirements will vary, possibly from second to second depending on the stage of the mission and the immediate threat situation. The means of transmitting information will need to be sufficiently robust to withstand enemy information operations; these could cover the full gamut from traditional electronic warfare through electro-magnetic pulse explosions (Radio Frequency Weapons) designed to damage electronic components to cyber attacks on software. The need to keep vital data bases secure will be mutually exclusive to the desire to have close allies operating as part of the system.[21] Sharing classified, codeword bearing, material around within one nation has proved difficult enough without trying to obtain wider clearances for allies.[22]

Space operations will play an increasing role in the provision of near real time information to commanders at all levels. Existing access, already impressive by 1999, will be further enhanced with the ability to deploy mini-satellites from the Common Aerospace Vehicle (CAV).[23] The well-understood concepts of protecting conventional intelligence gathering assets, and denying the enemy use of his vehicles will extend to space resulting in an inevitable militarisation[24] of the last frontier.

CONTROL OF THE AIR AND SPACE

The need to protect ones own space assets, and if necessary attack those of the bad guy, will equally inevitably move the war in the air into space. The USAF already has an F15-borne anti-satellite system. Other potential systems include a co-orbital satellite equipped with an explosive warhead or anti-satellite mines.[25] For every offensive system deployed, a potential adversary whose finances permit this sort of warfare, would have to field a defensive mechanism. This level of Star Wars may be beyond

most nations. But the scope for information operations should not be underestimated – particularly against commercial satellites the performance information for which is readily available on the Internet.

Within control of the air is the denial of that medium to the enemy. This therefore includes some form of anti-ballistic missile (ABM) defence as well as the more conventional forms of ground based air defence. Mention has already been made of the ABL (used to detect and shoot down ballistic missiles in their boost phase). An integrated and layered ABM and conventional defence system would include the assets from each of the services deployed to a given theatre – or indeed in defence of the home nation.[26] Notwithstanding the costs of these systems, the USA is not alone in developing and deploying them; Israel has test fired the Arrow missile as part of its Citron Tree anti-tactical ballistic missile system.[27] Our own SDR declined to commit the UK to the expense: by 2010, we may need to have done more than 'Monitor the risks posed by ballistic missiles',[28] particularly if proliferation of ballistic missiles continues at the present rate. This is highly likely as it offers the would-be pariah with a relatively (certainly to the cost of the counter measures) cheap asymmetric threat to major powers. Control of the air also encompasses countering the burgeoning cruise missile threat.[29]

STRATEGIC EFFECT OF AEROSPACE POWER

Air and space operations for strategic effect are aimed to identify and then destroy or disrupt the defined strategic centre of gravity (weakness, seam line or whatever) of the opponent. It need not be destructive: it could be economic, social or political. The aim is to undermine the opponent's will, ability and means to continue the fight. This is the use of air and space power at the highest level, with heavy emphasis on effect rather than destruction. By 2010, the availability of precision weapons, delivered by stealthy aircraft, or from space platforms will be such that desired psychological impact will be greater than had been possible – even though advocates of air power have long cherished this as a Holy Grail.[30]

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JOINT FORCE EMPLOYMENT

As the first decade of the 21st Century progresses, budgetary constraints will ensure that the armed forces will have to continue to work closer than ever together. Union of the forces would be so anti-synergistic that contemplation of such a course should be left to the musings of academia (and in more formal circles elsewhere in London). The introduction of Joint Force 2000 and the Joint Helicopter Command, however, are almost certainly the way ahead for other capability areas. If such knowledgeable advocates of air power, and international affairs more generally, as Air Marshal Sir Timothy Garden can see an ever increasing role for a European defence identity, the chances are that by 2010, at least some of our support for air operations will be shared across key allies.[31] Any return to a more isolationist posture by the US would only accelerate this movement. Key areas for increased co-operation include air-to air refueling;[32] air transport (especially for the insertion of mobile combat troops); anti-submarine warfare operations; and anti-surface operations. Joint electronic warfare (and SEAD) would be more difficult, despite the crying need for an expansion in this area of capability. The security difficulties alluded to earlier in this paper again come into play. But suitable 'firewalls' in our, and US, systems should be able to cope with this problem. The USAF, partly to reduce their footprint overseas, and partly to reduce reliance on host nation support, has moved towards an Expeditionary Air Force concept.[33] This carries with it a sizeable bill in terms of tanker assets and strategic lift. There is also a price to be paid for long range weapons systems whether conventional (such as the B2) or space based.

