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THE ROYAL AIR FORCE

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**Front cover**:
Douglas Dakota C4 ZA947 of the Battle of Britain Memorial Flight.

The Dakota squadrons of the No 46 Group, RAF Transport Command played an important role in carrying the British 1st Airborne Division and the Polish Independent Parachute Brigade into the battle during Operation MARKET GARDEN, September 1944. See 27.

# CONTRIBUTIONS TO THE ROYAL AIR FORCE AIR POWER REVIEW

The Royal Air Force *Air Power Review* is published quarterly under the auspices of the Director of Defence Studies (RAF) and has the sponsorship of the Assistant Chief of the Air Staff. It is intended to provide an open forum for study which stimulates discussion and thought on air power in its broadest context. This publication is also intended to support the British armed forces in general and the Royal Air Force in particular with respect to the development and application of air power.

Contributions from both Service and civilian authors are sought which will contribute to existing knowledge and understanding of the subject. Any topic will be considered by the Air Power Review Management Board and a payment of £200 will be made for each article published.

Articles should be original and preferably not previously published, although those of sufficient merit will not be precluded. Between 2,000 and 10,000 words in length, articles should list bibliographical references as end notes, and state a word count. Lengthy articles may be published in instalments. Contributions from serving military personnel should be in accordance with DCI GEN 313 dated 26 November 1999.

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# FOREWORD

We begin this edition of Air Power Review by re-examining some ideas from one of the earliest air power theorists, in the form of General Douhet. Even now little of his work has been translated into English, so this article, written just two years after his death by a contemporary, General Tulasne, gives us a unique perspective of how Douhet's views were perceived in the Italian military at the time. Whilst some elements of his theories clearly did not anticipate technological advances that would alter, for instance, the balance between offence and defence, his thoughts on the need for a single unified command structure and a joint military academy seem remarkably prescient.

Perhaps one of the key areas of interest on both sides of the Atlantic at present is that relating to the use of air power in Phase IV operations. In his article entitled 'The Utility of Air Power in Nation Building', Gp Capt Poole considers what 'air' can provide if an effects-based approach is taken. There is a great deal of food for intellectual thought in this piece, and the need for agile minds is quite clearly going to be a prerequisite for effective operations in this area.

In 'Operation Market Garden: Did Air Power Fail?', Dr Seb Ritchie from the Air Historical Branch has produced a counter-argument to the piece by Wg Cdr Winstanley that was published in the Autumn 2004 edition of Air Power Review. His thesis is that Operation Market Garden had such inherent flaws, particularly related to failures in intelligence and the subsequent campaign plan, that air power was unlikely to be able to compensate for them. The evidence of the problems that were experienced with close air support are perhaps surprising, given the wealth of practice that had been undertaken in this area. However, in terms of whose analysis is more correct — that is very much up to you, the reader, to decide.

Wg Cdr Walters then returns us to the present day in his article on the debate over the most effective use of offensive air power — neatly taking us back to the debate started by Douhet, in terms of whether air should be a force in its own right or should simply be an adjunct to land and naval forces. Whilst some may take exception with his conclusion regarding the optimal target set for coercion in territorial and non-territorial conflicts, it provides a useful summary of both recent theories and practice in this area.

The next piece is a historical article by Sqn Ldr Williamson (retd), which deals with a little known footnote of the RAF's past — and probably one of the very few occasions when Spitfire fought Spitfire in open combat — when the nascent Israeli Air Force and the RAF clashed in late 1948 and early 1949. Whilst the poignancy of the events comes through strongly, as the Israeli Air Force pilots had, to a man, flown either with or alongside the RAF during World War II, there are a number of lessons to do with complacency that are still applicable today. Indeed, some of the decisions, such as despatching aircraft unarmed into a very fluid area of operations, seem almost beyond the bounds of credibility given the immense pool of war-fighting experience that the RAF possessed at that time.

The last article comes from FS D'Alderley, and examines the principle of proportionality as expressed in Additional Protocol 1 to the Geneva Conventions. This should be of direct interest to all Service personnel involved with the delivery aspects of 'kinetic' air power, and of general relevance to anyone concerned with the legal and ethical aspects of air warfare. It explores exactly how the elements of proportionality stand up to scrutiny via a number of recent examples before concluding, perhaps not surprisingly, that like much in international law there is still a considerable amount that is open to interpretation.

Finally, following on from the foreword in the Spring Edition, you will see that we have included a readership survey questionnaire in this edition. I

would urge you to complete and return the survey, as the Editorial Board are keen to ensure that Air Power Review remains both relevant and thought-provoking, and feedback from those who read the magazine is a critical part in our assessment of how we are doing. In these times of constant change, nothing can afford to stand still and Air Power Review is no exception. So, if you wish to have a say in how we move forward, this is your chance.

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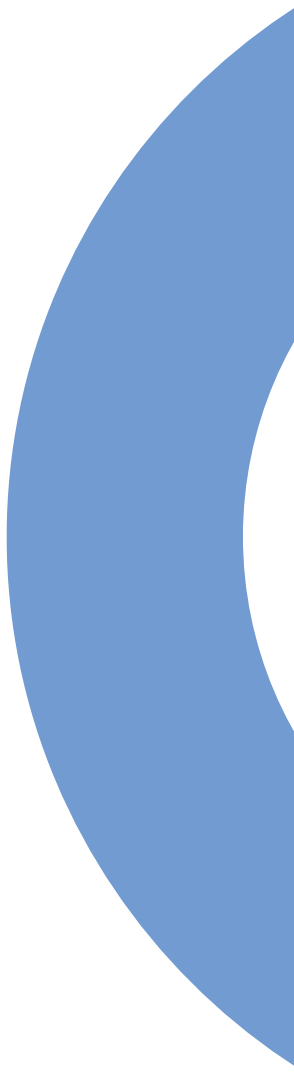

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## Contents

# The Air Doctrine of General Douhet

By General Tulasne

General Guilio Douhet

*He was of the opinion . . . that the air will normally be the decisive element*

This material is based mainly on an article published in *Rivista Aeronautica*, July 1932, by General Tulasne, entitled *A New Military Doctrine.*

At the end of 1930 the death occurred of a man who, although comparatively unknown outside his own country, has played a by no means unimportant part in the development of Italy's defence policy, and who has, as a result of his writings, attracted a great deal of attention in several other countries. This man, General Guilio Douhet, was an Army officer who served in the Great War, and who was at one time imprisoned on account of his criticism of the higher command, but was reinstated after the disaster of Caporetto, as it was recognized that his criticisms were fully justified and that he had sacrificed his career in the interest of his country. Subsequently, during 1918, he served as head of the Central Command of Aviation, and returned to civil life after the Armistice.

He had already devoted much thought to the problems of air power, and had, during the war, recommended the use of aircraft in an independent role, but it was not until 1921 that his first paper of importance, entitled 'Air Supremacy', was published. It attracted comparatively little attention, but in the course of time, as his works became better known, the doctrine developed by him gradually created an increasing amount of interest and, incidentally, encountered a considerable volume of opposition.

The fundamental basis of this doctrine is that it is necessary for the security of a country to have a powerful air force, independent of the other two services, and that this air force should be made the primary arm because, owing to the impossibility of preventing air attacks, an independent air force, used offensively against military and economic objectives, can force a decision, whereas on land and sea, owing to the superiority of the defence over the offence, a land or naval offensive requires forces greatly superior to those of the enemy in order to have any chance of being successful.

In support of his arguments the General quoted the Great War, in which he said that it was not mere chance that a balance was established on the land and sea fronts, but that this was inevitable under the conditions then ruling, owing to the power of the defence.

In the air, on the other hand, he considered that an offensive policy would be the most advantageous, owing to the impossibility of providing an effective defence from air attack. For this reason, and owing to the fact that it is impossible to be strong everywhere, he recommended that the greatest strength of the national forces should be concentrated in the arm which is most likely to prove decisive, namely, the air force, which can take action not only against the enemy air force, but also against the land and sea forces, and against objectives in the interior of the enemy territory.

He was of the opinion, therefore, that the air will normally be the decisive element, and that it will be necessary for the air force to take the offensive, whilst the navy and army maintain a defensive role. The General then proceeded to argue that, if the soundness of his premises is admitted, the major part of the expenditure on national defence should be allotted to the air force, the army and navy being granted only a proportion sufficient to ensure that they will be capable of undertaking adequately a defensive role in war, and preventing the enemy achieving a decisive result on land or sea.

The General attached so much importance to being able to develop a powerful air offensive that he recommended that the auxiliary aircraft allotted to the army and navy should be abolished, and the money saved thereby used to increase the strength of the independent air force. Similarly he considered that fighter aircraft are of so little value in defence that they should also be eliminated, and that the whole of the aircraft of the independent air force should consist of bombers.

He recognized, however, that it is possible that the enemy may undertake a counter air offensive, and that it is therefore necessary to limit as far as possible the damage which might be caused by such attacks. For this purpose anti-aircraft defences must be provided, but they should be concentrated on the defence of a few of the most important points, and in addition all possible means of

*Aircraft are an indispensable auxiliary to land and sea forces*

passive defence of the civil population should be organized and developed.

Having outlined briefly the main points of General Douhet's doctrine, they can be summarized as follows:

i. Adopt a defensive attitude on land and sea, and concentrate on the air offensive.

ii. Allot all the air resources available to the creation of an independent air force designed solely for offensive action.

iii. This involves the abolition of all auxiliary aircraft, including those allotted to the army and navy, and all fighter aircraft.

iv. Concentrate the anti-aircraft defences on the protection of centres of maximum importance, thus avoiding dissemination which would make the defence ineffective everywhere.

v. Organize the whole nation so as to develop the best possible measures of passive air defence.

vi. Concentrate technical research and development on the design of aircraft which will have the maximum radius of penetration into enemy territory.

These theories naturally encountered a great deal of opposition, and for some years the arguments for and against occupied a considerable amount of space in all the Italian military journals. The main objections, and the answers thereto by the General, fell under the following headings:

i. Aircraft are an indispensable auxiliary to land and sea forces, and an army or navy unprovided with aircraft would find itself at a grave disadvantage if opposed to an enemy possessing auxiliary air forces.

The General's reply to this was that to provide auxiliary air forces means a dispersal of effort, and a decrease in the offensive power of the independent air force. If the latter is beaten the auxiliary air forces will be of no further use, and the army and navy would be powerless to defend the nation from an enemy air force possessing air supremacy.

ii. The General attached insufficient importance to fighter aircraft and anti-aircraft defences, which can provide an efficient defence from air attack.

In reply to this objection the General stated that his whole doctrine was founded on the fact that no effective defence to air attack as yet exists. If proof to the contrary could be provided he would be willing to renounce his theories.

iii. It is admitted that the independent air force can penetrate the air over enemy territory, but before they can attack their objectives they must first defeat the opposing air force. In the air, therefore, as on the land and sea, the primary aim must be the defeat of the enemy forces.

The General's reply to this was that an air force which concentrates on the attack of objectives in enemy territory may be interfered with by the enemy air force, but that such attacks cannot be entirely prevented. An attacking air force which endeavours first of all to defeat the opposing air force will, therefore, be wasting its efforts, as it can achieve its aim without doing so. Air warfare, therefore, does not consist of air fighting, but of a bombing offensive.

iv. The final objection is that the land or sea, and not the air, will probably be the decisive element in wars of the future as of the past.

To this the General replied that, even if this contention is correct, it is still necessary to make the air force the strongest of the 3 services because, even if the air should not be the decisive element, it will still be necessary for the success of the naval or military operations to ensure that the national territory is safe from attack by the enemy air force. On the land or sea it is possible to temporize, but not in the air, and therefore it will always be essential to have a powerful air force. This does not mean that the whole of the defence resources should be concentrated in the air force, but that, as it is impossible to be in strength everywhere, the army and navy should only be strong enough to ensure that the enemy cannot force a decision on land or sea, whilst entrusting the major responsibility for defence to the air force. Each of the three services has, therefore, its mission in the defence of the country, and there is no question of entrusting to the air force alone the task of deciding the result of a war.

Finally, as a general conclusion, General Douhet stated that war must be considered as a whole and not from the point of view of any particular service. In order, therefore, that the resources of the nation can be correctly proportioned between the land, sea and air forces, it is necessary to have a Chief of the General Staff who will be responsible to the Government for the employment of all the defence services, whilst a Ministry of National Defence should be created which would administer the whole of the funds allotted to the defence services, and which would decide upon the proportion to be allocated to each. The officers on the General Staff of this Ministry should be trained at a special Military Academy, distinct from any schools or colleges belonging to any of the three services, where the study of war should be undertaken from the national aspect.

There is no doubt that the General's doctrine has profoundly influenced Italian ideas in regard to national defence, and, although his theories have not been adopted in their entirety, particularly in regard to his proposals to abolish fighter and auxiliary aircraft, his suggestions have in many cases been carried out. In 1927, for example, the first step towards the creation of a Ministry for National Defence was taken when a Chief of the General Staff of the Forces of Italy was appointed.

A great deal of attention has also been devoted to the General's writings in the press of other countries, and, even if one is not in entire agreement with all his theories, it must be admitted that he has put forward forcible arguments and that he has made a thorough study of the problems involved. It should also be taken into consideration, however, that the General developed his thesis mainly from the point of view of Italy, and that he did not intend, therefore, that it should necessarily be applicable to all other countries. Nevertheless, a study of his doctrine is considered to be of considerable general interest, and, in addition, to provide a valuable guide to the trend of thought in regard to air power in a country which is occupying an increasingly important place amongst the great Powers.

**Iraqi Rebels.**
**Air Power consistently proves its worth, yet many believe it to be largely useless when combat is over and nation building begins**

# The Utility of Air Power in Nation Building

By Gp Capt R M Poole

*'Warfare rarely is only about breaking things or killing people. The goal is to affect some sort of change in the opponent's behaviour.'*[1]

*'It now [2002] does look as if air power has prevailed… and that the time to redefine how victory in war may be won has come.'*[2]

Airpower in its many forms has long since become an indispensable tool for any military force fighting against guerrillas, terrorists and other irregular forces.[3]

Air power can combine synergistically with land power and be decisive in a joint campaign to rebuild a nation post major combat, provided that the mesmerising lure of technology is balanced with a desire to improve process and common understanding.

No one can doubt the utility of air power following the massively impressive successes in Gulf War I, Kosovo and Gulf War II. When a target set exists that requires kinetic effects, air power consistently proves its worth. Yet many believe it to be largely useless when the major combat phases are over and nation building begins. This view fails to understand the broad utility of power projected from the skies. With lateral thought and considerable effort to achieve common intent with the supported commander, air power can provide a significant contribution to the difficult and poorly understood concept of reconstruction or stabilization operations. Yet there is more to be done.

The military's primary task in nation building is to establish a secure environment. The focus of effort is therefore on the prevention and deterrence of hostile acts, criminal activity and acts of sabotage

**Devastation after a car bomb explodes in Iraq**

*A significant risk of winning the war while losing the peace has arisen in more than one contemporary crisis*

against the infrastructure. Support from the air plays a major role in two of these tasks at least, in roles that have hitherto been dismissed by many:

*'Despite being designed to target laser guided bombs, in both Afghanistan and Iraq we are employing the targeting pods on F-15s, F-16s, A-10s and the B-52 to provide . . . high-resolution video of ground targets, allowing us to use these airframes in non-traditional ISR roles for increased coverage of the battlefield . . . While these have not been traditional uses for air power, they have been effective and that is all that matters.'*[4]

'Joint' is the way ahead: careers depend on it and organizations spring up based on it. But are recent conflicts good examples of jointery? We have made a good start, but much needs to be done. An imbalance exists between joint process techniques and technology dependence that exacerbates the problem. We will be truly integrated when we no longer need the word 'joint'. Against an updated process tool of *conceive, act, assess,* this paper shows that air power is a multifunctional tool with inherent characteristics of flexibility, speed and reach that secures it a leading and enduring role in all areas of effects based operations.

UK and Canada define 'joint' as being 'activities, operations, organizations, etc, in which elements of more than one service participate'. The US version is similar though 'military departments' is used instead of 'services'.[5] Joint defines the military relationships, not the interaction between military and civilian organizations.

We could do well to rip up all the single service and so-called joint doctrine and just learn to communicate. Just because armies are from Mars and air forces are from Venus, it doesn't mean we can't forge a happy marriage — we, like most, have to work at it.

War is more than the military; combat is the purview of the military. Effects Based Operations (EBO) can only be truly successful if traditional military activity is integrated with civilian activity in some form of combined joint interagency Task Force.[6] Only in concert with Non-government organizations (MSF, ICRC etc) and other Government departments (CIA, MI6 etc) can a nation's military plan to win a small or asymmetric war succeed. Even then, the demand on intelligence services may be too great.

Recent examples in Asia and the Middle East suggest that the military's traditional force on force role is becoming less relevant as the West struggles with nation building in new forms and paradigms. A significant risk of winning the war while losing the peace has arisen in more than one contemporary crisis. The first step will

*The transition to peace must start with enforcement, then through consent, a handover of sovereignty before stabilisation and eventual withdrawal*

**Coalition troops in Iraq**

be to recognize the need for a pan-government, nation-wide control mechanism to better shape the response to future crises — the concept is not new. While some countries have recognized the need for pan-departmental cooperation to address homeland and continental security in the post 9-11 era, little has been implemented. Such interoperability is as difficult as herding cats yet is critical to future operations.

However, the military must get its own house in order before engaging other agencies: we must perfect joint operations, an underlying principle of EBO. The unchartered territory seen in Iraq with novel and non-traditional uses of air power, supporting and augmenting ground force operations will form the backdrop. I will give an airmen's perspective of the joint processes required to conduct a successful campaign (using Iraq and Afghanistan as the context) with a design to transfer sovereignty following major combat — also known as nation building. Afghanistan is arguably further 'along track' with well-established Provincial Reconstruction Teams (PRTs). Iraq has moved on from major conflict but a type of insurgency, bordering on civil war, persists.

The post major combat phases are perhaps the most difficult for militaries to succeed in: the situation is often more confused, plans for sovereignty transfer not always clear and collateral damage risks are even more of a concern. Moreover, there is no front-line and few control measures such as a fire support coordination line (FSCL) with which to separate friendly forces from foe. Most importantly, the enemy is indistinct: they blend in with the population and gain easy sanctuary. I will therefore concentrate on this early phase of nation building, the area between major combat and the less violent PRT type scenario. Finally, I contend that the focus on technology is deflecting western militaries and their nations away from the greater process requirement of true 'jointery', a pre-requisite to the next stage of EBO: the cooperation between the land and air components in the application of national power in modern conflict.

**Background**

There can be few doubters over the ability for US-led coalitions to rapidly and decisively overcome conventional forces with the shining examples of Operations Desert Storm, Allied Force and the major combat phase of Iraqi Freedom. The difficult bit, a linked sequence of confrontations,[7] follows thereafter. It is not that easy to pack up and move out to the next big fight — intervention and occupation, as Colin Powell warned, equals ownership. As Meigs suggests:

*'Military organizations must be able to work across a much broader field of activities than those of the conventional military setting; focusing units intensely on the tasks needed to win conventional combat is no longer sufficient for operational success across the spectrum of conflict.'*[8]

The transition to peace must start with enforcement, then through consent, a handover of sovereignty before stabilisation and eventual withdrawal. Before looking at what might be called 'operations other than war (OOTW)' or counter-insurgency it is useful to start from a common understanding of what EBO means.

EBO, as many commentators advocate, is nothing new.[9] Still in the concept stage, the UK considers EBO to be 'the coordinated national and international activities conducted to realise the objectives necessary to obtain strategic aims. The military contribution to EBO is the synchronised application of military capabilities to achieve effects.'[10] (DGD&D's dismissal of the use of the term 'effects-based' with regard to operations in Iraq highlights the considerable debate remaining).[11] US Joint Forces Command defines effects-based operations as 'a set of actions planned, executed and assessed with a systems perspective that considers the effects needed to achieve policy aims via the integrated application of various instruments of power.' RAND offers a better description:

*'. . . operations conceived and planned in a systems framework that considers the full range of direct, indirect and cascading effects, which may — with different degrees of probability — be achieved by the application of military, diplomatic, psychological and economic instruments.'*[12]

In all instances, the recognition that the range of options available is wider than just the military element is manifestly true.[13] The RAND definition importantly recognises the taxonomy of effects, to which *unexpected* should be added. Moreover, though axiomatic, (as the JFCOM definition recognises) *assessment* is a major ingredient. Finally, the wording implies *joint* action unequivocally, a theme I shall use throughout this paper.

What is new is the context within which EBO takes place. Whether an RMA has happened or not is hard to tell, it being early days, but Transformation is the name of the game in the post 9-11 era of the global war on terror.[14] Whether all practitioners are on board and know what we are transforming into, and why, is also uncertain. Change from a steady state is not an easy thing to manage; change induced before previous changes have taken place is complex in the extreme.