The last twenty years have seen European air forces, in conjunction with American counterparts of all air arms, take major steps forward in their ability to produce complicated attack packages for use against a wide range of targets. Realistic training on courses such as the Tactical Leadership Programme and on Red Flag, combined with real experience of combat, must continue – especially as the increasing array of sensors, platforms and weapons systems will need to be blended together. The air interdiction role, SEAD and even possibly close air support may be carried out by space-borne weapons. The synergy of the coalescence of the many and varied platforms could well be lost if stringent efforts are made to ensure that they are exercised together, and with representative command and control decision making.

CONCLUSION

This paper has sought to stimulate debate as to what aerospace doctrine may look and sound like in 2010: it may or may not replace straight air power doctrine depending on how much we decide to expand our frontiers. We may choose not to invest in certain areas of technology. But the relevance of combined, or coalition, operations will remain such that our doctrine will need to encompass these areas so that we will at least be able to understand the full spectrum of capabilities and where our forces

fit into this. The paper is by no means a prediction of the future. Nor does it purport to be the first draft of the next strategic defence review, or of the fifth edition of AP 3000. That said, the span of new, or advanced, technologies that we will need to embrace will be so broad that serious decisions will be needed over what we will elect to do ourselves and what we must attempt to share with allies (formally or otherwise). Merely monitoring the progress of key weapons systems will only serve to exasperate key partners such as the US as the gap between their and our capability will inevitably broaden. This is the subject of some concern now;[34] 2010 may to be too late to play catch up. By the same token, it is incumbent on all sides to close the gap and US reluctance to release codes and key equipments (especially in the communications area) does not help.

Some authors have sought to question, even denigrate, the future role of air power.[35] The counter argument is that the reach, ubiquity and flexibility inherent in air power and enhanced by a reasonably affordable use of space will continue to be invaluable to a commander of any cloth. By 2010, host nation support for forays abroad to counter evil will not be as forthcoming as it has been over the last decade. An expeditionary military capability in general and a deployable air force in particular, (along the lines being developed the USAF)[36] is absolutely dependent on the force possessing the right blend and quantity of air and space assets. The use of aerospace power for effect rather than destruction will serve to make it ever more the politician's weapon of first choice. But the fuel that makes the whole machine function is a living and relevant doctrine without which we will become fossilised in Professor Overy's lava flow.

NOTES

1 Richard Overy, Doctrine Not Dogma: Lessons from the Past, *RAF Air Power Journal*, Vol 3, No 1, page*.

2 Ibid, page*.

3 For a scathing review of this calamitous state of affairs the reader could do worse than look at A J P Taylors introduction to Len Deighton, Fighter, Pimlico, London, 1996, page xv. See also Alfred Price, The Hardest Day, Janes Publishing, London, 1979, page 41.

4 James S Corum, The Luftwaffe: creating the operational air war 1918-1940, University Press, Kansas, 1997, page 124 et seq.

5 *The Strategic Defence Review*, Cm3999, London, 1998, Chapter 3. (Henceforth cited as 'SDR')

6 *AP 3000, British Air Power Doctrine*, Third Edition, HMSO, London, 1999.

7 SDR, page 16.

8 Matthew Campbell, 'Chinese radar may trap stealth planes', *Sunday Times*, 28 November 1999, page 25.

9 Group Captain Bill Boothby, 'The Use of Force to Prevent a Humanitarian Disaster' RAF *Air Power Review*, Vol 2 No 4, page 68.

10 This is a term widely used by US force planners. They work on a force structure capable of supporting two near contemporaneous major theatre wars (MTWs); all other adventures are SSCs.

11 SDR Supporting Essays 6-3.

12 William B Scott, 'USAF Nuclear Detectives Assume New Roles', *Aviation Week & Space Technology*, November 3 1997, pages 50-59.