What is important, however, is not to be seduced by the dazzling PowerPoint slides of the technologists. Military people like order and control; they like to command people and things. To use Czerwinksi's words: 'Bureaucracy is the quintessential linearization technique in social affairs'.[15] There is little more bureaucratic or linear than the military. It therefore is not surprising that procurement processes revolve around replacing your old equipment with new equipment that can, in theory, do so much more than before. There is no doubt that the right equipment will help but resources spent on process will give just as much capability but at lower risk.

By thinking logically through the processes required and ensuring that the human interfaces are honed to perfection, many effects can be produced jointly that will propel a campaign towards its objectives. Air power still has a role to play, some 18 months after the major combat phase in Iraq — it is just that many cannot see what that role is. When Baghdad fell, the USAF air support operations squadron (ASOS), a critical link between the land component and its supporting air forces, was repatriated as each component believed there was little that air power could do. Now that the ASOS is back in theatre, air power has supported troops in contact with conventional firepower and other effects on many occasions. But before joint effects can be achieved, the desired outcome must be conceived and planned and to complete the loop, assessments must be made. In all of these aspects, technology must facilitate, not dominate.

The OODA loop paradigm has been useful to date but now needs updating. I suggest that the *observe*, *orientate* and *decide* components can be rolled into one: *conceive*. This simplification presents an opportunity to better address the oft forgotten *assess* element after the action phase. I will therefore use an EBO process loop (model) of *conceive*, *act* and *assess* (the sum total of which would be *achieve)* by which to measure the utility of air power in nation building.[16]

**Conceive**

To correctly identify the required effect it is imperative to think like your adversary, not yourself. When we are searching for clues as to what course to take, we think of what would hurt us. The tendency for 'mirror imaging' must be avoided.[17] Time after time, conflict after conflict, western militaries consider the likely enemy courses of action based on the assumptions and culture inherent in our western way of warfare.[18] Peach adds, 'western intelligence staffs . . . are highly skilled at analysing images . . . but . . . less adept . . . thinking like the enemy'.[19] Warden-ist plans advocate the turning out of the lights, yet Saddam used to switch the lights off in towns or villages as a punishment. Understandably, it is hard for the locals to tell the difference between these two forms of power cut: the effect perceived was not the effect achieved. Therefore, the conduct of the major combat phase will directly affect the subsequent stabilisation and rebuilding process. Such phasing implies sequential actions — once the door is kicked down and the suspect taken away (a technique Saddam used) we will think about winning over the population. Similarly, during the American Civil War, General Sherman sliced his way through Georgia, capturing Savannah but avoided regular battles and killed few people. However, the devastation caused *en route* is still resented a century and a half later.[20] The lesson has not been learned.

Allies and friends who understand the culture, history, religion and numerous other factors of the nation in question must be part of an eclectic team. I met a Syrian-born American member of the US Office of Special Investigation in Oman. He had more insight into the problems in Iraq than had been heard in the Combined Air Operations Centre (CAOC) in months. With his thoughts in mind, we must exploit the beliefs of the adversary — religious and moral. Culture, values and vulnerability must be understood, as must motivation and *modus operandi.* It would also help to be at least conscious of the need for a hearts and minds campaign: bombing a field after an attack on the coalition, for example, is unlikely to create a useful effect on a few insurgents. [21] It is almost certainly going to adversely affect the locals in the neighbouring towns and villages who will probably receive a very different message:

'We don't know why they bomb our house and our fields. We have never resisted the Americans. There are foreign fighters who have passed through here, and I think this is who [sic] they want. But why are they bombing us?'

US Army Brig Gen Mark Kimmitt told reporters . . . that Operation Iron Grip in this area sends a very clear message to anybody who thinks that they can run around Baghdad without worrying about the consequences of firing RPGs, firing mortars. There is a capability in the air that can quickly respond against anybody who would want to harm Iraqi citizens or coalition forces. [22]

So Corum and Johnson's view that 'aerial campaigns that target insurgents and terrorists located in or very near population centres are generally counterproductive' seems to hold water.[23]

Conceiving the right effect puts significant demands on the intelligence services, particularly human intelligence or HUMINT. Despite all the technological advantages available to the US, the coalition still knew little about what was going on in Iraq. Jane's reports that 'while national technical means continued to receive high levels of funding for surveillance satellites, signals intelligence flights, and other eavesdropping technologies, human-based intelligence capabilities have withered'.[24] In mitigation, the Iraqi regime was so tight that it was almost impossible to get operatives in on the ground. This has been learned as one of many lessons: 'high technology IS&R assets have not proved to be a substitute for HUMINT sources and analytic skill'.[25]

Time spent in deducing and conceiving effects is time well spent. Turning thoughts into deeds demands an equal amount of lateral thinking and mental agility. Having decided on 'the right things', we must do 'the things right'.

**Act**

**Beyond 'joint'**

Pape rightly states that 'the combined use of air power and ground forces . . . remains the most effective way . . . to win major wars'.[26] How those elements of military power combine is more significant. Once an effect has been deduced, an effects chain must be created. However, until the joint issues are sorted out, the chain will be of limited utility. One of the greatest failings in joint operations has been the propensity to dictate the air support in the form of platform and weapons required while omitting the essential reason for calling the air component. Components must learn to ask the right question and learn to listen.

**Common intent**

The best form of support and in turn, the greatest synergy from joint operations, will come when each party understands the other fully. In a supporting role, the air element must understand the intent of the land commander, either explicitly or implicitly. Commander's intent is associated with a commander's objectives and end-states for the mission. It is usually articulated explicitly (often in written form) and is intended to guide or direct action. Explicit intent[27] is costly in terms of time taken to pass knowledge and obtain understanding — this time is rarely available. It follows therefore, that the more a relationship can operate on implied intent, the more flexible will be the supporting/supported relationship and more robust the outcome in times of uncertainty.

The Canadian scientists Pigeau and McCann advocate a theory that is perhaps useful as a model

to help understand a root problem with jointery. They claim that common intent, a mixture of explicit and implied intent, forms a key part of military relationships. Furthermore, they suggest shared knowledge, reasoning ability and motivation are all necessary for shared intent which, between the commander and subordinates, is 'fundamental for achieving coordinated action in military missions'.[28] The ultimate objective of air and land forces would be common intent: a shared goal or purpose along with a shared understanding of the connotations. It includes a shared understanding of:

• Correct actions in *foreseen* circumstances
• Appropriate actions in *unforeseen* circumstances.

Achieving common intent between the air and land components could be furthered through:

• Socialization (i.e. team building)
• Joint training
• Professional indoctrination through doctrine
• After-action reviews
• Shared operations
• Shared ideals
• Dissemination of command experiences and debriefing

Indeed a similar concept exists within the philosophy underpinning British Army ethos and doctrine: mission command. Principally, it is 'unity of effort , . . . decentralization, trust, mutual understanding *[intent]* and timely and efficient decision making'.[29] Thus an expansion of this philosophy to the joint arena would appear to be a good start. It stands to reason that air and land components of a JTF should not meet for the first time on the battlefield. There is a pressing need for joint training and socialization through team building — the searching for a common understanding of the psyche and make up of each other's tightly-woven formations. Sun Tzu suggests that knowing one's enemy as one knows oneself will ensure that in a thousand battles, you will never be defeated. I would suggest the same would be true if 'enemy' was replaced with 'sister-service'.[30]

**Train as you fight**

The UK can no longer afford to train its forces solely through independent training programmes where service training objectives take primacy over developed interoperability. The propensity to justify huge exercise costs through 'success' in the form of achieved, but canned, objectives must yield to a learning environment that tries to emulate the Chaos brought by conflict.[31] The air/land relationship must be tested, not scripted. Mistakes must be made and then learned from. The intelligence community must have an input to the outcome and quality of the exercise. At the National Training Centre, Fort Irwin, California, the US Army has learned the value of ignominious defeat at the hands of a highly skilled Red Team.[32] As Bingham highlights, 'the conduct of joint operations in war becomes, in effect, on the job training and repeatedly reveals that lessons from previous conflicts in areas such as interoperability have not been fixed'.[33] We cannot allow this to continue. In other words, train as you would fight; accept failure on the training range, not the battlefield.

The Joint National Training Capability (JNTC), an initiative being developed by the USJFCOM is exactly the sort of approach that is being pursued by the UK as a result of Lessons Identified[34] from Operation Iraqi Freedom. Indeed, the UK has instigated a re-invigoration of joint training under the Project Cunningham initiative to address battlefield interoperability shortfalls. Other examples worth considering are the Combined Arms (live fire) exercises at the US Marine Corps Air Ground Combat Centre at Twentynine Palms, California and the Western Desert Scud Team training model.[35] Service components must not only train together, they should serve together too.

**Liaison**

A vital element of component cooperation and understanding is the liaison officer (LNO). Frequently an unfortunate soul, the LNO is posted or attached to another service to primarily advise on the capabilities of his component and perhaps try and learn the tools of the trade of another. It takes months to be accepted and often that individual remains in obscurity on return — it is thus seen as a 'punishment' posting. Never more than now has it been necessary to reverse this mindset and send our best and brightest to serve with a sister service. Far from a career backwater, such a posting should be seen as promotion positive. True integration will be achieved when

we can think instinctively like our colleagues in the other environments and be better placed to share implicit intent.

When a JTF is formed, call for the other service's best LNOs and include them (and the component they represent) in the planning at an early stage. I have seen at first hand in the CAOC in Qatar, LNOs who have signed up their units for missions they cannot perform while failing to properly offer capabilities that, with lateral thinking, could create new operating procedures and opportunities.

**Improve process**

New joint tasking processes must be created to remove the limitations of previous experience. Requests for ISR and CAS support are achieved using two separate US forms (Form 75 and Form 72 respectively). Both come in from different organisations (G3 — ground Ops and G2 — ground Intel) and both normally fail to articulate the intent or the effect required. Such requests then enter the CAOC separately through the Battlefield Coordination Detachment and the ISR Division. This highlights a further problem of compartmentalising ISR assets and attack (CAS) assets. With lateral thought and a willingness to break with tradition, reconnaissance assets can contribute kinetically whilst attack assets can add to battlespace surveillance.

It was proved time and again in Iraq and Afghanistan that effects can be achieved with non-traditional means. Fast jets can offer non-traditional ISR using targeting pods; unmanned aerial vehicles (UAV) can be armed (MQ-1 Predator) for kinetic response. When the intent is common, the lateral thinkers, SAMS and SAASS graduates,[36] QWIs[37] and tacticians can all flourish and the opportunities for supporting the commander with novel and effective methods can multiply.

**The effects chain**

In order to address the time sensitive and mobile nature of the vast majority of targets, a chain of events — *the effects chain* — must be created that is reactive, dynamic and flexible. Consisting of the elements *Find*, *Fix*, *Track*, *Target*, *Engage* and *Assess* (F2T2EA), the process dictates an end-to-end sequence of events that if prepared and followed will give the best chance of mission success. The air component initially struggled to gain support of this concept from CJTF-7, a follow on C2 organization conceived for the nation building/stabilization phase in Iraq, also known as 'phase IV'. Formed overnight, mainly from V Corps, its constitution[38] and approach to operations reflected the warfighting needs of the major combat phase. Having taken Baghdad in quick order and achieved a decisive point, the required change in mindset to match the change in the nature of the operation was slow in evolving.

When III Corps later replaced V Corps, the air component and the inbound land-centric JTF staffs quickly reached 'violent agreement'. Air Combat Command had run a phase of pre-deployment Battle Command Preparation Training for III Corps that concentrated on EBO. It produced a new team with a refreshingly broad-minded flexibility that saw immediate improvements in the inter-component relationship. Before the deputy air component commander could ask for intent to be included in all air support requests, the incoming commanding general proposed it. By way of example, the following vignette from a testimony given by Lt Gen Buchanan to the US House of Representatives Armed Services Committee illustrates the effective linking of effects capability:

*'On December 29, 2003, Forward Operating Base St. Mere came under mortar attack. The 3rd BCT Fire Support Element counter-battery radar fixed the point of origin and within 20 seconds the point of origin was passed from the air liaison officer to the MQ-1 [Predator] crew. Eighty-five seconds after the attack, the MQ-1 had located and was tracking two vehicles fleeing the point of origin at a high rate of speed. The MQ-1 was directed to follow the southern-most vehicle, as a quick response force was assembled. Forty-five minutes into the engagement, the quick response force from the 82nd Airborne apprehended the subjects that were tracked by the MQ-1.'*[39]

**F-15E Strike Eagle approaches a tanker during a routine patrol over northern Iraq**

*The unique characteristics of air power will continue to add value to the joint effects chain. Reach, speed of response, enhanced observation and perspective through elevation will offer distinct capabilities to the chain builder*

It was this success with V Corps, albeit rare, that the air component hoped to recreate on a routine basis with III Corps. It should also be noted that a similar chain was built with a pair of F-16s using LITENING targeting pods, though inefficiencies in the chain led to a failure as a QRF could not be found.[40]

Effects chains were then further developed to examine all the possible platforms, from all services, that could be combined to cover the effects chain elements. Only when analysed in such detail could issues such as communications be addressed. If the effect required was air cover for a convoy, for example, it was imperative that the aircrew could talk to the commander in the convoy. The US Army uses FM radio within its convoys — only the A-10 and the F-16 had compatible radios. Without communications, the level of support would be fairly minimal. An F-15E providing air support for a convoy in Iraq found suspicious activity (also using the LITENING targeting pod) under a bridge some miles ahead of a friendly formation. Either ACFs[41] were planting an improvised explosive device (IED) or locals were attending to a broken down car — full motion video (FMV) alone could not tell. The convoy was called (through the air support operations cell (ASOC) because of communications limitations) and a QRF dispatched. It turned out to be a hostile act: the perpetrators were 'dealt with' and the IED disabled.

Air power can offer, in increasing lethality, the following effects within current capabilities:

**Presence**

- Shaping[42]
- Show of Force/Intent
- Warning Shot
- Kinetic Engagement, increasing in magnitude from the 'practice charge' weapon to a 2000 lb high explosive class

If the overall effect is likened to a pie, traditional air strikes with kinetic weapons against fixed targets would normally account for a major slice, if not the whole pie, in terms of the effect generated. With the non-kinetic options listed above, the pie is sliced in much smaller pieces with contributions from land, NGOs, OGDs, the local police and security forces, to name but a few. The air power slice may be very small but as long as it exists and contributes to the total effect, it is worth doing, particularly if there is a political reluctance to put more troops on the ground.

For those yet to grasp the nuances of EBO, air power can be viewed as irrelevant to this form of engagement. The utility of a suitably equipped UAV in certain situations has been proved; however, the platform is not a panacea. The unique characteristics of air power will continue to add value to the joint effects chain. Reach, speed of response, enhanced observation and perspective through elevation will offer distinct capabilities to the chain builder. Today's aircrews and joint planners must always understand this.

Our air forces spend all their time learning how to blow targets up or how to support those who do. With smarter weapons that require less in terms of input from the crew (and thus training), the time is right to start developing a more complete skill set, to include the full range of effects and how to apply them. The trick will be to balance the needs of a military that must be able to win force-on-force conflict.

A show of force, this time from Afghanistan, underlines the effects-based approach and gives a soldier's perspective:

*'So we are up in the mountains at about 0100 hrs looking for a bad guy that we thought was in the area. Here are ten of us, pitch black, crystal clear night, about 25 degrees. We know there are bad guys in the area, a few shots have been fired but no big deal. We decide that we need air cover and the only thing in the area is a couple of B-1 bombers. They fly around at about 20,000 feet and tells us there is nothing in the area. They then asks if we would like a low level show of force. Stupid question. Of course we tell him yes . . . Pilot asks if we want it subsonic or supersonic. Another very stupid question . . .You have to picture this: Pitch black, ten killers sitting down, dead quiet and overlooking this about 30 mile long valley. All of a sudden.…you see a set of four 200' white flames coming at us. The controller says, 'Ah — guys — you might want to plug your ears'. Faster than you can think a B-1, supersonic, 1000' over our heads, blasts the sound barrier and it feels like God just hit you in the head with a hammer. He then stands it straight up with 4 white trails of flame coming out and disappears. Cost of gas for that: Probably $50,000 - $100,000 Hearing damage: For certain. Bad guys thinking twice about shooting at us: Priceless.'*[43]

A mission and subsequent effects chain that further illustrates the utility of air power is the ongoing task to protect the infrastructure in Iraq. The establishment and maintenance of power generation and its subsequent distribution is of strategic importance. Taken with the distribution of oil, this constitutes the Iraqi 'Crown Jewels'. Not only does a country need power for all the obvious reasons but in terms of the IO campaign, the 'lights must be switched back on' as soon as possible, if the population is to believe that a transition to sovereignty and prosperity is taking place. The power line network was thus of strategic importance yet was being interdicted on a daily basis both for insurgent reasons and by criminal acts. With little employment and a need to put bread on the table, together with a smuggling/crime ring brought about as a result of years of sanctions, many reverted to crime to support their families: the copper prevalent in power line towers, many newly repaired, was of high scrap value. The thousands of kms of power line could not be patrolled by the hard-pressed ground forces of CJTF-7 and thus a solution was found using the

lightly tasked air component. The power lines (and fortunately the pipelines too) run from Basra in the south to Baghdad and then north to Mosul. Fast-air on its way to the CAS stack[44] had to fly from Basra to Baghdad as part of a previously fruitless transit. By using the ever-more-capable targeting pods in a reconnaissance role, it was possible to covertly look for activity along the lines and pipes. When suspicious vehicles and personnel were spotted, a call to the ground via the ASOC could alert a nearby QRF that would be vectored to investigate. *Find*, *Fix*, *Track*, was thus done by the air component, *Target*, *Engage* and *Assess* by land forces. In developing this tactic, it was found that by flying low the mere noise of a coalition aircraft could induce other effects. Interrogated Iraqis believed that every coalition aircraft had the technological means to see everything on the ground — it therefore followed in many minds that if you hear an aircraft, you have probably been spotted and now would be a good time to desist.[45] Of course tactics must change to reflect the adaptive nature of the enemy in an ever-changing dynamic — we must never be predictable.

Thus effects are best applied in an integrated form: Echevarria espouses interdependent manoeuvre which 'calls for a fully joint approach from the outset, generating synergy with the interaction between fire and movement rather than placing the burden of success on one dimension, with others absent or only in support'.[46] Moreover, it would probably help if some form of 'framework for jointery' existed - perhaps the USAF approach to the Air Operations Centre (AOC) would be a useful model. Designated as the AN/USQ-163 Falconer, the processes, systems and people within the latest Block 10 AOC are treated as a weapon system. All elements must be accredited and incumbents trained before being declared combat ready. Thus a key element of the planning, executing and assessing of air and space missions is properly controlled, organised and maintained. If we treat the joint processes in a similar way, a more structured mechanism may help maintain the required levels of interoperability. Importantly, such enhanced levels of cooperation can only help prevent cases of fratricide. Air power can play a pivotal role in generating effects to support nation building so long as it is constantly reactive to the environment. Having acted, it is imperative to assess.

**Assess**

In a linear world, the delivery of effects is dynamic and the processes used are adjusted in a cyclic way: action-reaction is the key. In a non-linear, post-Newtonian construct, it is no longer possible to achieve success by detailed monitoring and control of 'inputs in a linear phenomenon that are proportional to outputs'.[47] The non-linearity of the modern era and EBO demands a new approach where it is no longer safe to assume that '2+2=4; it may equal oranges'.[48] Czerwinksi suggests that concepts of *proportionality*, *additivity, replication,* and *demonstrability of causes and effects* can no longer be relied upon. Unfortunately, these concepts make up most of what is undertaken in combat assessment.

An area of consistent weakness, analysis, continues to be the ugly duckling of combat ops. A dearth of suitable measures of effectiveness leads to *output* analysis in terms of 'bean counting' rather than *outcome* analysis. We do it because we can. We do it because we are inherently linear in mindset. In some cases this is perfectly acceptable. However, as van Creveld observes in his analysis of the C2 of the Vietnam war:

*'Statistics constitute one of the most abstract forms of information known to man; although they can possibly present a good picture of a whole phenomenon the relevance of any given set of figures to this or that particular event at this or that particular place may well be next to zero.'*[49]

During Gulf War I, Schwarzkopf could not be sure of the outcome of air operations because he did not receive outcome-related information.[50] Many will remember the attrition graphs of Iraqi armour destroyed or SAM defences neutralised. Even today, when imagery is available to confirm a strike, all that can be assessed is whether the aim point was hit. It is hard to tell from an entrance hole what happened thereafter: did the weapon explode; what was the functional damage to the facility?