13 See for example, Martin C Libicki, *What is Information Warfare?*, Centre for Advanced Concepts and Technology, National Defence University, Washington, 1995. See also, Andrew Rathmell, 'Mind Warriors at the Ready', *The World Today*, November 1998, page 289.

14 The Clinton Aministration's Policy on Critical Infrastructure Protection: Presidential Decision Directive 63, dated 22 May 1998.

15 See for example, Lawrence Freedman, 'Britain and the Revolution in Military Affairs', *Defence Analysis,* Vol 14 No 1, 1998, page 58.

16 Andrew Rathmell, *Future Patterns of Military Conflict*, Ditchley Conference Report D97/15, page 3.

17 Introduction to a CADRE paper by Major William L Spacy USAF, *Does the United States Need Space-Based Weapons?,* Air University Press, Maxwell AFB, Alabama, September 1999.

18 Mark Clodfelter, The Limits of Air Power: the American Bombing of North Vietnam, The Free Press, New York, 1989, page 140.

19 Basil Liddell-Hart, Thoughts on War, Faber & Faber, London, 1944.

20 This theory has been reiterated many times; it is quoted for example in AP 3000, British Air Power Doctrine, third edition, 1999, pages 2.4.1 and 2. The difference between the OODA loop and the loop described earlier is that the new model takes the cycle to the highest levels of political military decision making. The emphasis on vulnerability and intentions at the political level takes the discussion onto a different plane. Arguably the two loops are intertwined rather than being the same beast.

21 Natalie Crawford, 'The Impact of Technology in the Next Century', in Shaun Clarke (Ed) T*esting the Limits: the Proceedings of a Conference held by the RAAF in Canberra*, March 1998, pages 27,28.

22 Richard P Hallion, *Storm over Iraq; Air Power and the Gulf War*, Smithsonian Institution Press, London, 1992, page 204.

23 Boeing publicity material.

24 For a description of the use of laser anti-satellite weapons and satellite jamming in USAF wargames, see Lieutenant Colonel Mark P Jelonek, *Toward An air and Space Force; Naval Aviation and the Implications for Space Power,* CADRE Paper, Air University Press, Maxwell AFB, Alabama, September 1999, page 57.

25 Spacy, ibid, pages 24 and 25.

26 David Gates, 'Countering Aerodynamic and Ballistic Missiles: Extended Integrated Air Defence', *RAF Air Power Review*, Vol 1, No 1, 1998, pages 59-70.

27 Clifford Beal, 'Israel's Citron Tree system bears fruit' in *Jane's Defence Weekly,* 8 July 1998, page 17.

28 SDR Supporting Essays, page 5-15, paragraph 45.

29 For a useful review of the progress made in this field in comparison with the ballistic missile threat see Dennis M Gormley, 'Hedging Against the Cruise-Missile Threat', *Survival*, Spring 1998, page 92-111.

30 For the further potential of high technology in this field see, Malcolm R Davis, 'Valkyries of Tomorrow's Air War; Hypersonics and Aerospace Operations in the 21st Century, *Air International*, September 1998, pages 176-180.

31 Air Marshal Sir Timothy Garden, 'A Need for a European Air Power', RAF *Air Power Review*, Vol 1 No2 Autumn 1998, pages 1-11.