**A Nimrod MR2 MPA**

*A Nimrod MPA was assisting in the night interception of Taliban and AQ who were smuggling people, drugs and money across the Gulf of Oman*

If we have a poor ability to assess kinetic effects, then non-kinetic assessment poses a whole new set of problems. With the inherent temporal nature of effects, metrics have to be time sensitive. Moreover with a complex adaptive system as the adversary, analysis itself becomes more complex. Effects are achieved with many interdependent methods: military, economic, political and psychological, to name but a few. Analysis will therefore need to make use of models, both qualitative and cognitive as well as empirical information.[51]

In addition to new methods developed by the analytical community, joint and interagency systems analysis and fusion will be essential. Non-government organizations, other Government departments, the media[52] and all the other theatre actors could and should play a part in building the picture - the eclectic mix again. One example of effects assessment can be found in the following vignette from Operation Enduring Freedom:

*'A Nimrod MPA was assisting in the night interception of Taliban and AQ who were smuggling people, drugs and money across the Gulf of Oman. Having found a contact on the aircraft's Searchwater radar, the Nimrod continued until close enough to slave its massive searchlight to illuminate the return. The target boat, which had been travelling at speed, stopped, giving the coalition naval forces time to intercept and detain. All were puzzled by this reaction to what was after all, only a light. After questioning it became clear: to those adversaries on board, the bright light was the 'finger of Allah'.'*[53]

This example lies squarely in the cognitive domain. The same principle of influence (stop) by effect

(illuminate) could be applied to other operations such as infrastructure protection.

There is a groundswell of opinion that suggests that a solution lies in FMV. Receive Only Video Enhanced Receiver (ROVER) is in use with several ground units in Iraq giving the Predator FMV picture to the local commander. Despite the attraction of 24/7 video, the spell-binding download from Predator and other UAVs is fairly limited in value. As with a still image, unless interpreted by an image analyst, it is often hard to discern the relevance of what one sees. Colour, high-resolution video gives plenty of *information* but little *intelligence* because it cannot show intent. As with the earlier F-15E convoy escort example, it normally takes a knowledgeable human element at the scene with significant understanding of the culture, ethos, language, and habits *etc* of the subject. Individuals being tracked by Predator as they walk across a high pass are either AQ/Taliban or local tribesmen doing what they have always done. Technology thus has serious limitations that must be balanced against improved techniques and processes.

*Individuals being tracked by Predator as they walk across a high pass are either AQ/ Taliban or local tribesmen doing what they have always done. Technology thus has serious limitations that must be balanced against improved techniques and processes*

**Technique or technology?**

There is a long-standing obsession with technology as the panacea to all ills. But as Jane's reports:

*'. . . even US technical means have been 'fooled' by those determined to avoid them. India's nuclear detonations in June 1998 were timed to escape detection by US surveillance satellites through a sophisticated deception programme. The timing of India's arrival as a new nuclear power caught the intelligence community by surprise.'*[54]

With resources naturally limited, this focus on technology comes at the expense of doctrine, organization and process developments that are as likely to produce results. As DiNardo and Hughes


**A Predator UAV undergoing maintenance on returning from a reconnaissance flight over Afghanistan**


**An F-16 over Afghanistan; note the LITENING targeting pod under the fuselage**

*Units in Afghanistan are now able to see the targeting pod image of the supporting aircraft and do the ultimate talk-on — 'left a bit, right a bit; that's the target' — a novel mix of process and technology*

argue, 'history has repeatedly shown that technology is best incorporated in the context of enhancing such *methods* that have already proven successful'.[55] Since the balance and symmetry of the days of the Cold War we have been comforted by the perhaps false impression that technology was everything: 'the Soviets have had great respect for, and fear of, Western systems based on high technology'.[56] An *effect* perhaps but the reality might have been very different.

In Iraq, the 101st Airborne Division has recently been replaced by a Stryker Brigade where numbers have been replaced by technology — in essence, 'bytes for boots'. Yet at $2 million dollars apiece and with the 'latest C4ISR equipment',[57] the vehicles are still vulnerable to ambush by Haji (the Iraqi resistance) using fairly primitive RPGs — the soldiers within are no more safe than before.[58] 'See first, understand first and act first' is all well and good as a concept for future land conflict,[59] but it does not address the difficulty of finding and identifying the terrorist/insurgent/resistance fighter. That said, the plan to integrate these high mobility land units with air power platforms should lead to opportunities for true synergy in the combined arms battle and better opportunities to see, understand and act first.

Communication shortfalls have always been the number one action item in Lessons Learned or After Action Reports. It is inconceivable that we could migrate to networks of sharing masses of information without considerable teething problems. Making improvements in communications – a fundamental requirement — would be money well spent. The ability to talk, by voice or data, to Stryker type units or the conceptual UK FRES[60] will enhance the transfer of intent and lead to a quantum leap in the level of support given. Units in Afghanistan are now able to see the targeting pod image of the supporting aircraft and do the ultimate talk-on — 'left a bit, right a bit; that's the target' — a novel mix of process and technology.

Smart Acquisition is designed to procure equipment for the UK Armed Forces *'faster, cheaper and better'*.[61] The methodology aims to reduce procurement time and cost by managing risk in partnership with industry. The migration to true effects based procurement is not yet complete — we still buy equipment to replace equipment — but we are getting smarter. While emphasis is rightly on war-winning capabilities, we have found ourselves in need during OOTW or nation building on more than one occasion. Air and Land systems should therefore have an additional ability to bring a wider range of effects to bear.

Efficiencies in design have led to smaller but equally effective warheads in new and planned kinetic weapons — a cockpit selectable, variable explosive yield would be the natural corollary. The UK has been considering a precision training weapon, the Laser Guided Training Round,[62] as a potential low collateral damage weapon for some time. Precision guidance with a low or zero warhead seem to offer a promising match. With almost no financial expenditure, air platforms could drop practice weapons as a sign of intent — the marker charge giving minimal collateral damage concerns but a clear indicator that the scale of strike can be increased.[63] Moreover, experience in Afghanistan has underlined a need for smaller kinetic effects. Small teams of Special Forces hunt down high value individuals in the mountains near the border between Afghanistan and Pakistan, often taking weeks to make contact with the target. If additional support is required from air assets it has often come in the form of a 2,000 lb bomb. To avoid fratricide, the team must separate by at least 2 km and as a result, inevitably lose contact with their target. Smaller weapons, equally deadly, would enable contact to be maintained. Finally, the utility of the air-to-ground gun has never been greater. Arguably the weapon of choice in both theatres, its utility for either a warning shot or direct engagement is proven. Indeed the lethality of the A-10 Gatling gun or the multiple AC-130 guns has an additional IO effect on the adversary to the point where often just the seeing or hearing of the aircraft can induce the desired result. But kinetic attack is often excessive in the many and varied situations that pop up

during nation building. There appears to be a place for non-lethal weapons (NLW).

Non-kinetic effects continue to be developed and are increasingly relevant in the nation building phase. Cruise missiles with carbon fibre warheads temporarily turned out the lights in Baghdad during Desert Storm. Rubber bullets have been used in Northern Ireland for some time though not all are entirely comfortable with their use as they can still kill or lead to serious injury. While lawyers struggle with new definitions over the legality of use, and others over the morality and ethics, work progresses with lasers, acoustic beams and bullets, foam and sticky materials, nets and so on. Whether delivered by air or by ground, non-lethal restraint sounds promising, but there is a long way to go to determine the full range of effects, primary and secondary, that these methods induce. NLW will not, as some might advocate, replace conventional kinetic weapons.[64] More likely, they will complement and provide decision makers with a wider range of options. Lewer and Schofield go on to say that there is:

*'. . . [an] attraction of a new generation of weapons that seem to offer the potential for a new form of warfare. This might be described as 'societal war', a reconceptualization of total war, in which the major civil assets of an adversary are targeted as well as its military forces and structures. For some advocates of non-lethal weapons, that offers the West the potential for strategic paralysis of an enemy's civilian infrastructure and economy.'*[65]

It's an interesting thought that NLW could counter the restraints and constraints of contemporary targeting and open up the full range of options that have hitherto been denied to the modern day targeteer. Perhaps this would enable, as Steven Metz preposes, 'full-dimension precision'.[66] The use of such weapons would be equally attractive to police forces and thus another field of closer coordination and cooperation could start to present itself. These forces will have skills that complement the military; the opposite is also true.

**Concluding thoughts — achieve?**

EBO must address interagency concerns over the coming months and years — such coordination and cooperation will demand even more of our people and processes and will be the subject of many future studies. In the interim, the military would do well to get its own house in order and start to take 'joint' seriously by truly integrating the components. The *combined* interoperability successes of fighting components suggest that many nations have the wrong balance or emphasis on the need to be joint. Single service training objectives must not be achieved at the expense of jointery and senior commanders must not be afraid of failing under exercise conditions. Indeed, if one is to meet the maxim of train as you fight, fight as you train, then failure must be expected under training conditions if we are to learn properly and not fail on the battlefield. Perhaps the AN/USQ-163 Falconer weapon system would be a useful model for a framework for jointery. The parallels to the processes and requirements of true joint operations are fairly axiomatic. Right now, I would suggest that, in terms of jointery, we are at best, limited combat ready.

Technology has its limits yet a rose tinted view prevails of what is likely to be achievable over the coming years — 'technical breakthroughs have been promised for decades, but do not appear to occur [sic] despite the introduction of much more technology and . . . complexity . . .'[67]
The future will belong not necessarily to the most technologically advanced combatant but the one that understands the nature of war and can most effectively cope with and exploit it. [68] Encouragingly, the UK is now adopting procurement along lines of development (LoD)[69] to break away from the equipment-orientated approach. The 'Training' and 'Tactics & Doctrine' LoDs, could address the need to gain common or shared intent and are thus the most important at the moment.

Nation building from the air is a valid role but not one that exists in isolation. Independent strategic attack and interdiction beyond the FSCL is a mature operation. A weakness exists in the closer support operations, particularly when the FSCL is ill defined or non-existent — doctrine ceases to help. The unique characteristics of airpower

complement actions taken on the ground and can lead to true synergy, a hackneyed phrase that through misuse has lost the benefit of its meaning. Most articulated future capability programmes show an overriding penchant for the linear, especially the enchantment with, and over-dependence on, technological solutions.[70] Notwithstanding possible help from technology, existing capabilities can be brought to bear to the nation-building role. Targeting pod-equipped aircraft can aid force protection through non-traditional surveillance measures. Kinetic or non-kinetic effects can be delivered against surface targets or points of interest most effectively in close coordination with troops on the ground. Equally, traditional ISR assets can be armed to offer a kinetic effects option at short notice. The more assets that can join the effects chain and the shorter the time taken to do it, the better and more flexible the JTF will be:

*'As the air commander, my primary concern is the effect air power has on the battlefield in support of . . . our ground force. If I can achieve a particular effect with F-16's with LITENING Pods, then I'll task them . . . The bottom line is to create an effect that supports the war fighter and his mission.'*[71]

I have shown in this paper that there is much that air power can do to support nation building. However, until we gain a mindset that can see beyond the traditional kinetic engagement, an underlying principle of EBO, the full benefits will never be realized. The brightest and best need time with the other Services to understand and achieve common intent. One only need look at the US Marine Corps to see air/land operations, albeit fairly limited in scope, that are so joint that they do not even need to use the word. Once achieved, precision campaign effects over range and time will become a reality rather than an aspiration — practice makes perfect. Then, with the military house in order, we will need to read up on complexity and Chaos theory and begin to address the real challenge of interagency operations.

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41 Anti-coalition Forces, Former Regime Elements, or just 'bad guys'.
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Allied airborne invasion of Holland in September 1944

# Operation Market Garden:

## Did Air Power Fail?

## By Dr Seb Ritchie

There has been a striking tendency in a number of recent histories of Operation Market Garden (the Allied airborne invasion of Holland in September 1944) to criticise the role of air power, and to argue that air power's failure played a central part in the Allied defeat.[1] This appears curious at first, as both the RAF and the USAAF lent their backing to the operation on an immense scale. In a period of nine days some 13,000 air sorties and 2,600 glider sorties were flown in support of Market Garden;[2] if it is considered that poor weather grounded the majority of Allied aircraft on at least two days in this period, the true extent of the air effort will be appreciated. It is nevertheless now common to read that the air forces and their senior commanders — General Brereton of First Allied Airborne Army, and his subordinates, General Williams of 9 (US) Troop Carrier Command, and Air Vice-Marshal Hollinghurst of 38 Group, RAF — bear primary responsibility for the operation's failure.[3] Employed more efficiently, it is argued, air power could have turned a disastrous defeat into victory. Recently Wing Commander Dave Winstanley has repeated this argument in the *Air Power Review*.[4]

It is a sad reflection on the state of academic research into air power history in Britain today that such views have rarely been properly challenged. Only Sebastian Cox, writing in *Air Clues* two decades ago, has provided serious grounds for reconsidering the role of air power in Market Garden.[5] And yet there are good reasons for treating the allegations of failure with scepticism. Some of the more damaging criticisms were not documented but emerged instead from the memoirs or the recorded testimonies of officers

*Following the Crete debacle Hitler declared that the days of parachute troops were over. The parachute arm is one that relies entirely on surprise. In the meantime the surprise factor has exhausted itself*

from 1 Airborne Division. Their accounts, while of immense historical value, inevitably suffer from predictable problems of bias, parochialism and selective recollection; they represent a very narrow source base for the history of a very large and complex operation.[6] Moreover, few of the historians who have blamed the RAF and the USAAF for the failure of Market Garden are established authorities on air power, or appear to have much knowledge of the parameters within which air operations were conducted in September 1944.

This article re-examines the role of air power in Market Garden, drawing as far as possible on the surviving official records rather than the published literature. The result is a very different view of the operation. It is suggested, in particular, that the events of September 1944 should be considered in their proper historical context, and that we should not underestimate the immense complexities involved in planning and executing the supporting air operations. It is also argued that any serious attempt to explain Market Garden's failure must primarily consider such issues as conceptual planning, intelligence, and the quality of leadership within the airborne formations. In what follows it has been convenient to employ some of the headings used by Wing Commander Winstanley, namely: historical context, the nature

of airborne warfare, the Market Garden plan, information exploitation, the selection of British landing zones (LZs) and drop zones (DZs), airlift, control of the air and close air support.

**Historical context, and the nature of airborne operations.** Winstanley's account opens with a survey of the historical background to the launch of Market Garden, focusing on the underlying motives behind the operation. He then continues with a selective discussion of the nature of airborne operations, arguing that early German experience had emphasised the importance of shock effect and surprise, but that such fundamentals were ignored during the planning and implementation of Market Garden. He does quite rightly acknowledge the acute risks inherent in airborne warfare, but it is not clear that he fully appreciates their severity.[7]

In the early years of the Second World War, the high reputation of airborne warfare was founded on the first German operations — in Norway, Belgium, and Holland. These certainly benefited from surprise, but the effect was vastly magnified by the fact that, at the time, airborne landings represented an entirely novel method of waging war. Moreover the Germans largely prevailed against weak or poorly led adversaries. Even then, detailed examination shows that these operations did not meet with unqualified success: virtually any failure in planning or execution usually resulted in heavy losses of personnel and/or equipment, because airborne warfare typically involved the insertion of lightly armed troops, lacking logistical support, fire support or mobility, into locations where, potentially, they could find themselves surrounded by heavily armed opponents.[8]

Nazi Germany's love affair with large-scale airborne operations came to an end in May 1941: Operation Mercury, the invasion of Crete, resulted in victory, but at an unacceptable cost — a total of 4,522 casualties from the airborne formations, or 56 per cent.[9] The Germans also lost 350 aircraft, including at least 150 Junkers transports.[10] Although they maintained a substantial airborne capability for the rest of the war, they subsequently attempted only a limited number of small-scale airborne operations, and the vast majority of their paratroops were employed as conventional infantry.

Following the Crete debacle Hitler declared that the days of parachute troops were over. 'The parachute arm is one that relies entirely on surprise. In the meantime the surprise factor has exhausted itself.'[11] This was undoubtedly true. In future, airborne operations were likely to be far more difficult because opposing forces would be better prepared for them. Certainly in the planning of Market Garden three years later the surprise factor was not ignored, but it was considered difficult to attain. As one Field Order for the operation put it:

*'Tactical surprise is very unlikely and the enemy will undoubtedly have advance knowledge of the approach of Troop Carrier formations through radar plots, visual reconnaissance, or reports from ground or naval forces.'*[12]

Apart from surprise, the other important assumption underpinning German airborne doctrine was that airborne operations should be undertaken in daylight, to ensure the accuracy of parachute drops and glider landings: all the German airborne assaults conducted in 1940-41 were executed in daylight.[13] Due to the inherent vulnerability of transport aircraft — low speed, lack of defence, low altitude and straight and level flight during parachute drops — it followed that control of the air was fundamental to success, both to eliminate the risk of interception by enemy fighters and to suppress ground-based air defences in the drop or landing areas.

The Allied approach was somewhat different, in that the airborne actions which preceded Market Garden were largely subordinated to parallel ground operations, the timing of which dictated that the airborne landings were conducted in darkness. As the Allies lacked control of the air, night operations also provided valuable protection for their transport aircraft. Yet night-time airborne operations raised another acute problem

— navigation. In the early years of the Second World War the science of night navigation was developing only slowly within the RAF; within the USAAF, which would ultimately operate the majority of Allied transport aircraft, it was even less perfectly practised, particularly when the troop carrying aircraft came under fire.[14]

The Allies' first attempt to employ their newly created airborne forces occurred in Tunisia in 1942 and was a fiasco, which contributed nothing to the ultimate victory; in one failed operation the British 2 Parachute Battalion suffered 50 per cent casualties.[15] The second attempt, in Sicily in July 1943, was utterly chaotic. An official report on the British 1 Airlanding Brigade's glider landings behind the beaches records that 'the operation was not a failure . . . but it was a very costly success.' Of their gliders, 69 landed in the sea and a further 10 were completely unaccounted for; 54 landed somewhere in Sicily,[16] but only four gliders landed on their designated LZs.[17]

The troop carriers that conveyed 1 Parachute Brigade to the Primasole bridge were not very much more accurate. Only 39 parachute aircraft dropped their troops on or within half a mile of their DZs, 48 more dropped them over half a mile away and 17 returned to base with some troops still on board. A further 12 were unable to reach or find their DZs at all, and 11 were shot down. At first the Brigade could muster only 12 officers and 283 other ranks, out of a total of 1,856 all ranks who left North Africa.[18] The US No 504 Regimental Combat Team and 82 Airborne Division lost 23 of their 144 aircraft to 'friendly' naval anti-aircraft fire. Only one company and one light battery landed on their correct drop zone, and in the first 24 hours only 37 officers and 518 other ranks were assembled. The US 505 Regiment, destined for the Piano Lupo, was dropped all over southern Sicily.[19] The next Allied airborne operation, at Salerno in September, achieved more success when the airborne troops were merely flown in to reinforce regular ground forces. But operations involving the US 509 Parachute Combat Team inside enemy territory were another matter. Of 40 aircraft involved, only 15 placed their paratroops within five miles of the drop zone. In October it was reckoned that nearly 20 per cent of those who made the jump were dead, wounded or still missing.[20]

By contrast, Operation Overlord, in June 1944, is generally seen as a success for the Allied airborne formations. Yet all too often this view is based on British perceptions of high-profile but small-scale actions, such as the seizure of Pegasus Bridge, or the destruction of the Merville Battery. The totality of the Allied airborne experience in Normandy (particularly the American experience) was very different. In fact, on the night of 5/6 June 1944, a combination of poor visibility, German flak, and consequent evasive action by the troop carriers caused the US airborne divisions to be widely scattered. Many paratroops were dropped far from their zones; they lost much of their arms and equipment, and suffered massive loss of force cohesion.[21] Around 75 per cent of the US paratroops landed more than five miles away from their zones or beacons. Although the US airlift involved some 13,000 personnel, only around 4,500 were under divisional control after 24 hours.[22] The two US divisions also suffered an estimated 2,500 casualties on the first day of the operation alone.[23]

In the British sector the drops were more concentrated, but were far from perfect. Of 71 troop carriers assigned to one of the three principal drop zones, only 17 dropped their paratroops accurately; at one of the other zones some 35 aircraft dropped inaccurately.[24] Two of the component battalions of 5 Parachute Brigade went into action 40 per cent under strength.[25] Of the 750 men assigned to Lieutenant Colonel TBH Otway to destroy the Merville Battery, he was able to assemble just 150, half of whom became casualties in the subsequent operation.[26] For the US and British divisions far more severe casualties were only avoided because the airborne troops were rapidly reinforced from the landing beaches, only a few miles to the north. The 101 Airborne reported that it could not have held out for much more than 24 hours without support from Utah beach.[27]

In summary, the Allied experience of airborne warfare up to and including Overlord was very far from positive. For a variety of reasons the

Allies were repeatedly compelled to deploy their airborne arm under cover of darkness; but such were the problems of night navigation in combat conditions that these operations were mostly characterised by highly inaccurate drops and landings, by consequent loss of force cohesion and combat power, and also by high casualties. It is against this background that the planning of Operation Market Garden must be considered.

**The Market Garden Plan**

The Market Garden plan was primarily devised by Field Marshal Montgomery and involved the seizure by some 35,000 airborne troops of 1 (British) Airborne Division, 82 and 101 (US)Airborne Divisions, and 1 Polish Independent Parachute Brigade, of a series of river and canal bridges along a single road running north from Eindhoven, through Nijmegen, and finally to Arnhem. At the same time, XXX Corps (part of the Second British Army) was to break through the German defences along the Meuse-Escaut canal, south of Eindhoven, and drive rapidly up the same road to establish a 'corridor', linking up with the airborne divisions as it advanced. XXX Corps was to relieve 1 Airborne Division at Arnhem, 64 miles from its starting point, in two or three days, and establish a bridgehead on the north side of the Arnhem road bridge over the Lower Rhine. Montgomery hoped this would become a springboard for a subsequent advance into Germany.

The airborne plan's most original feature was that for the first time in a large-scale Allied airborne operation the airlift was to be made in daylight. This held out at long last the prospect that the overwhelming majority of the airborne forces involved would be dropped or landed at their correct locations, that their weapons and equipment would soon be available to them, that they could be rapidly assembled into cohesive formations, and that virtually all of the forces landed would quickly be available for operations. In short, the airlift would achieve levels of accuracy and concentration completely unprecedented in the otherwise troubled history of Allied airborne warfare. However, a daylight airlift would only be possible through a massive supporting effort to protect the troop carriers, gliders and tugs — through the assignment to Market Garden of immense numbers of escort fighters and ground attack aircraft for flak suppression.[28]

Otherwise, the most notable feature of Operation Market Garden was that it involved a high level of risk. Montgomery intended to exploit what were thought to be relatively weak German defences in Holland, yet the Allies knew that enemy forces in the area were being strengthened. This meant that Market Garden had to be launched with the very minimum of delay. As one post-operation report put it:

'Actual enemy defensive positions were being improved rapidly, particularly in the Nijmegen-Maas-Waal canal area, but it seemed that these would be inadequately manned if D-day was not postponed.'[29]

Consequently, barely a week was allowed for planning an operation of immense complexity: it was sanctioned on 10 September and launched on the 17th. There was no time for detailed consideration, questioning, discussion, and consequent revision of the plans; they had simply to be drawn up and implemented.[30] Moreover, there were no specific training programmes or rehearsals, and virtually no preliminary exercises.[31]

Secondly, the Market Garden plan ignored at least one of the elementary principles of war, namely the concentration of force at the decisive point; for there was no very obvious basis upon which a 'decisive point' within Montgomery's corridor could be identified. The *sine qua non* of the operation was of course the Arnhem road bridge. Yet to the planners of Market Garden the more southerly bridges appeared of equal, or indeed greater importance, because without their capture 1 Airborne Division could not be relieved. Hence the Nijmegen and Eindhoven sectors received priority in the allocation of air transport and (on the opening day of the operation) close air support.[32]

The risk was greater still because the road along which XXX Corps had to advance was barely more than a country lane, raised on an embankment in some areas, bordered by soft ground or thick woodland in others, and wide enough for only one tank; it should not have required exceptional foresight to see that the road would be susceptible to congestion and highly vulnerable to blocking action.[33] Moreover, the corridor could easily be cut from either flank. Market Garden was launched with completely inadequate support to the south-east (which included German territory), or the north-west, where the Germans were re-deploying forces withdrawn from the Scheldt estuary.[34] Such was the threat to the corridor that airborne troops were from the very outset diverted from their primary task of capturing bridges to the undesirable but no less necessary role of blocking counter-attacks into the Nijmegen sector of the corridor.[35] XXX Corps became involved in similar operations, which reached farcical proportions on 22 September when the Guards Armoured Division was actually sent *south* from Nijmegen to confront a German attack on the town of Veghel — more than halfway back to Eindhoven.[36]

In addition, Montgomery's corridor concept had profound implications for air operations in support of Market Garden. As the ground operation was conducted within such a restricted area, it followed that the air space available for air support (in its broadest sense) was restricted as well. Airborne operations, including both airlift and re-supply, had inevitably to be assigned top priority; this meant that escort and flak suppression aircraft had to receive an equivalent status. Consequently close air support and fighter cover for ground troops had effectively to be downgraded. The need to prevent confliction (accompanied by the danger of air-to-air fratricide), caused Second Tactical Air Force (2 TAF) to be excluded from the airspace above the corridor while airlift and re-supply operations were in progress.[37] The task of operating over Arnhem outside these periods was, however, exceptionally difficult because, for logistical reasons, 2 TAF had been unable to match the army's rapid advance from Normandy to the Dutch border in the preceding weeks. As a result, one of 2 TAF's two principal groups, 84 Group, was not based within range of the Market Garden area, and could not participate in the operation at all.[38] The other, 83 Group, was sufficiently far from the northern end of the corridor to make participation extremely difficult.

**An aerial reconnaissance photograph of the Arnhem area**

*It has long been argued that there was a failure to exploit aerial photographic reconnaissance (PR) before the operation. Specifically, PR imagery showing that there were SS panzer formations in the Arnhem area, posing a serious threat to 1 Airborne Division*

**Information exploitation**

Calculations of the risk inherent in Market Garden naturally involved what is now known as 'information exploitation'; the risks had to be assessed on the basis of Allied intelligence about the strength of German forces in Holland. In this regard it has long been argued that there was a failure to exploit aerial photographic reconnaissance (PR) before the operation. Specifically, PR imagery showing that there were SS panzer formations in the Arnhem area, posing a serious threat to 1 Airborne Division, is said to have been ignored.[39] More recently it has also been suggested that Allied commanders overlooked imagery showing anti-aircraft defences to have been removed from Deelen airfield, close to Arnhem. This was significant because the photographs might have influenced the location of 1 Airborne Division's DZs and LZs, allowing them to land closer to their objectives.[40]

The issue of the panzer divisions is complex, but it is important to remember that PR represents only one source of intelligence, the other main sources for Market Garden being signals intelligence ('sigint') and human intelligence ('humint'). Taken together, these sources made it reasonably clear to both corps and divisional commanders that at least some German armour would probably be encountered in the Arnhem or Nijmegen areas. High-grade sigint ('Ultra') had reported early in September that II SS Panzer Corps was to move to Eindhoven to supervise the refit of several armoured formations. The land component of 1 Allied Airborne Army, 1 Airborne Corps, under General 'Boy' Browning, was warned that 'one broken Panzer Division' had been sent to the Arnhem area for refit and that the presence of II SS Panzer Corps was suspected.[41] At least one report accurately located this division north of Arnhem on 11 September.[42] Other documents suggest that the refitting panzer division was thought to be to the south-east of Nijmegen, in the Reichswald forest, threatening the landing zones assigned to 82 Airborne Division. Although a Market Garden Field Order dated 13 September made no mention of it, an area which 'may be pool for refitting Pz Divs' was clearly indicated in the Reichswald on a map attached as an annex.[43]

As the countdown to Market Garden continued, there was no real change in this intelligence picture. A report prepared by 1 Airborne Division speculated that 'a battle-scarred Pz Div or two' might be 'reforming' south-west of Zwolle, forty miles north of Arnhem.[44] The Dutch resistance warned more ominously that 9 SS Panzer Division was closer to Arnhem, south of Apeldoorn.[45] The PR imagery of panzers near Arnhem which was allegedly obtained at about this time would therefore not have come as much surprise to Browning. But a source of greater concern emerged on 15 September, when further humint indicated that German armour was present in strength in the Reichswald forest.[46]

This threat, at least, was taken very seriously. That same day an assistant to the head of operations in 1 Allied Airborne Army flew to Brussels to discuss air support tasking on the first day of Market Garden with 83 Group, 2 TAF. In raising the specific targeting concerns of 1 Airborne and 82 Airborne Division, he made no reference to the possibility that German armour was located near Arnhem, but again drew attention to the threat of panzers in the Reichswald forest. It was agreed that 83 Group:

'*Would have their Spits watch for any tanks coming out of the woods southeast of the [82 Airborne Division's] DZ-LZ area; and that they would run their RP Typhoons along the edge of these woods at approximately H plus 90.*'[47]

Throughout the planning process, Browning was insistent that the Groesbeek Heights, protecting Nijmegen from German attacks out of the Reichswald, should be secured before 82 Airborne Division sought to capture Nijmegen itself, with its crucially important bridge over the Waal river.[48]

Here was information exploitation of the best kind. Unfortunately, however, the information turned out to be incorrect, for while 82 Airborne Division faced repeated German counter-attacks from the Reichswald forest during Market Garden, no German armoured formations were located there. By contrast, while the proximity of German armour to Arnhem was not ignored (1 Airborne Division deployed with more than 70 anti-tank

guns and numerous PIAT infantry anti-tank weapons),[49] it was clearly considered to pose less immediate danger. This was probably because Browning underestimated the capability of the reportedly under-strength and battle-scarred German forces north of Arnhem and believed that 1 Airborne Division could hold out there until it was relieved from the south. The critical priority was to ensure that the corridor was not severed at Nijmegen, as this would have halted XXX Corps' northward advance.

As for the photographs of Deelen airfield, they were in fact far from conclusive. Taken by a 541 Squadron Spitfire on 6 September, they were afterwards superseded by a study by Headquarters First Allied Airborne Army of imagery gathered between 6 and 11 September. This stated that at Deelen airfield 'Flak is apparently still present in rather large quantity, there being seventeen (17) heavy guns and fifty-five (55) light guns shown as occupied positions on the latest photo cover.'[50] Hence, the most up-to-date intelligence available before Market Garden demonstrated that Deelen still posed a significant threat.

The most striking feature of Allied intelligence on German dispositions in Holland prior to Market Garden was its contradictory character. The only consistent reports in the two weeks before the operation concerned German anti-aircraft defences: virtually all Allied intelligence agreed that German flak was being rapidly augmented along the proposed corridor.[51]

Otherwise, while the surviving intelligence documents mostly emphasise the weakness of German forces in Holland, they are punctuated by suspect inconsistencies and caveats. XXX Corps' detailed orders for Market Garden on 15 September described the total German force in the operation area as 'quite inadequate to offer prolonged resistance along any line', but their previous day's intelligence summary had warned that 'they must oppose us with something'.[52] The 13 September Field Order stated that at Nijmegen evacuated elements of the German 15 Army 'might be preparing river line or moving into battle area' but later declared that there were 'no confirming reports of troop concentrations' in the town; although the Germans had increased the strength of their outer defensive line in southern Holland, they were thought to have little in reserve. The only enemy forces known to be at Arnhem were the flak units protecting the city, and those defending Deelen airfield.[53] On 14 September 1 Airborne Division's intelligence officer wrote that 'every able-bodied man in uniform who can be armed is in the battle . . . and it is improbable that any formations capable of fighting will be found in an L[ine] of C[ommunications] area.'[54] But the next day another assessment contradicted this report by describing Nijmegen and Arnhem as being among various 'nodal points' which 'are likely to be strongly held for their communications value.'[55]

It is too simple to argue that there was merely a failure of information exploitation in the planning of Market Garden. In fact, the operation plan did seek to exploit available intelligence by reducing, as far as possible, the risk posed by flak to the airborne formations. Equally, it was believed that risks *could* be taken on the ground – that a rapid advance along a narrow axis *could* be achieved — because the bulk of Allied intelligence suggested that the enemy was too weak to offer serious opposition.[56] The primary information exploitation problem in Market Garden was that the two principal ground commanders — Montgomery and Browning — when confronted with contradictory intelligence, were predisposed to attach more weight to optimistic than to pessimistic assessments. This was partly because they underestimated the residual capability of the German army in the aftermath of the Normandy breakout, and the Allies' rapid advance from the Seine to Antwerp, and partly because they were steadfastly determined that Market Garden should be launched as planned, not least for reasons of their own self-aggrandisement.[57] Their perspective remained that enemy reinforcements would not pose a serious danger if the operation began immediately, and if XXX Corps' advance to Arnhem was not significantly delayed.

**The Impact of Air Power on the Selection of British Landing Zones and Drop Zones**

One of the most common criticisms of the RAF in the planning of Market Garden is that they forced 1 Airborne Division to accept DZs and LZs some seven miles north west of the Arnhem road bridge, near Wolfheze. The distance between these zones and the bridge is held to be primarily responsible for the operation's failure.[58] Before Market Garden there do not appear to have been any significant disagreements between air and airborne divisional commanders about the location of landing areas. But at Arnhem the commander of 1 Airborne Division, Lieutenant General Urquhart, naturally hoped to stage landings close to the road bridge, while his RAF counterpart, Air Vice-Marshal Hollinghurst, favoured Wolfheze.[59] The difference was, of course, that Market Garden was to be launched in daylight.

Here it is necessary to recall that Market Garden grew out of a smaller operation known as Operation Comet, which had the same basic objectives, but which would have involved fewer airborne troops. Proposals to mount Comet in daylight encountered determined opposition from Hollinghurst, who was of course concerned over the threat posed by German flak. Eventually he appealed to the Air Commander-in-Chief, Air Chief Marshal Leigh-Mallory, only to be over-ruled.[60] Subsequently, after Comet's cancellation, it was decided that Market Garden should also be staged in daylight.

Hollinghurst is often condemned for being reluctant to accept risk, yet his anxiety is easy to understand. The operations under consideration were of course the first large-scale airborne operations to be conducted by the Allies in daylight; also, no previous landings had been made immediately adjacent to a large town or city. Moreover, Arnhem was some 64 miles inside enemy territory, and close to the German frontier. Allied intelligence — the only information available to him — showed a steady build up of flak in Arnhem, and also pointed to heavy flak concentrations at Deelen airfield, as we have seen. The routing plans for Comet and Market Garden were such that if the DZs and LZs had been located near to the road bridge, the (largely American) transport aircraft would have had to over-fly at low altitude both the city and the airfield.[61] Apart from the losses that seemed likely to result — partly to USAAF troop carriers transporting British paratroops – one important lesson of Normandy and Sicily was that heavy flak tended to cause widely dispersed and inaccurate drops, and the loss of much vital equipment. In short, on grounds of flak alone, there seemed to be good reasons for avoiding central Arnhem.

However, predictions of the strength of German flak played only a part in the decision to locate the DZs and LZs at Wolfheze; of equal importance were the mass glider landings. There was never any realistic prospect of safely landing more than 600 gliders in the countryside south of the Arnhem road bridge. Allied intelligence (partly from Dutch liaison officers and partly from aerial photographs) showed that this area was polder-land, criss-crossed by dykes and drainage ditches.[62] According to one post-war official account, the land was divided by the ditches into areas of 50 to 100 metres in width, and 100-200 metres in length; the ditches were 2-3 metres wide and 1.5 metres deep, and contained water about half a metre deep.[63]

Away from the polders, much of the countryside around Arnhem was characterised by small fields. The only larger and more open fields near the town were those actually chosen for the landings, and they were only just large enough.[64] The commander of the Glider Pilot Regiment, Colonel George Chatterton, allegedly suggested it might be possible to land a small glider force (five or six gliders) in the immediate vicinity of the road bridge. However, there is no reason to believe that such a force would have been more successful than Lieutenant Colonel John Frost's Second Parachute Battalion in holding the bridge for long against determined counter-attacks by heavily armed German formations.[65]

It is frequently claimed that in the selection of the DZs and LZs Urquhart was 'over-ruled' by Hollinghurst, yet this seems improbable. Major confrontations between senior operational commanders are normally well recorded in the

official documents. For example, Hollinghurst's appeal to Leigh-Mallory (see above) is so recorded, along with subsequent disagreements over the location of 101 Airborne Division's landing areas around Eindhoven.[66] If Urquhart genuinely believed that the success of Market Garden was being jeopardized by the location of 1 Airborne Division's DZs and LZs at Wolfheze, he had a duty to raise this issue not merely with Hollinghurst, but at higher levels of his command chain. Yet the surviving documents do not record that he took any such action. One reason for this is almost certainly that the areas chosen were at first selected not for Market Garden but for Comet.[67] When Comet was being planned Allied intelligence indicated that only three enemy divisions, of limited capability, were present in the entire corridor area. Arnhem itself was thought to be protected by nothing more than a flak battalion.[68] Clearly there would have been little reason for Urquhart to be particularly concerned over the capacity of his troops to deal with such meagre opposition.

But most of all there was the all-important *quid pro quo* of the daylight airlift. Although Urquhart's forces were to be landed further from the road bridge than he would have wished, the daylight lift offered him immense compensating advantages. So while he may well have expressed *concerns* to Hollinghurst over the location of the landing area, it is far from certain that he pressed the issue, nor was there any obvious reason for him to do so. It is only with the advantage of hindsight, and because of the subsequent Allied defeat, that historians have blown out of all reasonable proportion the significance of Urquhart's doubts. After 10 September the DZs and LZs selected for Comet were simply expanded to accommodate the far larger forces assigned to Market Garden. Again, there is no record of any protest from Urquhart, presumably because he now assumed that, with many more troops at his disposal, there would be no great difficulty in achieving his objectives.

Urquhart's battle plan also suggests strongly that, despite the location of the DZs and LZs, he was confident of success. Historians often claim that he was compelled to split his forces on the first day of Market Garden between his ultimate goal — the road bridge — and the landing areas, which had to be held pending the following day's airlift.[69] But he does not appear to have harboured particular concerns over this issue. He afterwards described the airlift as 'quite first class. It was easily the most successful and accurate of any previously achieved either in operations or on exercises.' Moreover, in complete contrast to earlier experience, 'all units were able to move off to their tasks practically at full strength and in a very short time after landing.'[70] And yet, having been gifted the most accurate and concentrated landing in the history of Allied airborne operations, Urquhart chose to despatch the three component battalions of 1 Parachute Brigade into Arnhem along three different routes.[71] They subsequently lost contact with one another, and with their headquarters, because their communications equipment failed. This was unfortunate, but it should not have been unexpected, for poor communications had bedevilled earlier airborne operations — the Bruneval raid, for example, and Sicily.[72]

No 2 Parachute Battalion was ordered to capture the main road bridge, but was also lumbered with a variety of other tasks which would reduce its strength by at least one company before it reached its primary objective. In theory, 3 Parachute Battalion was to 'assist 2 Para Bn in capture of main bridge'. However, given the two battalions' geographical separation this was never likely to be easy. As for 1 Battalion, it was not even sent to the bridge: rather, it was tasked to occupy high ground in northern Arnhem.[73] No 2 Parachute Battalion duly reached the road bridge, demonstrating in the process that the location of the main landing area seven miles away was not, in itself, the fundamental cause of 1 Airborne Division's failure. But a more effective strategy would have been to deploy 1 Parachute Brigade as a single cohesive force. Such a force would almost certainly have been able to overwhelm the low-calibre German units which prevented 1 and 3 Battalions from advancing into Arnhem, well before the SS panzer formations encamped to the north and east could be deployed in the town in strength.[74]

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**The Airlift**

One of the most difficult issues facing the Market Garden planners was that insufficient aircraft were available to convey all three airborne divisions into Holland in a single lift. This raised acute prioritisation issues which were, as already suggested, inherent in Montgomery's basic 'corridor' concept. Browning believed that top priority in the allocation of air transport should go to the Eindhoven and Nijmegen sectors of the corridor; if 101 and 82 Airborne Divisions secured their objectives, XXX Corps would advance rapidly north to relieve 1 Airborne Division at Arnhem.[75] The entire operation, he explained to Urquhart, had to be planned from south to north, 'bottom to top'; objectives in the southern and central sections of the corridor must be 'seized first to get the ground forces through — otherwise, the First Airborne would be wiped out.'[76] Those who suggest that priority should have been assigned to the Arnhem airlift appear not to understand the fundamentals of Browning's thinking.

As the airborne divisions could not be infiltrated in a single airlift, the scheduling of follow-up lifts had to be carefully considered. At an early stage in the planning process, senior USAAF commanders within First Allied Airborne Army (specifically Brereton and Williams) decided to restrict operations to a single lift per day, over three days; in practice, however, it was planned that most of the airborne troops, including the whole of 1 Airborne Division, would be infiltrated over two days. Historians have severely criticised this decision on the grounds that it significantly reduced the force available at Arnhem on the first

day of Market Garden.[77] It is commonly maintained that the availability of a larger force, brought in by two lifts on 17 September, would have allowed Urquhart's division to achieve its objectives.