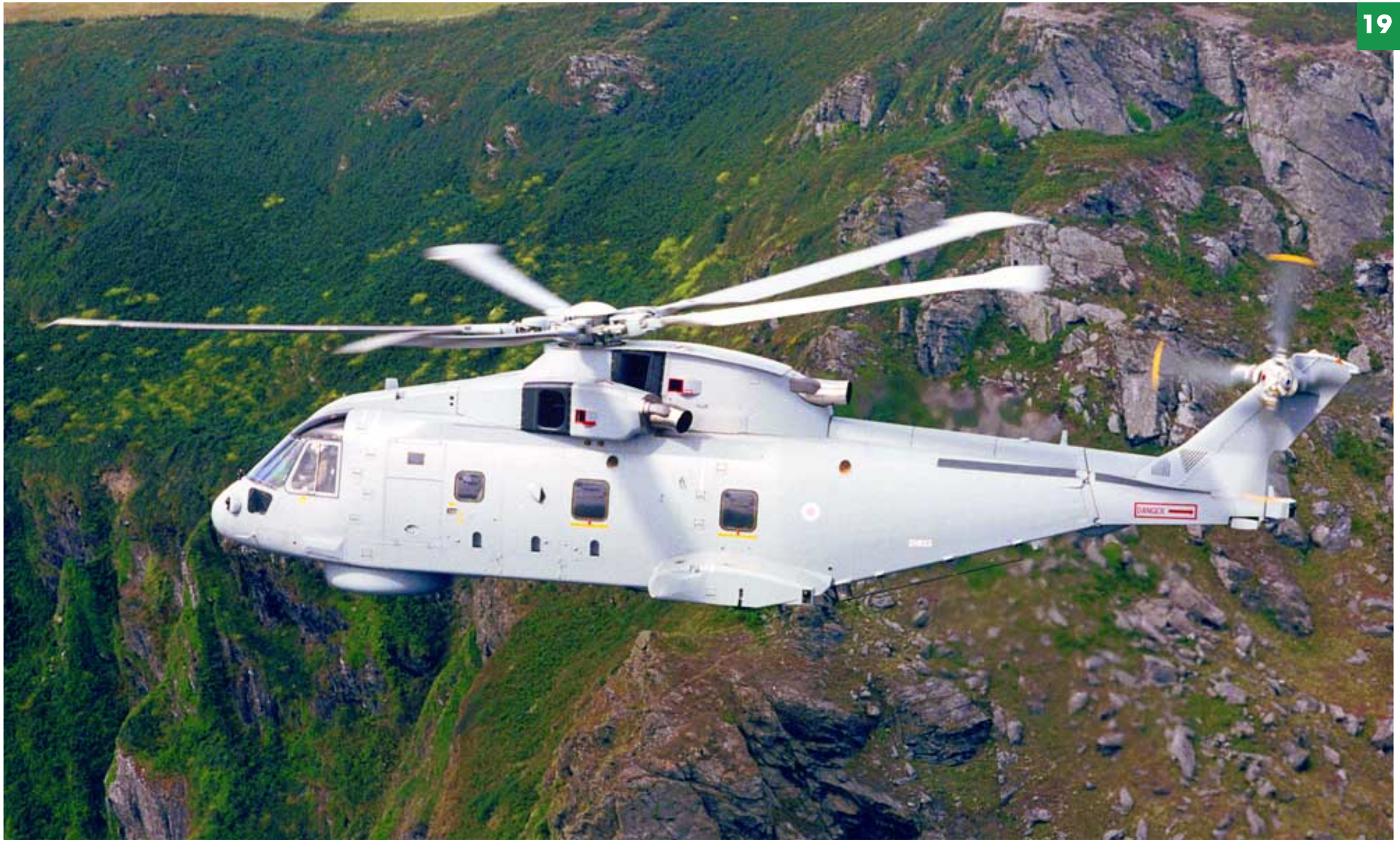
32 Interoperability, or certainly cross-training,is already well advanced in this area. During the Kosovo air operation, some 85% of non-USAF AAR was carried out by RAF tankers.

33 General Michael E Ryan, USAF Chief of Staff, in his address to a Conference held by the RAAF in Canberra: New World Vistas: USAF Air and Space Power for the 21st Century, in Shaun Clarke (Ed) *Testing the Limits: the Proceedings of a Conference held by the RAAF in Canberra,* March 1998, page 13.

34 Take, for example, Secretary for Defence William S Cohen's remarks to this effect in his key note address to the IISS Annual Conference, 9 Sep 99.

35 See, for example, Martin van Creveld, 'The rise and fall of air power', *MHQ – The Quarterly Journal of Military History*, Spring 1996, Vol 8, No 3, pages 76-81.

36 General Michael E Ryan, ibid, page 13.



EH 101 Merlin. A Joint British-Italian collaborative programme, to replace RAF Wessex and Puma aircraft within the RAF. Merlin will also replace Sea King aircraft in the Royal Navy.