This argument is based on a fundamental misunderstanding of 1 Airborne Division's battle plan. Urquhart never envisaged that the formations conveyed by the second lift — the second contingent of 1 Airlanding Brigade, and the whole of 4 Parachute Brigade — would fight alongside 1 Parachute Brigade. Instead, 1 Airlanding Brigade was to establish an outer defensive line west of Arnhem — only a short distance from their LZs — while 4 Parachute Brigade was to form a similar line on the northern outskirts of the town.[78] In the event both brigades were largely wasted: several battalions were despatched from the DZ/LZ area towards Arnhem at different times, compounding 1 Airborne Division's fragmentation, while two of the three battalions of 4 Parachute Brigade were sent to the north of the city. Sadly, they suffered heavy casualties and achieved literally nothing.[79]

It nevertheless seems necessary to explore Brereton's thinking on the airlift in more depth. Operation Comet, scheduled for the beginning of September, had envisaged two airlifts on its opening day, the first transiting in darkness and reaching the landing area early in the morning. Having returned to Britain, and having undergone the normal maintenance processes, refuelling, reloading and glider marshalling, the troop carriers and tugs were then to return to Holland. This second lift was scheduled to reach its landing areas between 1745 and 1900.[80]

Early in September this timetable left only limited room for unexpected delays; by mid-September, with rapidly reducing hours of daylight in northern Europe, it left no room whatsoever.[81] If it is also considered that the number of aircraft involved in Market Garden was far greater than the number in Comet, and that the Allied transport fleet as a whole was suffering from a serious shortage of ground personnel, the dimensions of Brereton's problem will be understood. The prospect of squeezing two airlifts into one day without one or the other not only flying but also making parachute drops and glider landings in darkness was extremely remote. This in turn had far reaching implications, for the navigational task of staging an accurate lift to landing areas up to 100 miles from the Dutch coast in darkness and, at this time, without moonlight, was one of unprecedented difficulty.

It is also important to bear in mind that the airlifts had to be closely co-ordinated with escort and flak suppression operations. It would have been far more difficult to effect such co-ordination for two airlifts at each end of the day than for one lift in the middle of the day, assuming that the escort fighters and ground-attack aircraft could have been turned around in parallel with the air transport fleet. The navigation issue was also of importance here: as Hollinghurst told his senior staff officer on 11 September, 'the operation will be carried out in broad daylight (because the 8th Air Force cannot operate their fighters at early dawn or dusk).'[82] In short, if the potential difficulties involved in conducting a double airlift on the first day of Market Garden are considered in their proper context, the decision to mount only a single lift appears less susceptible to criticism. It must also be remembered that the decision was taken in the expectation that German ground forces in the Arnhem area would not be capable of very effective opposition.

The compensating feature of the airlift plan was that the first two lifts were both scheduled to take place within 24 hours. Both the initial landings and XXX Corps' offensive at the southern end of the corridor were scheduled for a period between 1300 and 1430 on 17 September. This synchronisation was crucial: an earlier lift would have warned German forces at the southern end of the corridor of an impending offensive, while an earlier attack by XXX Corps would have alerted the Germans further north. The initial landings and the ground operation had to be precisely co-ordinated. As the second airlift was scheduled for 1100 on 18 September, the plan still promised to deliver the whole of 1 Airborne Division to Arnhem less than one day after the initial landing *and* less than

Lieutenant General Urquhart

*Urquhart went so far as to suggest that CAS 'might easily have turned the scale and allowed the whole of 1 Para Bde to have concentrated near the main Arnhem Bridge'. Many historians have accepted Urquhart's judgment*

one day after XXX Corps began their advance. In practice, poor visibility in Britain delayed the lift on 18 September so that the landings began at 1400, but this still meant that 1 Airborne Division was brought into Holland in about 25 hours.[83]

Had a double lift been attempted on 17 September (and assuming both lifts were successful), the troops conveyed by the first lift would have landed at dawn, and would have been exposed in the field for the entire day before the second lift arrived; it could not have arrived before late afternoon. Given the time required for their assembly and the collection of equipment, it is extremely unlikely that the force elements infiltrated by the second lift could have been employed before nightfall. Therefore 1 Airborne Division would not have begun operations at full divisional strength (had such operations been planned) until dawn on the 18th, at least 24 hours after their initial landing. In short, they might have gained just one hour's advantage from a double lift on 17 September.

**Control of the Air and CAS Operations**

Control of the air is fundamental not only to air warfare but to nearly all types of military operation. However, Stephen Badsey has argued that the Allies fought Market Garden with 'air inferiority, which was self-inflicted'.[84] Furthermore, the Second Tactical Air Force — 2 TAF — has often been severely censured for failing to provide sufficient close air support (CAS) for 1 Airborne Division at Arnhem, and indeed for Market Garden as a whole. After the operation Urquhart went so far as to suggest that CAS 'might easily have turned the scale and allowed the whole of 1 Para Bde to have concentrated near the main Arnhem Bridge.'[85] Many historians have accepted Urquhart's judgment.

Neither criticism is supported by much evidence. Where control of the air is concerned, Allied barrier patrol and fighter escort operations during Market Garden were so completely successful that the Luftwaffe failed to intercept a single aircraft involved in the various Market Garden airlifts. This achievement was all the more remarkable because the Allies lacked comprehensive radar coverage and fighter control capabilities in northern Holland when the operation was launched.[86]

The Luftwaffe subsequently enjoyed one solitary success against a re-supply mission over Arnhem on 21 September, shooting down 18 aircraft after a breakdown in co-ordination between the transports and their escort fighters. The German documents suggest, however, that the Luftwaffe aircraft involved were fighter-bombers rather than interceptors, despatched on a ground-attack mission after it was thought that Allied aircraft had left the area.[87] In other words, the Germans were never intending to contest Allied air superiority; their success was a matter of pure luck. Otherwise, Luftwaffe operations largely took the form of hit-and-run attacks against Allied airborne troops in Arnhem and occasionally Nijmegen. Such tactics were entirely in keeping with Luftwaffe practice since the Normandy landings, and there is no evidence that the Allies expected to be immune from them.[88] Indeed, an Allied report on Luftwaffe activity during Market Garden recorded that 'the German fighter reaction has been very close to the 100-150 sorties forecast as the average to be expected over a period of three days following the actual landing.' Moreover, the Luftwaffe contributed little to the Allied defeat:

*'The support given by the German Air Force to the ground troops, either in intercepting transports and gliders en route, or dealing with troops that had already landed, was small. Its part in combating the Allied airborne landings has been a minor one, was largely ineffective, and has contributed little to the outcome of these operations.'*[89]

Responsibility for control of the air when airlift or re-supply operations were not taking place rested with 2 TAF. Due to the airspace deconfliction measures described above, and to the frequent revision of air transport schedules because of the weather, gaps in fighter cover over the northern end of the corridor tended to appear before the arrival of US Eighth or Ninth Air Force escort or barrier patrol fighters, or after their departure.[90] This area of the corridor was, of course, furthest from the 2 TAF airfields in Belgium, and fighter endurance was therefore an additional problem. The Air Officer Commanding 2 TAF had specifically raised this issue at the very highest levels shortly before Market Garden, but at that time no longer range fighters could be spared from Britain (then still under attack from V1 flying bombs).[91]

There is no doubt that co-ordination between these formations could have been better. However, the deficiencies resulted largely from the fact that Montgomery had, at only seven days' notice, imposed his operation on Allied air formations which were normally charged with entirely different responsibilities. The Eighth Air Force, which provided the majority of escort and barrier fighters, was chiefly involved in strategic bombing operations over Germany, while the Ninth Air Force had, until Market Garden, been entirely committed to tactical and air superiority operations in support of US ground forces in France; 2 TAF had predominantly been used to provide equivalent support to the British and Canadian armies advancing through northern France into Belgium and had virtually no experience of working with airborne formations. The problems were exacerbated by the fact that their respective headquarters were located at some distance from one another, with the Eighth Air Force (as well as the Allied air transport commands) being based in Britain. The immense geographical area over which air operations were conducted, encompassing different time and weather zones, magnified the difficulties involved in scheduling rendezvous and relays accurately.[92]

More comprehensive control of the air over the northern end of the Market Garden corridor would

have required the extension of full radar and fighter control coverage to this area, the movement of 2 TAF airfields to the Holland-Belgium border, and probably the creation of command and control machinery specifically designed to co-ordinate the activities of 2 TAF with those of the Eighth and Ninth Air Forces. As none of these things were likely to happen in the seven days Montgomery allowed for planning the operation, it can only be concluded that the level of control of the air established during Market Garden was the best that could be achieved in the prevailing circumstances.

As for CAS, limitations in its availability were always inherent in Montgomery's plan for Market Garden. As we have seen, airspace constraints over the corridor prevented CAS from being undertaken while airlift or re-supply operations were in progress; if the weather then delayed transport missions from Britain (and it did so repeatedly), the time available for CAS was reduced still further.[93] As 2 TAF's operations were also disrupted by adverse weather and poor visibility in the Low Countries, there was often very little time left for any CAS to be carried out at all.[94]

Nevertheless, the common argument that 2 TAF was barely involved in the operation is impossible to sustain. Their contribution was of course limited by the fact that 84 Group was not based within range of northern Holland. Nevertheless, on 17 September, before the airlift, 83 Group Typhoons together with Mosquitoes, Mitchells and Bostons from 2 Group attacked German flak and gun positions in Arnhem.[95] Later that day the Typhoons played a vital role in helping XXX Corps to break through German defences at the southern end of the corridor; this was crucial if 1 Airborne Division was to be relieved according to schedule.[96]

Over the next two days, because of airspace limitations and poor weather in Belgium and Holland, they flew hardly any sorties.[97] But on 20 and 21 September they flew armed reconnaissance over Arnhem. On 22 September they were again involved in critically important operations further south: they were instrumental in defeating German attempts to cut the corridor in the Veghel area. The next day they were in action in both the Veghel and Arnhem areas, and against German rail traffic heading for Holland; on the 24th they attacked German positions to the west of Arnhem, and rail traffic heading for Arnhem.[98] Suggestions that 2 TAF may have turned down nearly 50 per cent of requests for CAS from 1 Airborne Corps during Market Garden are completely unfounded. The often-quoted 50 per cent figure actually refers to the period 22 September to 8 October 1944. It is not clear that 83 Group received *any* requests for CAS over Arnhem before 22 September; on the 22nd, 23rd and 24th they operated to their maximum capacity in support of Market Garden, and on the 25th the withdrawal of the remnants of 1 Airborne Division across the Lower Rhine effectively brought the operation to an end.[99]

So what did go wrong with CAS over Arnhem? The answer is that in September 1944 1 Airborne Division was completely unfamiliar with CAS techniques, tactics and procedures; the division did not even possess ground-to-air radios. When Market Garden was sanctioned, 1 Airborne Corps as a whole had no air support facility in their signals organisation: they were not linked into the general army signals net that was used for requesting air support.[100] This basic shortcoming within the Allied airborne arm had been identified before the Normandy campaign, but no remedial action had been taken. Based in England, 1 Airborne Division also lacked much contact with 2 TAF, which was of course located in France and Belgium.[101]

On the very eve of Market Garden each airborne division and 1 Airborne Corps headquarters were allocated two US air support parties. Between them, they were supposed to operate an air support signals net, and ground-to-air radios. They had no experience of working with British airborne formations, and were unfamiliar with some of their radio equipment. The air support teams that accompanied 1 Airborne Division to Arnhem proved a complete failure. The first team never succeeded in contacting the rest of the net. The only requests that reached 2 TAF from Arnhem came via 64 Medium Regiment,

*The potential for 83 Group's Typhoon squadrons to find targets around Arnhem in the short time available without specific target information was extremely limited*

Royal Artillery, who established the single radio link with the bridgehead — but not until they advanced north of Nijmegen on 22 September. Requests were then passed to 1 Airborne Corps headquarters, to XXX Corps, and then to 2nd Army, who passed them to 2 TAF; 2 TAF passed them to 83 Group, who then passed them to the squadrons. It is hardly surprising that this convoluted chain was not particularly responsive.[102] Requests were also received from 1 Airborne Corps headquarters based on such general information as they possessed on the situation at Arnhem, but some of these were rejected because they were accompanied by vague and imprecise targeting information. This may seem over-cautious, but the reality was very different.

To begin with, there were no forward air control facilities to guide the Typhoons to targets in the Arnhem area. The second air support team with 1 Airborne Division was unable to contact any aircraft directly: their radios had been wrongly set up, and not tested, before Market Garden. Enemy fire had in any case put them out of action by 20 September.[103] Secondly, before the operation, a bomb line had been agreed between 2 TAF and 1 Airborne Division which, as events turned out, bore no relation to the dispositions of British or German forces in the area: it was well outside Arnhem. The risk of inflicting friendly casualties would have discouraged uncontrolled air attacks inside the line; there had of course been numerous blue-on-blue incidents in Normandy, for which the Allied air forces had been heavily criticised by army commanders.[104] Thirdly, the Typhoon squadrons were between 17 and 23 September flying from airfields near Brussels and Antwerp.[105] The Typhoon was a converted air defence fighter,

designed for home-based interception duties. Its endurance was limited, and became even more so when it was carrying a full load of rockets. It is not clear precisely how long the Typhoons that flew armed reconnaissance over Arnhem on 20 and 21 September could linger over the city, but 15 minutes would be an optimistic estimate.[106] Finally, the Typhoons had often to fly at times of the day when visibility was deteriorating, because the best daylight hours had been allocated to lift or re-supply missions.[107]

In summary, the potential for 83 Group's Typhoon squadrons to find targets around Arnhem in the short time available without specific target information was extremely limited. Why then were they able to do so on 23 and 24 September? The answer lies primarily in their movement on the 22nd to a new forward airfield inside the Market Garden corridor near Eindhoven. This move, which was conducted at the earliest possible moment, markedly reduced their transit time to Arnhem, allowing them to spend more time over the city searching for ground targets.[108]

**Conclusion**

The starting point for any objective history of Market Garden should be one simple truth: airborne warfare frequently involves an exceptional degree of risk. In essence, airborne forces voluntarily isolate themselves on the battlefield. Their success also depends on a wide range of preconditions, including at least temporary control of the air, the absence or suppression of ground-based air defences, good navigational conditions, accurate drops, surprise, the absence of numerous and heavily armed enemy ground forces (confirmed by accurate and up-to-date intelligence), and, most importantly of all, rapid reinforcement from friendly ground forces over land. For the Western Allies, in the operational circumstances prevailing for much of the Second World War, this was a hugely ambitious wish-list and it was rarely fulfilled. The consequences were all too evident in Tunisia, Sicily, Italy and Normandy.

Nevertheless, in September 1944 Montgomery elected to use this high-risk medium of warfare as part of a broader high-risk venture, involving the advance of XXX Corps 64 miles up a single vulnerable axis to the Arnhem road bridge. The operation's success depended overwhelmingly on the perception that German forces in the area were weak, and lacking any significant depth – a picture reinforced by much of the available intelligence. Yet some intelligence available before Market Garden warned of the potential for stronger enemy resistance. Unfortunately, when presented with these contradictory messages, senior commanders chose to accept the intelligence that they wanted to read. The apparent threat from German armour around Nijmegen was taken very seriously, and the presence of panzers near Arnhem was not ignored. But Montgomery and Browning convinced themselves that the operation would succeed if it began immediately, and if 1 Airborne Division was relieved quickly.

They could not have been more mistaken. Montgomery's corridor was easily blocked, and repeatedly counter-attacked from its exposed flanks; confronted by stronger resistance than expected, particularly in Nijmegen and to the north of the town, XXX Corps' advance faltered, and fell far behind schedule.[109] By the time their forward elements reached the Lower Rhine, the Germans had long since retaken the road bridge from 2 Parachute Battalion; 1 Airborne Division had already lost much of its strength and was cut off on the north bank of the river – well away from the bridge — by vastly superior enemy forces.

If Market Garden is considered in this context, then it can be more easily appreciated that any part played by air power in the operation's failure was inconsequential. The hackneyed critique of Hollinghurst's role in the location of the Arnhem DZs and LZs at Wolfheze is in any case flawed. The decision to choose Wolfheze was entirely rational given the topography of the area, the available intelligence on the strength of German flak, and the prevailing view that German ground forces were not capable of posing a significant threat. As 1 Airborne Corps' post-operation report stated:

*'The general picture . . . was that the flight and landings would be hazardous, that the capture intact of the bridge*

*objectives was more a matter of surprise and confusion than hard fighting, that the advance of the ground forces would be very swift if the airborne operations were successful, and that, in these circumstances, the considerable dispersion of the airborne forces was acceptable.'*[110]

Moreover, if Urquhart had anticipated exceptional difficulty reaching the Arnhem road bridge from the landing area, he would surely have challenged Hollinghurst more forcefully, and placed his concerns on record. That he expected no such difficulty is also suggested by his decision to divide 1 Parachute Brigade on landing, thus throwing away the enormous advantage which the daytime airlift conferred on his division, and by his assignment of less than two battalions to the road bridge. The other common criticism – that 1 Airborne Division should have been airlifted into Arnhem in a single day – also does not stand up to detailed analysis. The formations conveyed by the second lift were not assigned to central Arnhem in Urquhart's battle plan. Moreover, even if dawn and dusk lifts had been successfully staged on 17 September, 1 Airborne Division would have gained at best about one hour's advantage over the airlift plan that was actually implemented. It seems highly unlikely that this would have made the difference between success and failure.

Would more comprehensive air cover or close air support have allowed the Allies to snatch victory from the jaws of defeat? Again, this seems improbable. The Allies in fact dominated the air throughout much of Market Garden; 1 Airborne Division was destroyed by German ground forces rather than by the Luftwaffe. And if more effective CAS was a fundamental prerequisite for victory, then 1 Airborne Corps and its component divisions should have paid more attention to the relevant techniques, tactics and procedures in the preceding months. Ideally, the operation should not have been launched until 2 TAF was better placed to intervene at the northern end of the corridor. The problem here, of course, was that Montgomery could not risk delaying Market Garden, because the Germans were known to be strengthening their defences in Holland.

The truth is that air power contributed a great deal to Market Garden. The airlifts were far more accurate than any Allied airborne lifts previously attempted. The combination of evasive routing and flak suppression allowed the lifts to be undertaken with only minimal losses to German ground-based air defences, and Allied barrier and escort fighter patrols also prevented the Luftwaffe from intercepting the airborne armada. Subsequent (largely futile) re-supply operations for 1 Airborne Division were executed with incredible bravery and self-sacrifice by the RAF transport force. Despite the problems facing 2 TAF, Luftwaffe operations at the northern end of the corridor were largely restricted to limited hit-and-run ground attacks; meanwhile, the Typhoon squadrons of 83 Group played a crucial part in XXX Corps' initial advance on 17 September, and a no less vital role in preventing the Germans from cutting the corridor at Veghel on the 22nd. They also deployed forward into the corridor at the earliest possible moment, so improving their ability to operate over Arnhem.

The Allied defeat in September 1944 stemmed overwhelmingly from Montgomery's decision to use at minimal notice an extremely high-risk medium of warfare in an equally high-risk, conceptually-flawed and poorly led undertaking based on contradictory intelligence and a chronic underestimate of the German armed forces' residual fighting capability. It would be naïve and unrealistic to expect that air power alone should somehow have compensated for these more fundamental causes of Market Garden's failure.

**Notes**

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5 Sebastian Cox, 'Air Power in Operation Market Garden', Air

Clues, April, May and June, 1985.
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# Long-Range Offensive Air Power:
## A Strategic War-Winner, or Tactical Supporter of Ground Forces?

By Wg Cdr A J C Walters

'*Air power can win wars,* ***of course it can!***'[1]
But can it?

The debate over the most effective use of offensive air power has raged since the First World War. The 2003 Iraq War highlighted the need to improve the support of the land forces by air power,[2] reinvigorating the debate over the relative merits of strategic and tactical air power. It is therefore timely to revisit this age-old dispute.

The term 'strategic bombing' evokes historical images of long-range bombers targeting cities in an attempt to break the population's will to fight. However, RAF doctrine has evolved. 'Air operations for strategic effect' aim to undermine the opponent's ability, will and means to continue his aggression.[3] This can be achieved by bombing or non-lethal means and is normally conducted independently from land or maritime forces. In contrast, tactical offensive air power aims to deprive the enemy of the military power he needs to occupy territory or exploit sea space.[4] However, there is an increasing blurring of platform roles and the levels of war; B52 bombers were used for Close Air Support (CAS) during the 2001 Afghan Conflict, where they achieved strategic effect in terms of the overall campaign.[5]

Coercion is a pervasive theme when analysing offensive air power because the objective of most air campaigns is to make the victim comply (by withdrawing, surrendering or achieving a behavioural change) rather than annihilate him.

**The bombing of Baghdad in the recent war with Iraq**

*Air power has non-coercive applications such as the use of 'brute' force to deny the opponent the capability to employ weapons of mass destruction*

However, air power has non-coercive applications such as the use of 'brute' force to deny the opponent the capability to employ weapons of mass destruction. Therefore, the discussion centres on the relative merits of strategic and tactical effect, rather than concentrating on coercion alone.

The logic of this article develops in three stages. Firstly, the scene will be set by a discussion on legal constraints, Centres of Gravity (CoGs), targeting and coercive strategies. Secondly, 6 case studies will be analysed, with an emphasis on breadth rather than depth. These case studies cover the major applications of UK and US air power from the 1986 Libyan air strikes to the 2003 Iraq War. Finally, the threads are drawn together in a summary of the most significant lessons concerning the strategic and tactical employment of air power.

**Legality**

The way that the UK wages war is constrained by legal and doctrinal factors. 'Protocol 1 Additional' to the Geneva Conventions is now ratified under UK domestic law. Amongst other things, Protocol 1 addresses 'civil-military distinction', stating that '*attacks shall be limited strictly to military objectives*'[6] and '*parties to the conflict . . . shall direct operations only against military objectives*.'[7] Attacks against the population or individual civilians are defined as '*grave breaches*' of the Geneva Conventions which '*shall be regarded as war crimes*'.[8] The protection that Protocol 1 offers civilians is morally laudable, but can restrict the way in which coercive strategies are applied, since attacks '*to spread terror among the civilian population are prohibited*'.[9] Pending a change of the Geneva Conventions' definition of a 'civilian', the Protocol brings into question the legality of applying coercive force on civilians who support an opponent leader's political or economic power base; Protocol 1 currently states that '*in case of doubt whether a person is a civilian, that person shall be considered to be a civilian*'.[10]

**Centres of gravity**

To ensure that force is used as sparingly as possible, UK doctrine only permits the use of force against those targets that effect the enemy's CoGs. A CoG is defined as '*those characteristics, capabilities or localities from which a nation, an alliance, a military force or other grouping derives its freedom of action, physical strength or will to fight*'.[11] However, as Sun Tzu advises us to avoid attacking an enemy's strengths to avoid costly attritional battles,[12] a CoG is perhaps better conceptualized as 'that on which the enemy relies for success', rather than a strength or weakness. According to Clausewitz, we should trace '*the ultimate substance of enemy strength . . . back to the fewest possible sources, and ideally to one*'.[13] UK doctrine agrees that there should be only one CoG at the strategic and operational levels, '*although in practice this may prove simplistic*'[14] and '*it is quite possible for the CoG to change*'.[15] It practice, the UK accepts that there will only be one CoG at each level of war,[16] although US doctrine accepts that '*frequently, multiple centres of gravity will exist at any given level of war*'.[17] It is therefore vital that the correct CoG is selected, as attacks that do not contribute to this CoG are in contravention of the customary law of military necessity, which states that '*the employment of any kind or degree of force not required for the partial or complete submission of the enemy . . . is prohibited*'.[18] CoG selection and legal issues became major factors during the Kosovo Campaign.

**Targeting**

The essence of projecting offensive air power is targeting. There are several different targeting strategies that can be employed. Attritional, 'resource-based' targeting is a relatively simple matter of listing the enemy's assets and infrastructure, then matching platforms and weapons to each of these targets. However, with better intelligence, it is possible to carry out a 'nodal analysis' of the enemy's infrastructure to identify critical targets. For example, it may be possible to neutralize an electrical power grid by targeting a few critical sub-stations, rather that destroying every power station. With this knowledge, specific effects can be achieved with minimum effort, cost and casualties. By targeting specific sub-systems, precision-guided munitions (PGMs) may allow a specific amount of functional degradation to be imposed on a target. Targeting a critical, irreplaceable sub-system such as a power station's generators may neutralize the target for years, whereas attacking the same target's transformer yard with carbon-graphite filament weapons will stop power production for only as long as it takes to remove the threads. Although this targeting strategy seems preferable to attrition, political constraints can constrain the full application of air power's potential, as will be demonstrated in the Kosovo case study.

Prior to the 1991 Gulf War, Colonel John Warden developed the 'five-Ring' targeting strategy. Warden, an advocate of strategic bombing, opined that '*the purpose of war is not to defeat the enemy's armed forces . . . we easily get lost in a Clausewitzian world in which defeat of the enemy military forces becomes an end to itself rather then merely one of a number of possible means to a higher end*'.[19] He conceptualized any target system at the strategic level as five concentric rings, as shown in **Figure 1.** In the middle is the 'organizational centre' (in the case of a country, the leadership and strategic communications) without which the system cannot operate. This is '*the figurative and*

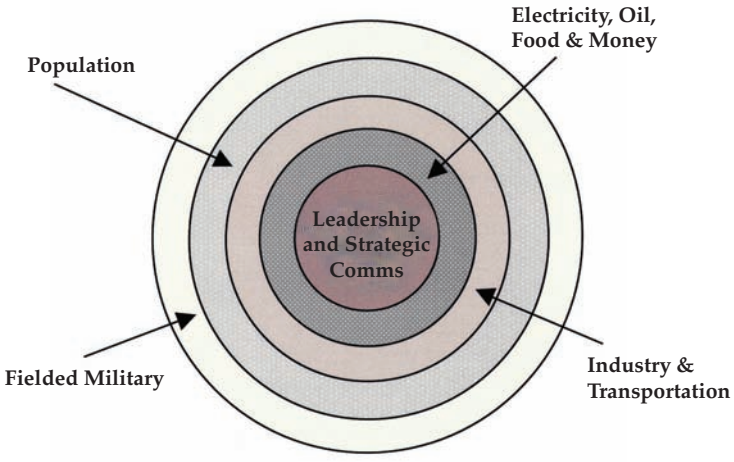


**Figure 1. Warden's '5-Ring' model of a nation state**

*sometimes the literal target of our every action*'.[20] The next ring contains the 'system essentials' on which modern states depend, such as electricity, oil, food and money. As Warden says, '*Unless the stakes in the war are very high, most states will make desired concessions when their power-generation system is put under sufficient pressure or actually destroyed*'.[21] The third ring is 'infrastructure', such as industry and transportation. Although there is often a delay between targeting strategic infrastructure and its tactical consequences, the effects can be enduring. Therefore, the efficacy of targeting industry in short conflicts is questionable unless used as a coercive tool in itself or if the desired effect is, say, the *long-term* degradation of a military capability. However, targeting industry will increase the cost of post-conflict reconstruction. As already discussed, targeting the fourth 'population' ring directly may be constrained by legal and moral factors, although indirect coercion may be possible. However, tyrannical leaders may have sufficient control over their populace to be invulnerable to their influence. Nonetheless, some adversaries, such as al-Qaeda, may deliberately target a Western population; public support may be the West's strategic CoG, and it will need to be protected. Warden, however, dismisses targeting morale as being '*beyond the realm of the predictable… because humans are so different from each other*' adding that '*our war efforts, therefore, should be directed primarily at the physical side*'.[22] The outer ring is the 'fielded military' that, according to Warden, serve only to protect the inner rings and can often be vertically outflanked by air power. All these rings are inter-related. Therefore, although direct attack on a specific ring may be constrained by rules of engagement or its invulnerability, targeting another may induce second or third-order effects on the desired system.

Both stealth and PGMs act as considerable force multipliers. In World War II, the vulnerability of the 'strategic' bomber and its poor weapon accuracy meant that it took 'thousand-bomber' raids to penetrate German air defences and attack a single target, resulting in 'serial' warfare. However, a single B2 can now release 80 PGMs against 80 separate targets in a single pass.[23] Indeed, the RAF's proportional use of PGMs has increased from 18% during the 1991 Gulf War to 25% in Kosovo and 85% in the 2003 Gulf War.[24] This potentially allows a 'parallel attack' against all of Warden's rings simultaneously, overwhelming the opponent and leading to 'strategic paralysis' where the enemy is physically constrained from offering resistance. Although Warden contests that the 5-Ring model '*seems to describe most systems*',[25] networked organizations, such as al-Qaeda, are notable exceptions.

Warden's model is heavily biased towards air power and kinetic targeting. As a concept, it is more robust if an effects-based philosophy is applied, whereby the desired effect in each subsystem is achieved by applying the most appropriate tool, be it diplomacy, economics, or information operations. For example, pressure could be applied by imposing sanctions, attacking financial computer networks, or supplying humanitarian aid. This approach, which seeks to influence the adversary's perceptions while minimizing casualties and collateral damage, is termed Effects-based Operations (EBO). To be effective, it requires cross-government and cross-coalition synchronization, possibly even extending

to non-governmental organizations. 'Joined-up government' is therefore essential, as will be illustrated in the 2003 Iraq War case study.

It is apparent that an in-depth knowledge of the enemy system is essential if the desired effects are to be achieved. Additionally, the amount of functional disruption achieved must be measured to determine whether the desired effect has been achieved and whether a re-attack is required. Therefore, the *sine qua non* of targeting is accurate and timely intelligence. Without this, effects-based targeting is severely constrained. Furthermore, remote sensors that provide high-resolution imagery, whilst of value, are not enough. All-source intelligence must be gathered and managed, a process called Operational Net Assessment. Rather like playing a game of chess, being able to see all your opponent's pieces tells you little about his intentions and does not confer 'decision superiority'. This became a major factor in the 2003 Iraq War.

**Coercion**

Coercion is one of the eight military effects defined in the 2003 Defence White Paper. While there are occasions when 'brute force' is required (such as the 1981 Israeli air strike on the Osirak nuclear reactor which halted Iraq's nuclear weapons program[26]), strategically, annihilation is rarely the ultimate aim; persuading your opponent to comply, either by offering inducements or applying force, is normally less costly. Coercion, as a form of persuasion, involves applying psychological pressure to an opponent to undermine his will to fight by creating the perception that the cost of conceding outweighs the benefits of continued resistance. However, a victim can tolerate considerable pain if he believes victory is within his grasp.[27] The psychological nature of coercion makes predicting the probability of success difficult, especially if the coercer and victim are from different cultures. A thorough knowledge of the enemy's psyche is essential; as Schelling notes, '*one needs to know what an adversary treasures and what scares him*'.[28] The victim's perceptions may be at variance to the coercer's intentions, so communication is a vital ingredient of effective coercion. The victim must also believe that the coercer has both the capability and the will to carry out a threat. Both deterrence and compellence are forms of coercion; deterrence seeks to maintain the *status quo*, while compellence attempts to change the victim's behaviour.

Classically, the leadership, population or armed forces are the targets of coercion. Historically, targeting the leadership or population was classed as 'strategic' attack, whereas targeting the military was deemed to be 'tactical'. Nonetheless, coercing any of the groups can have strategic effect. The relationship between a coercer and victim is normally interactive, with the victim seeking to coerce the coercer into abandoning his strategy.[29] Effective coercion must therefore neutralize the victim's conventional and asymmetric responses. The taxonomy of coercive diplomacy is somewhat confused. Robert Pape has published widely on coercion and contends that there are 4 basic coercive strategies.

**Punishment strategies**

The first strategy, 'punishment', involves inflicting pain without necessarily reducing the victim's war fighting capability; in other words, targeting his *will*, rather than his *ability* to resist. Punishment strategies rely on creating the fear of future pain, as in the 1986 US air strike on Libya. Clearly, it is possible to punish any of the three target audiences, although Pape erroneously equates punishment only with direct harm to civilians, concluding as a result that '*punishment does not work. When important interests are at stake, modern nation-states have very high pain thresholds*'.[30]

**Denial strategies**

The second strategy, 'denial', seeks to defeat the enemy's military strategy by weakening his fielded forces until he *perceives* that he cannot successfully defend his territory. Although not necessarily defeated, the victim then concedes to the coercer's demands rather than continue suffering for no gain. The enemy can be weakened by targeting his fielded forces directly, by attacking his armament industry or by interdicting his logistical supplies. Pape states that '*denial can work, but strategic bombing is not the best way to achieve it . . . Theatre air power is a much stronger coercive tool*'.[31] Pape's ideas are essentially Clauswitzian: '*if you are to force the enemy, by making*

*war on him, to do your bidding, you must either make him literally defenceless or at least put him in a position that makes this danger probable*'.[32] However, Pape focuses on wars of territorial gain; his comments on 'strategic' bombing appear less relevant in non-territorial coercive disputes, as will be shown in the Kosovo case study. Denial and destruction have much in common; as Mueller says, '*the best way to convince someone that defeat is inevitable is usually to make it inevitable*'.[33] Therefore, if denial fails, the campaign can be continued until the enemy's fielded forces are annihilated. **Figure 2** illustrates the varying force associated with these strategies.

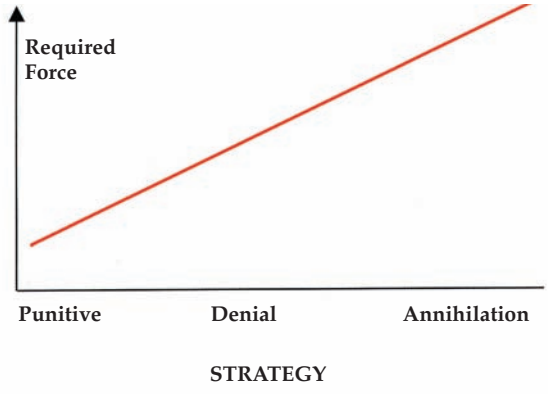


**Figure 2. Figurative graph of the varying amount of force required for different coercive strategies**

**Risk strategies**

Pape terms the third coercive strategy 'risk', although others have called it 'try and see'.[34] Risk strategies are essentially incremental, escalating punishment strategies and can develop from initial punitive strikes, through denial, to annihilation. Risk strategies can be tempting in conflicts where the coercers are not fully committed to the cause and so do not want to apply excessive force. However, incremental coercion can reveal the coercer's constraints, weaknesses or lack of resolve, which may actually encourage the victim to resist. Pape states that '*risk does not work*'[35] because it is merely a watered down punishment strategy, but again he only considers targeting the population.

**Decapitation strategies**

The final strategy, 'decapitation', involves PGM strikes against leadership and telecommunication targets; '*regardless of the strength of a state's fielded forces . . . if the leadership is knocked out, the whole house of cards comes down*'.[36] Again, Pape states '*decapitation does not work*'.[37] He accuses Warden's 5-ring model, as applied to the 1991 Iraq War, as being a decapitation strategy, which Warden rebukes: '*our strategy was not a decapitation strategy. Our plan was to impose strategic paralysis on Iraq.*'[38] Warden's argument rings true; isolating the enemy leadership in 'limbo' makes them difficult to coerce, but may paralyse the country.

**Concatenation — the 'Bigger Picture'**

Many authors have applied a 'reductionist' approach to coercion, breaking down this complex subject into constituent parts, analyzing them in isolation and then ranking them in binary, 'all-or-nothing' terms (for example, successful/unsuccessful). In reality, the victim has to assess the overall balance of military power, internal security, diplomatic support and economic prosperity, amongst other factors. Air power is additive and synergistic to other pressures, such as diplomacy, economics sanctions, media and information operations, and humanitarian aid. This 'concatenation effect' is most effective if the various pressures peak simultaneously, as shown in **Figure 3**.[39] This holistic approach will be used later to analyse six case studies.

**Psychological effects**

Coercion, whether targeted at a population, the leadership, or the armed forces, is a form of persuasion and therefore relies on psychological effects against individuals. Lambert has conducted considerable research in this field and notes that '*the responses of soldiers and civilians in different cultures to bombardment have . . . a remarkable similarity... Symptoms appear to have more to do with response to overwhelming stress than with cultural . . . factors*'.[40] Combat Stress Reaction (CSR) is a state where an individual ceases to function or begins to act in a manner that endangers himself and his colleagues. Symptoms include irritability and sleep disturbance, confusion, disorientation, depression, anxiety and psychosis.[41] Clearly,

this is a highly desirable effect to impose on an opponent. Although it is not necessary to impose CSR on a whole population or the decision-makers to have a coercive effect, the stressors that cause CSR are nevertheless likely to be coercive in lower doses. But what are these stressors, and can air power impose them? Fatigue, personal discomfort and poor hygiene (conditions often imposed on soldiers, but less often on regime leaderships) have been shown to increase individuals' susceptibility to CSR.[42] Loud noises, the perception of being expendable and a feeling of isolation are also major stressors;[43] it has been demonstrated that

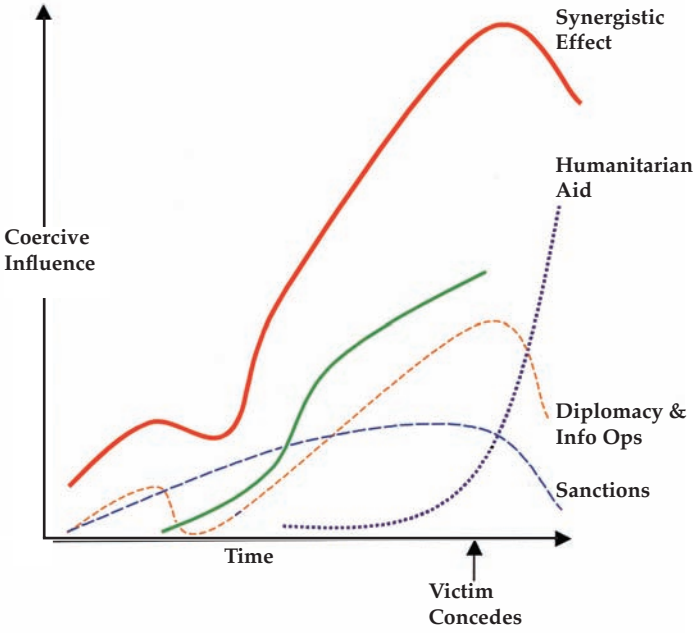


**Figure 3. Figurative graphical representation of the proposed 'Concatenation Effect'**

tightly knit groups of men can endure greater pain and discomfort than individuals, while evidence from the Korean War indicates that morale is highest in groups of four.[44] Other CSR stressors include the perception of the enemy as omnipotent or omniscient, or the victim deeming himself helpless or impotent;[45] the ability to fight back is a powerful stress reliever. Air superiority is the *sine qua non* of aerial coercion because it denies the enemy air defences the ability to inflict morale-raising losses on the coercer, while enabling bombardment from high level, which currently denies the fielded forces an opportunity to fight back. Night bombardment can be particularly demoralizing, as Speer highlighted during the 'Battle of the Bulge' in 1944: '*As if to illustrate our helplessness, our nocturnal talk was interrupted by a low-level attack from huge four-motored bomber formations. Howling and exploding bombs, clouds illuminated in red and yellow hues, droning motors, and no defence anywhere — I was stunned by this scene of military impotence . . .*'[46] Expectations affect impact. Individuals create a mental model of how much stress and destruction they expect to suffer under attack. If more damage is imposed than expected, morale is likely to deteriorate; conversely, resolve soars when damage is deemed unexpectedly low.[47] On the other side of the Channel, German V-weapons had a disproportionate effect against Londoners because, following D-Day, they perceived that victory was near. As a result of the unexpected damage, 1,450,000 Londoners fled the city.[48] So, will the low-collateral characteristics of PGMs be perceived by the victim as lacking 'shock and awe', or will their 'precision and focus' be interpreted as being humanitarian? The case studies later in this paper will highlight this issue.

Having examined some 'raw' psychological aspects of coercion in isolation, it should be possible to apply them to some of the different coercive strategies and determine which are likely to be effective. However, although classical psychology can be fairly precise at predicting the effects of coercion on individuals, it is less accurate at predicting the effects on groups;[49] it is at this level that understanding cultural differences can be critical. The temporal aspects of coercion can be critical to success or failure. The sudden death of a large number of people has more psychological impact than the same number of casualties over a longer period of time.[50] Similarly, incremental coercive strategies can fail because the target group becomes habituated to the gently increasing levels of stress. It is tempting to gradually escalate the level of pain in order to

avoid applying too much force, especially in a loose coalition of countries with varying degrees of commitment, as with NATO during the Kosovo Conflict. However, few incremental campaigns have been successful. Operation Rolling Thunder during Vietnam illustrated that these strategies can lead the habituation of casualties and attrition.[51] A quantitative assessment by the US Strategic Bomber Survey of frequently bombed German civilians showed that 36% became habituated, while 52% never adapted.[52] Indeed, Seyle's General Adaptive Syndrome predicts that a victim's performance actually increases under stress until a critical level is reached (see **Figure 4**).[53] Furthermore, in long coercive campaigns, this critical threshold can be raised by the perceived betrayal of previous casualties or the linking of leaders' political survival to a successful outcome. Additionally, incremental campaigns can give the victim an opportunity to develop counters to the threats he faces. Thus, incremental campaigns can result in greater destruction than more sudden, intense strategies such as Vietnam's Operation Linebacker II. As Vietcong's Minister of Justice noted: '*the first few times I experienced a B52 attack it seemed . . . that I had been caught in an apocalypse. The terror was complete*'.[54] Therefore, shock campaigns may actually be more humane. However, as we shall see from the Kosovo case study, aerial coercion is often used when the coercer lacks political commitment and therefore wants to use minimal force. Lambert suggests that successful coercive campaigns rely on giving the victim the following perceptions: he is incapable of withstanding the pressure; he is isolated from his backers; victory is impossible, yet defeat is probable; conceding to the coercer's demands is the least painful option; a face-saving way out exists to avoid utter humiliation. He highlights the need for recurrent engagement: '*Coercion is like the relationship of schoolmaster and schoolboy; it is not a one-shot event*'.[55]

**Libya**

On 15 April 1986, the US launched Operation Eldorado Canyon against Libya in response to its increasing sponsorship of Palestinian terrorism against Western targets. Ten F111s attacked Tripoli,[56] damaging a terrorist command and control facility occupied by Colonel Qaddafi, a commando training centre abandoned by Palestinian terrorists two days earlier and badly damaged 10 IL-76 aircraft at Tripoli Airport used to transport terrorists.[57] Fifteen A6 bombers attacked Benghazi, heavily damaging a terrorist training facility and destroyed a SAM site and up to 14 MiGs at Benina Airfield.[58] The Libyan Government announced 267 casualties, and unsuccessfully sued the UK and US Governments for $2,036,577,000.[59]

Tension had been building between Libya and the West for some time over Libya's sponsorship of terrorism. International terrorist acts averaged about 500 per year between 1979 and 1983, but increased to 600 in 1984 and 800 in 1985.[60] Following Libyan-sponsored terrorist attacks on Israelis at Rome and Vienna Airports in December 1985,[61] the US implemented an escalatory coercive 'risk strategy', initially banning all US trade with Libya.[62] In March 1986, the US deployed 3 aircraft carriers into international waters claimed by Libya, precipitating a Libyan-initiated exchange of fire. On 5 April a bomb exploded at 'La Belle Discotheque' in West Berlin, resulting in over 100

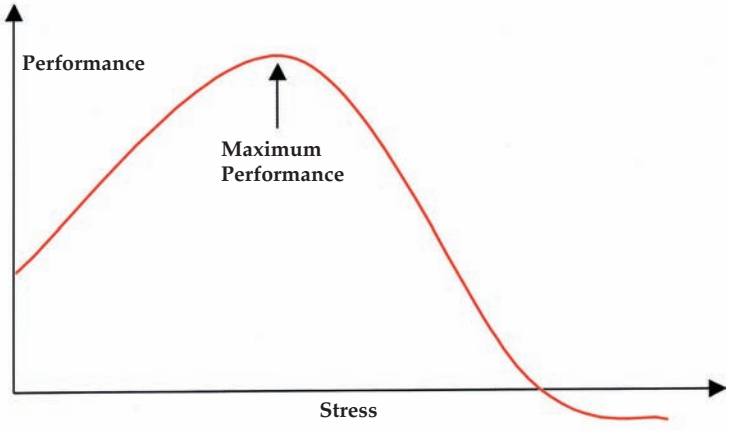


**Figure 4. Graphical representation of Seyle's General Adaptive Syndrome**

casualties. Incriminating Libyan radio messages provided the US with sufficient proof to launch Eldorado Canyon.[63] Announcing the raid, President Reagan emphasized that: '*we tried quiet diplomacy, public condemnations, economic sanctions, and demonstrations of military force. None succeeded.*'[64]

Eldorado Canyon inspired a brief spate of attacks against a handful of Westerners in the Middle East.[65] However, Middle Eastern terrorism in Europe dropped by almost 50% during 1986 and remained low through 1987.[66] Attacks against Americans dropped from 38 in 1985 to 12 in 1986, and to 7 in 1987. One academic proclaimed in 1987 that the US escalatory strategy '*appears to be a success for coercive diplomacy*'.[67] The pronouncement was premature. In November 1987, the French intercepted a ship carrying 150 tons of Libyan arms bound for Irish terrorists; it was the *Ersund's* fourth delivery.[68] In December 1988 Pan Am Flight 103 exploded over Lockerbie[69] and in September 1989 a bomb destroyed the French UTA Flight 772 over Niger.[70] A French court found six Libyans guilty *in absentia*,[71] while in 2003, Libya accepted responsibility for the Lockerbie bombing in return for the removal of United Nations (UN) sanctions.[72] According to 2 Libyan spies, Qaddafi had ordered the Lockerbie bombing in revenge for the Eldorado Canyon raid.[73] Therefore, the raid appears to have achieved little long-term effect other than making Libya more covert about its support of terrorism.

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**Bosnia**

NATO's 1995 Bosnian campaign was unique in that Western diplomats conducted a series of meetings with the adversary decision-makers during the conflict, giving a rare insight into the effects of coercive aerial bombardment. When Bosnia withdrew from Yugoslavia in 1992, civil war erupted as the Bosnian Serb Army (BSA) attempted to gain territory from the weaker Croatian and Muslim Bosnian Armies (BiH). A UN peacekeeping force (UNPROFOR) was deployed to keep the factions apart. There were occasional uses of CAS when UNPROFOR units were attacked; in April 1994 a Sea Harrier was shot down while engaging BSA tanks.[74] However, in November 1994, NATO carried out a limited air strike against the Serb-held airfield at Ubdina in retaliation for a BSA air raid on a Muslim enclave.[75] It was described by the US as a '*pinprick*',[76] while UNPROFOR called it '*a textbook example of the precise use of force in a peacekeeping mission. Those who claimed that the UN had not used sufficient force were using war-fighting criteria... Our mandate was to keep the peace*'.[77] Nonetheless, the situation declined; in May 1995 Bosnian Serbs took 370 peacekeepers hostage following NATO raids on the Bosnian Serb 'capital' of Pale, while in July Bosnian Serbs overran the UN-mandated 'safe area' of Srebrenica.[78] In response, the BiH began operations against the BSA in Western Bosnia in mid August.[79] When a mortar bomb killed 68 people in a marketplace in the 'safe area' of Sarajevo on 28 August 1995,[80] NATO launched Operation Deliberate Force. Its objective was to '*adversely alter the BSA's advantage in conducting successful military operations against the BiH*'[81] to make the Bosnian Serbs '*sue for cessation of military operations, comply with UN mandates, and negotiate*'.[82] Effectively, this was a coercive denial strategy to alter the military balance of power in Bosnia.

Deliberate Force started on 30 August 1995. NATO's air commander personally selected each aim point in an attempt to coerce the Bosnian Serbs into political dialogue. Day One commenced with aerial attacks on Bosnian Serb air defences.[83] Sixteen CAS sorties were flown, mostly against artillery and mortar positions, which were largely successful and caused little collateral damage. However, poor weather and lack of Forward Air Controllers precluded further CAS missions for nine days. On the second day the target list expanded to include BSA ammunition facilities, depots, command posts and communications sites. Following assurances from the Serbian President, Milosevic, that General Mladic, the BSA Commander, was likely to give in, NATO halted strikes on 1 September.[84] During negotiations with the UN/NATO 'Contact Group' in Belgrade, Milosevic commented that it would be difficult for NATO to resume hostilities. However, on trying to contact Mladic in Pale, he found all communications between Serbia and Bosnia severed; the potency of the air campaign was becoming apparent to him.[85] Meanwhile in Vicenza, the Combined Air Operations Centre Director wanted to send Mladic photographs of the damage that NATO had wreaked, along with a mobile telephone so that he could contact NATO and the UN.[86] This illustrates the conflict between decapitation and coercion strategies, in that it is difficult to influence a decision-maker if he is isolated and lacks visibility of the ongoing destruction. Meanwhile in Bosnia, 14 hours of negotiations between UNPROFOR and Mladic ended in stalemate.[87] Deliberate Force recommenced on 5 September, shocking the Bosnian Serbs.[88] Nearly 300 aim points remained on NATO's target list. Air strikes targeted ammunition depots, storage facilities, command and control bunkers, and communications facilities.[89] 10 September saw the second use of CAS, when two hilltop bunkers and a large-calibre artillery piece were destroyed.[90] Having initially avoided targeting bridges for fear of civilian casualties, NATO attacked 12 bridges when the BSA began using them to reinforce Sarajevo.[91] Tomahawk cruise missiles were used for the first time against several communications facilities, demonstrating NATO's commitment by using its most advanced weaponry.[92] By 13 September NATO's target list was nearing exhaustion, but bad weather masked this from the BSA. However, the balance of power on the ground had swung in favour of the BiH, who were making considerable advances against the BSA. When the Contact Group met with Milosevic on 14 September, he looked '*very tired*'[93] and implored NATO to stop the air strikes. Milosevic had Mladic driven to the negotiations, where he reluctantly gave in to NATO's demands.

**So why did NATO win?**

So why did Mladic concede? It appears to have been a concatenation of events, with stressors all peaking simultaneously. The balance of power on the ground had swung in favour of the Croats and Muslims, with the BSA being unable to deploy troops effectively.[94] NATO had not intentionally integrated with the BiH, but admitted that their offensive had '*helped dramatically*'. Richard Holbrooke, head of the Contact Group, concluded that air power was the '*most important single factor*' that influenced the Serbs; '*never has airpower been so effective in terms of a political result*.'[95] Indeed years later, at the Dayton negotiations, Holbrooke showed Milosevic a Tomahawk missile in a museum. '*So much damage from such a little thing*' Milosevic retorted.[96] Nonetheless, diplomatic and economic inducements were crucial. NATO's Contact Group offered the removal of sanctions and recognition of a Serbian republic within Bosnia, a face-saving compromise that softened the blow of conceding.[97] Diplomacy would not have worked without military coercion, yet despite the success of NATO's denial strategy, it would ultimately have been unsustainable without diplomacy.

**Kosovo**

The 1999 Kosovo Conflict started as a civil war between the Kosovo Liberation Army (KLA), representing the Kosovo Albanian majority, and the ruling Serbs. Despite several UN Resolutions and intense international diplomatic pressure, on 20 March 1999 the Serbian Regular Army (VJ) and Serbian Special Police (MUP) launched a major offensive, driving thousands of Albanian Kosovars out of their homes.[98] NATO responded with Operation Allied Force on 24 March. Based on experience from Bosnia, NATO expected that Milosevic would sue for peace after a few days of aerial bombardment.[99] He finally conceded 78 days later on 3 June. When asked why Milosevic conceded, NATO's Supreme Commander in Europe, General Clarke, replied: '*You'll have to ask Milosevic, and he'll never tell you*'.[100] Nonetheless, an analysis of the main coercive pressures provides some clues, although space precludes a full description of the campaign.[101]

General Clarke identified the Serbian Third Army in Kosovo as the Serbian CoG and directed the Air Commander, General Short, to '*isolate and degrade the combat capability of VJ/MUP forces in Kosovo*'.[102] However, Short dismissed '*tank plinking*' as wasted effort which '*did not resonate with policymakers in Serbia*',[103] by which he meant that the potential destruction of the Serbian Third Army would not be a high enough price to pay to make Milosevic give up Kosovo. Additionally, President Clinton had declared that '*I do not intend to put our troops in Kosovo to fight a war*';[104] in effect, air power was being tasked to 'prepare the battlefield' for a battle that was wasn't going to happen. It is perhaps not surprising that Milosovic was willing to see if he could ride out this particular storm. Aircraft were restricted to a minimum altitude of 15,000 feet to reduce losses, from where they could only target heavy equipment which, without the threat of a NATO ground invasion, was easily concealed. Meanwhile, as part of Milosevic's counter-coercion strategy, Serbian light forces escalated their ethnic cleansing without exposing themselves to air power.[105] When Milosovic failed to concede, NATO appears to have adopted a land-centric strategy of bringing more firepower to bear on the Third Army by deploying more aircraft into theatre. General Short's opinion that the Third Army was an irrelevance had not yet found acceptance. NATO's official tally of equipment destroyed was 93 tanks, 153 armoured personnel carriers (APCs), 389 artillery pieces and 339 military vehicles,[106] although a post-conflict ground survey discovered only 14 tanks, 12 self-propelled guns, 18 APCs and 20 artillery pieces.[107] The House of Commons Defence Committee concluded that '*the relatively poor kill rate against Serbian armour suggests that their contribution to achieving the Alliance's overall coercive objective was, at best, marginal*'.[108] Only 38% of UK CAS missions released ordnance (compared with 50% against fixed targets), illustrating the difficulties in attacking mobile targets.[109]

Initially, NATO was badly under-resourced in terms of planning staff and target clearances, resulting in '*campaign by target-list management*'.[110] The lack of effects-based targeting analysis did not help Short in convincing the 19 NATO members of the need to attack 'strategic' targets in Serbia;[111] the result was an unintentional

incremental campaign, hitting five to eight targets each night in 'serial' rather than 'parallel' warfare.[112] Milosevic's counter-coercion plan of increased ethnic cleansing backfired, generating revulsion and strengthening international resolve. However, Serbian nationalistic reaction to NATO's interdiction campaign resulted in a brief spate of 'human shield' demonstrations on several Serbian bridges.[113] NATO emerged from its fiftieth anniversary summit at the end of April declaring '*whatever it takes, we will not lose*';[114] the conflict had developed into a battle of wills. Short finally received permission to '*go after the head of the snake . . . Milosevic, the leadership, the cronies around him*'.[115] The political offices of Milosevic and his wife, as well as her propagandist radio and television stations, were attacked. Oil refineries and armament factories, including several owned by Milosevic's cronies,[116] were attacked, making 100,000 civilians unemployed and reducing the economy by 50%.[117] NATO's Land Component Commander told the HCDC that the bombing '*was beginning to hurt that extraordinary politico-commercial Mafia that seems to operate around Belgrade and some of them were not making as much money as they used to.*'[118] NATO signatories to Protocol 1 of the Geneva Conventions were unhappy about targeting civilian infrastructure. As a result, the Serbian electrical grid was targeted on 3 and 8 May with carbon-graphite filament weapons, which cut off power to 70% of the country but caused no permanent damage.[119] In late May, however, the US (who are not signatories to Protocol 1) reduced the power grid by 80% using traditional weapons. Leaflet drops emphasized the link between the loss of essential services and Milosevic's policies.[120] The HCDC concluded that '*the effect of the strategic bombing against fixed targets in Serbia . . . was much weightier than the damage being done to his army in Kosovo*'.[121]

**Concatenation in Kosovo**

Milosevic was subjected to other coercive pressures. KLA activity increased towards the end of the conflict, flushing out the VJ and exposing them to NATO air attack; in early June, B52s targeted VJ concentrations around Mount Pastrik.[122] Nonetheless, the KLA never defeated the VJ.[123] Milosevic had to consider the threat of a NATO ground invasion, which would reinforce Pape's denial theory; despite Clinton's publicly declared intent not to fight on the ground, on 25 May NATO announced it would deploy 48,000 troops to the region for '*peacekeeping duties*', raising the possibility of a ground invasion.[124] Although the HCDC concluded that '*in the absence of a decision by early June to assemble a force for a ground invasion, it is doubtful whether NATO could have mounted and concluded . . . an operation successfully*',[125] the implicit threat existed. On 27 May, Milosevic and four of his cronies were indicted as war criminals by the International Criminal Tribunal for the Former Yugoslavia, reducing the likelihood of them obtaining exile abroad.[126] Anxiety levels within Milosevic's inner circle were increased by limiting their ability to leave the country[127] and computer network attacks against their financial assets. However, it is generally acknowledged that Milosevic's failure to secure the support of Russia, leaving Serbia isolated in the international community, was a major factor in his decision to comply with NATO's demands. A source close to the Yugoslavian Government revealed, '*there was tremendous pressure from all sides; the West, his inner circle, and his wife. It was building up, and eventually he just let go*'.[128]

**Afghanistan**

The 2001 Afghan Conflict was unique in many ways and the application of air power was fundamentally different from previous conflicts. Both sides had different goals and fundamentally different cultures and outlooks. They fought each other asymmetrically, using vastly different techniques. The country had little strategic infrastructure to target, but the religiously fanatical Taliban and al-Qaeda leadership proved difficult to coerce. However, military operations were only one facet of a global anti-terrorism campaign that included diplomatic, legal, financial and humanitarian elements.[129] Afghanistan had been in an ongoing multi-faction civil war since the Soviet withdrawal in 1989. Taliban fundamentalists had gained control of most of the country, although many warlords had coalesced into the Northern Alliance (NA) and posed an ongoing low-intensity threat. Al-Qaeda had a strong influence in the country due to the corrupting influence of their

**Sources suggest that the carbon-graphite filament weapons used to disable much of the Serbian electrical grid were released by USAF F-117 Nighthawks**

*NATO signatories to Protocol 1 of the Geneva Conventions were unhappy about targeting civilian infrastructure. As a result, the Serbian electrical grid was targeted on 3 and 8 May with carbon-graphite filament weapons, which cut off power to 70% of the country but caused no permanent damage*

financial wealth and the weakness of the Taliban's control over the country.

Operation Enduring Freedom began on 7 October 2001, 26 days after the al-Qaeda terrorist attacks on the US. It took 78 days to oust the Taliban and al-Qaeda from power.[130] The Taliban had no Integrated Air Defences; their air force existed almost in name only, while their only high-level Surface-to-air Missiles (SAMs) were a handful

of SA-3s.[131] More than 50 cruise missiles were fired in the opening days of Enduring Freedom[132] and medium/high-level air supremacy was achieved after just 48 hours. Thereafter, air power was used to target three target sets: command; military infrastructure; and fielded forces. As the US Secretary of Defense said, Afghanistan '*is not a country that is rich in targets*'.[133] Nonetheless, the assets the Taliban and al-Qaeda did possess were critical for coordinating, reinforcing and supporting combat operations. In particular, they were heavily dependent on trucks for mobility.[134] Although only 31,000 Coalition troops were deployed,[135] NA troops were seconded as force multipliers, giving the impression that anti-Taliban Afghans were the main fighting force, while avoiding the perception of 'Western invaders'.[136] The rugged terrain and lack of Coalition artillery meant that there was a high demand for CAS. This played a crucial role in many land engagements, being called in by Special Forces (SF) to destroy enemy infrastructure, facilities and fielded forces.[137] Despite their fanaticism, the Taliban frequently displayed the Afghan trait of initiating bargaining as soon as they came under serious pressure, then changing sides or dispersing and avoiding fighting. Most ground was occupied in this way and '*bombing seems to have had a major impact on their willingness to hold on to positions and fight*'.[138] Although air power was relatively ineffective against the leadership, it appears to have been a powerful coercive force at the local, tactical level.

Unlike the other case study countries, Afghanistan is remote. Despite Pakistan's previous tacit support for the Taliban, US diplomatic efforts quickly secured the use of its airfields[139] and eventually 23 countries hosted US forces directly involved in combat operations.[140] Despite the basing of Coalition fighter aircraft in some of these adjacent countries, the majority of air power was projected over a considerable range. Even carrier-based aviation was forced to operate at relatively long range over land-locked Afghanistan. Importantly, the key enabling aircraft were air-to-air refuellers. A brief analysis of the statistics illustrates the point. Carrier-based aircraft flew 75% of the 6,546 offensive sorties between 10 October and 31 December 2001, dropping 43% of the PGMs[141] and about 30% of the 17,471 weapons released.[142]

In contrast, B52s and B1s were employed on only 10% of the offensive sorties,[143] yet dropped 65% of the weapons released and 47% of the PGMs.[144] Pape, an advocate of the tactical use of offensive air power, recommended that air forces should buy '*short-range strike fighters, which can maintain the high operating tempos needed to deliver thousands of PGMs on thousands of targets . . . in other words, air forces would be wiser to buy A-10s and F-15Es*'.[145] Enduring Freedom shows that this advice is unsound; US Air Force (USAF) tactical fighters accounted for only 15% of Enduring Freedom's strike sorties.[146] Pape clearly equates 'strategic' bombing with long-range bombers, discounting their tactical use. Yet Enduring Freedom highlighted the utility of these long-range, pervasive bombers which, given air superiority, can loiter for long periods and be cued to engage fleeting tactical targets using PGMs. Indeed, Afghanistan demonstrated the limited range and endurance of US fighter aircraft.[147]

Enduring Freedom saw some of the first uses of time-sensitive targeting and network-enabled capability. Land, air and space Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) assets (including unmanned aircraft) were employed to cue PGM-armed aircraft onto fleeting targets. However, it would be wrong to assume that this nascent capability made the Coalition omniscient. During Operation Anaconda, al-Qaeda made good use of asymmetry by using the mountainous terrain to shield themselves from ISTAR assets. Helicopter-inserted troops were ambushed on landing and found their line-of-sight communications incompatible with the terrain, while satellite communications quickly became saturated. It took B52 air strikes to redress the balance, by which time the terrorists had escaped.[148] Furthermore, ISTAR assets lacked sufficient granularity at the human level and were incapable of distinguishing between civilians, terrorists and irregular soldiers. There were several incidents of innocent people being targeted, possibly due to deliberate misinformation inspired by inter-tribal rivalries. Indeed, following several incidents, Afghan President Karzai publicly implored the US not to rely on local informants alone.[149]

*Even carrier-based aviation was forced to operate at relatively long range over land-locked Afghanistan. Poignantly, the key enabling aircraft were air-to-air refuellers . . . Carrier-based aircraft flew 75% of the 6,546 offensive sorties between 10 October and 31 December 2001*

**The 1991 Iraq conflict**

On 2 August 1990, Iraq invaded Kuwait, beginning a conflict that is still ongoing. Although the 1991 and 2003 Iraq conflicts are often considered as two separate campaigns, this paper will examine the conflict holistically as an enduring 13-year-long event. The first phase of engagement was Operation Desert Storm, which began on 16 January 1991 with a six-week air offensive. When the Coalition ground offensive commenced, the Iraqi forces within the Kuwaiti Theatre of Operations (KTO) began a full-scale rout, culminating in the liberation of Kuwait four days later. Space precludes a full account of Desert Storm;[150] instead, Iraq's counter coercion campaign and the Coalition's leadership, psyops, CAS and air interdiction campaigns will be analysed.

The Coalition achieved air supremacy by 27 January,[151] preventing the Iraqi Air Force from bombing Coalition ground forces and inflicting significant, morale-raising losses on

Coalition aircraft. Indeed, the Iraqis developed such a healthy respect for Anti-radiation Missiles (ARMs) that, 12 years later during Operation Iraqi Freedom, they remained reticent to turn on their SAM radars.[152] Iraq fired 42 Scuds at Israel[153] in an attempt to provoke an Israeli response and demonstrate Iraq's ability to fight back. Israeli retaliation, Saddam hoped, would cause Arab countries to withdraw from the Coalition. Despite having targeting fixed Scud sites,[154] Iraq's mobile Scuds remained active, with the last launch occurring only two days before the War's end.[155] The US deployed Patriot SAMs to Israel and diverted a considerable number of aircraft to the 'Scud hunt'[156] to avoid Israeli intervention. Notwithstanding that '*the actual destruction of any Iraqi mobile launchers by fixed-wing Coalition aircraft remains impossible to confirm*',[157] Iraq's strategic counter-coercion campaign failed to break the Coalition's cohesion.

Following Iraq's invasion of Kuwait, Warden developed a six-day air campaign called Instant Thunder which targeted the Iraqi leadership and its communications, nuclear, biological and chemical (NBC) warfare facilities, Scuds, air defences, electrical power stations, oil refineries and military factories.[158] Although it was rejected in August 1990 because it ignored Iraqi forces in the KTO,[159] an expanded version of Instant Thunder became the strategic element of the air plan. 'Strategic' attacks during Desert Storm accounted for only 17% of the 43,000 strikes, while leadership, communications and power station targets accounted for less than 3%.[160] 'Brute force' was applied to some targets, such as the Scuds, NBC and military production facilities, to degrade Iraq's future offensive capability. However, the leadership, oil production and power station targets were meant to produce 'strategic paralysis'. It has been claimed that the counter-leadership campaign failed because Iraqi sovereignty was never threatened.[161] However, the post-conflict Shia and Kurd uprisings suggest that anti-regime elements of the population perceived the regime to have become vulnerable, despite Saddam's repressive secret police. Overall, the effectiveness of the counter-leadership campaign remains unclear.

Psyops against Iraqi forces in the KTO were decisive, influencing 87,000 troops to surrender and 160,000 to desert.[162] Coalition radio broadcasts began in November 1990, followed by leaflet drops and loudspeaker broadcasts from 16 January 1991.[163] With air supremacy, B52s, invulnerable at high level, began a daily cycle of leaflet drops and carpet bombing. Leaflets were often addressed to individual units and gave the time of the next bombardment, reinforcing the perception of Coalition omniscience and creating expectancy.[164] F111 bombers targeted tanks in the KTO using laser-guided bombs, denying them as sanctuary; their 'precision and focus', combined with psyops telling Iraqis to stay away from vehicles, demonstrated that the Coalition was not targeting the Iraqi people. Iraqi death squads executed deserters and anyone found with leaflets, leaving troops with the option of enduring the bombing or deserting and risking execution. Prisoners of War (POWs) revealed that 98% of them were exposed to leaflets, while 58% heard broadcasts, influencing 46% of them to give up.[165] However, B52 raids caused most desertions.[166] Most POWs described their combat effectiveness at the beginning of the ground offensive as zero.[167] Only 28 of the 1,400 vehicles destroyed during the Iraqi retreat along the 'Highway of Death' were armoured,[168] indicating that the individual soldiers' will, rather than their leadership, had been shattered.

Because of the short duration of the ground offensive and the lack of Iraqi resistance, CAS was a peripheral aspect of the campaign. CAS aircraft saw relatively little action; despite the number of targets available, only 61% of sorties released weapons. The Gulf War Air Power Survey concluded that '*Air power's greater effectiveness was in attacking the forces deeper in the Iraqi defense areas, in the regions where these attacks blended in with the interdiction strikes*'.[169]

Pape believes that air power thwarted Iraq's strategy by shattering the will of the frontline troops, destroying large amounts of equipment and immobilizing Iraq's mobile reserves.[170] Strikes damaged or destroyed 55 bridges leading to Kuwait.[171] Nonetheless, large logistic stockpiles were found in Kuwait after the war, although

*Only 28 of the 1,400 vehicles destroyed during the Iraqi retreat along the 'Highway of Death' were armoured, indicating that the individual soldier's will, rather than their leadership, had been shattered*

attacks against distribution vehicles within Kuwait deprived many units of these supplies.[172] The US estimated that 39% of Iraqi tanks, 32% of APCs and 47% of artillery within the KTO had been destroyed prior to the ground invasion,[173] reinforcing Pape's 'denial' theory that Saddam was coerced 'to leave Kuwait prior to the ground campaign because air power had devastated his army and he wanted to save what was left of his forces'.[174]

Following Kuwait's liberation, Coalition forces withdrew from Iraq. In response to an appeal by the United Nations,[175] the US, UK and France imposed No Fly Zones (NFZ) over Northern and Southern Iraq in April 1991 to protect Kurdish and Shiite refugees. These NFZs were patrolled almost every day for the next 12 years which, combined with sanctions, prevented Iraq from projecting power outside its borders. By August 2002 nearly 300,000 NFZ sorties had been flown,[176]

during which both sides gathered intelligence on each other.

**The 2003 Iraq conflict**

Following the Afghan Conflict, the US turned its attention to Iraq. Operation Iraqi Freedom began on 19 March 2003. This high-tempo assault overwhelmed Iraqi defences, toppling the regime within a month. It began with a rapidly planned decapitation attack on a Baghdad bunker, believed to be occupied by Saddam and his sons.[177] Post-war analysis revealed that the intelligence was incorrect; the bunker did not exist.[178] This attack was part of a campaign to '*destabilize, isolate, and overthrow the Iraqi regime*' by targeting the top 55 members of Iraq's leadership. As yet, very little data on Iraqi Freedom has been released. However, 9.8% of combat sorties were dedicated to suppressing the '*Iraqi Regime's ability to command Iraqi forces and govern* [the] *State*'.[179] Television producer Eamonn Matthews alleges that all of the 50 successfully executed attempts to target Iraqi leaders failed.[180] On 7 April, intelligence intercepts of a satellite telephone located '*extremely high level players within the Ba'th Party*' in Baghdad to an accuracy of about 100 ft. Two buildings were bombed. Eighteen civilians were killed, none of them Ba'thist leaders. An unsuccessful attempt to assassinate Iraq's Southern Region Commander by bombing his residence resulted in 17 civilian deaths. A US Defence Intelligence Agency officer concluded that '*these leadership strikes led to the highest number of casualties in the air war*'.[181] Nonetheless, Iraq's regular forces had great difficulty in coordinating coherent resistance against the high-tempo US/UK offensive,[182] which the decapitation campaign must have contributed to. Despite 12 years of US/UK intelligence gathering, the intelligence failures extended further than the targeting of individuals. The Coalition Weapons Effect Analysis Team that conducted a detailed post-conflict ground survey found that '*a significant number of targets were not what we thought they were - several were demonstrably not military facilities*'.[183] Overall, the capability to target buildings outstripped the ability to determine their function.[184] Additionally, the US/UK battle damage assessment process largely collapsed early in the conflict, making the timely assessment of Iraq's combat capability difficult.[185] The UK has acknowledged that improved methods of accurately measuring the effectiveness of effects-based targeting are required.[186] Furthermore, the UK Secretary of State for International Development opposed the war, making inter-Ministry planning for post-conflict reconstruction '*challenging*'[187] and accused the Prime Minister of allowing the UK to '*rush to war . . . without defence and overseas policy meetings*'.[188] The intelligence limitations and lack of 'joined-up government' bring into question the current viability of EBO.

The main effort of the air campaign was to defeat or compel the capitulation of Iraq's Regular Army and Republican Guard; 79.6% of targets fell into this category, of which all but 1.5% were mobile.[189] However, only 32% of RAF CAS sorties released weapons, compared to 73% for fixed targets,[190] highlighting the British Army's '*inability to provide sufficiently accurate co-ordinates for mobile targets*'. The UK has acknowledged that it lacked experience in requesting, coordinating and delivering CAS missions.[191] Although US CAS data is not yet available, a General Accounting Office study released before Iraqi Freedom found that the Army lacked CAS training, while the USAF focused excessively on longer-range interdiction missions.[192]

Iraq's counter-coercion campaign was extremely limited. Although 10.2% of US/UK combat missions were dedicated to hunting Surface-to-surface Missiles (SSMs),[193] the expected Scud launches never occurred. Twelve Al-Samoud and Ababil-100 SSMs were launched at Kuwait, 9 of which were intercepted by Patriot SAMs.[194] However, the threat these SSMs posed to the assembling US/UK ground forces in Kuwait may have caused the ground offensive to be launched earlier than planned. Prior to Iraqi Freedom, US/UK NFZ patrols had begun to suppress Iraq's air defences.[195] The Iraqi Air Force did not fly during the conflict. Overall, Iraq's air defences proved unwilling to protect their fielded forces.[196] The 1991 Conflict had apparently taught the Iraqi air defences to respect ARMs; the US fired only 408 HARMs[197] in 2003 compared with 1,961 during Desert Storm[198] and only 7.2% of

attacks were dedicated to '*maintaining air and space supremacy*'.[199] The effect of 12 years of NFZs and sanctions took its toll on Iraq's defences, as demonstrated by the SAM launcher propped up by bricks in **Figure 5**. Iraq deployed at least 4 electronic jammers to deny the US/UK their use of the Global Positioning System, but these were destroyed early in the conflict.[200] Squatters occupying the Air Defence Operations Centre in Baghdad revealed that the building had been abandoned about a week before the conflict,[201] while the operations board in the Air Defence Sector Operations Centre at Taji indicated that the facility was abandoned on 9 March (**Figure 6**). Attacks by Fedayeen irregulars became Iraq's main counter-coercion tool, which air power had difficulty in targeting.

**Bricks propping up launcher**

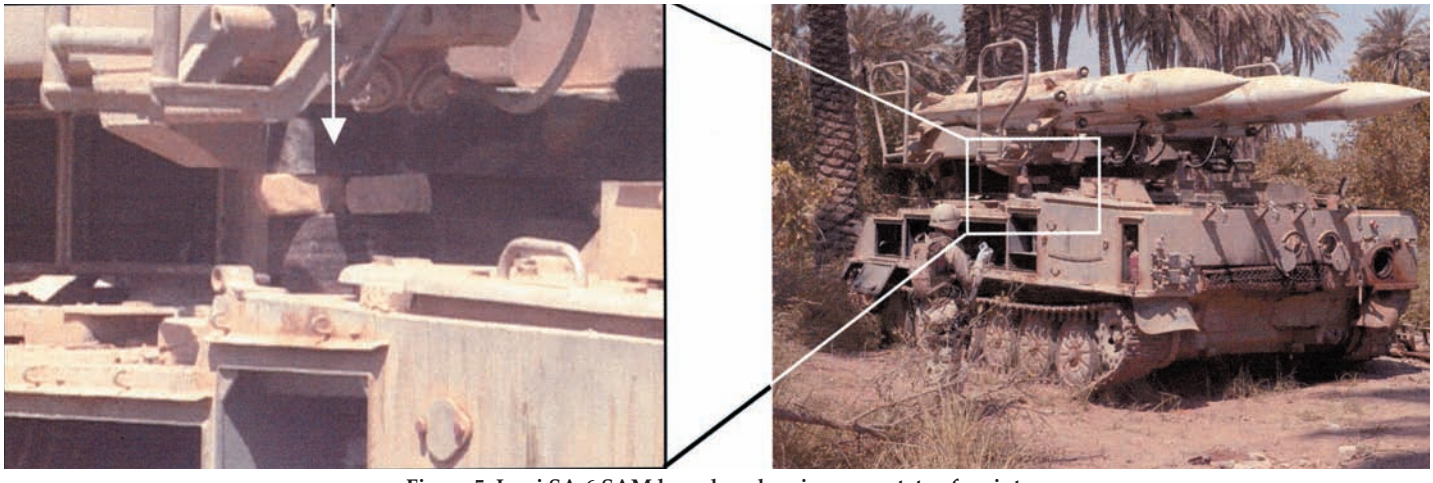
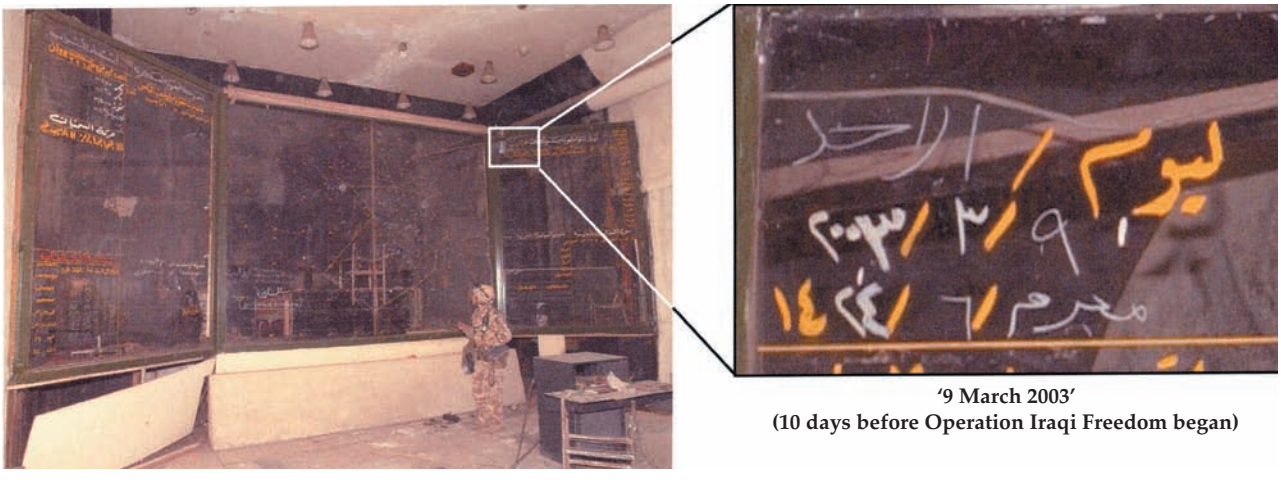


**Figure 5. Iraqi SA-6 SAM launcher showing poor state of maintenance**



**'9 March 2003'**
**(10 days before Operation Iraqi Freedom began)**

**Figure 6. Taji sector operation centre operations board showing date that the facility was abandoned**

**Conclusion**

These six case studies were all unique in some way. While it is dangerous to attempt to solve paradigm debates based on this small empirical sample, pulling the threads together is, nevertheless, revealing. The strategic air strikes against Libya achieved little long-term effect other than making Libya more covert in its support of terrorism. Warden's 'strategic paralysis' campaign in the 1991 Iraq Conflict seems to have been less decisive than the 'denial' strategy against Iraq's forces in the KTO. Similarly in the Bosnian Conflict, Milosevic realized the ground war could not be won when the 'denial' strategy against the BSA shifted the balance of power in favour of the BiH. However, the targeting of the Serbian Third Army in Kosovo was ineffective, probably because of the lack of a ground threat. Political constraints within NATO resulted in an unintentional escalatory 'risk' campaign of increasing strategic effect; Milosevic conceded when he was subjected to too many pressures from too many sources, although he retained sufficient military forces to defend Kosovo. In Afghanistan, air power appears to have been highly effective at the tactical rather than strategic level. SF, air power and indigenous ground troops worked in a highly successful and very cost effective, synergy. Air power and SF worked as force multipliers for a predominantly indigenous land force. This strategy should be employed whenever the circumstances are appropriate, as the minimal numbers of foreign 'occupation' troops adds legitimacy to the operation and is more likely to engender the support of the local population. Finally, in the 2003 Iraq Conflict, air power appears to have been effective at achieving the annihilation of Iraq's regular ground forces, and possibly strategic paralysis. The physical effect against ground forces is certainly easier to assess than the coercive effect on Iraq's leadership. However, since regime targets accounted for less than 10% of all combat sorties, the potential gains to be had from targeting the leadership are almost certainly worth the modest effort. Interestingly, CAS played little or no part in Libya, Iraq in 1991, Bosnia and Kosovo, but was prevalent in Afghanistan and Iraq in 2003. However, it is evident that CAS suffers from a low weapon release rate compared to attacks against pre-planned targets. Another consistent thread is that aircraft platforms can no longer be equated with air power roles; a B52 'strategic' bomber can used for tactical CAS, while an F16 can be tasked with 'strategic' regime targets.

Further distillation reveals significant trends. It is apparent that many conflicts start with tactical targeting of the enemy's physical component (his means of fighting), but conflict termination and the ensuing peace appears dependent on the moral component - a coercion/counter-coercion battle of wills. All the case studies demonstrate that the concatenation of coercive pressures from diplomatic, economic, psyops, media and information operations, strategic and tactical military effects can overwhelm an opponent and cause him to concede defeat. This can theoretically be achieved by a robust effects based campaign, although the accuracy of PGMs has developed faster than both the accuracy of intelligence gathering and our ability to measure the effects we are inflicting on our opponents.

Coercing the fielded forces appears to be effective in wars of territorial gain, such as Iraq in 1991, Bosnia (where the BiH fought for territory) and Afghanistan. However, in non-territorial conflicts (such as in Kosovo, where the KLA were never strong enough to challenge the Serbian Third Army) coercing the fielded forces appears to be ineffective. In contrast, while targeting for strategic effect always contributes to coercive concatenation to some degree, it becomes pivotal in non-territorial conflicts such as Kosovo. Generally, the high potential payoff from strategic effects, combined with the small number of sorties required to produce them, means that they should be included as part of an air campaign wherever possible. The selection of the correct audience to coerce (be it the leadership, fielded forces or population) is paramount - a selection that can only be made after a detailed analysis of the relative strategic influences of these groups and their vulnerabilities to the coercive tools available. In sum, air power must be able to produce both strategic effect and provide tactical support for friendly ground forces - the nature of the conflict dictates the most appropriate balance of effort. The ability to find the correct balance is one of the keys to air power.

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*Finding themselves caught in the middle of this conflict, 208 Sqn flying Spitfire FR18s were called on to attack Jewish forces that had engaged British Army units*

# Caught in the Middle
## Air Combat between Israel and the RAF

By Sqn Ldr B T Williamson Retd

Since the end of Second World War, only six RAF aircraft flown by RAF pilots have been lost in air-to-air engagements; the most recent was on 6 November, 1956 when a Syrian Gloster Meteor F8 shot down an English Electric Canberra PR7 over Syria, killing one of the crew. The other five aircraft were shot down by a Canadian and three Americans, flying as volunteers for the Israeli Air Force, during three confused and controversial encounters between former comrades in arms in the skies over Israel and the barren Sinai Desert.

**The background**

Britain's active involvement in the territory that now encompasses the state of Israel began in 1917, when the British Foreign Secretary, Arthur Balfour, issued a declaration that promised a national home for the Jews in Palestine, provided this did not harm the existing population. With the end of the Second World War, as the full horror of the Holocaust was uncovered, the majority of the surviving European Jews attempted to make their way to Palestine, despite Britain's best efforts to maintain the status-quo between the Arabs and the Palestinian Jews. Britain's attempt to restrict the mass influx of Jews into Palestine during this period was to be the cause of great bitterness in the years ahead. By 1946, the 80,000 British soldiers, along with 12 RAF Squadrons or detachments in the region, became the target for Zionist terrorists. This culminated on 22 July, 1946 when Irgun terrorists blew up the HQ of the British Army, located in the King David Hotel in Jerusalem, killing 91 people and injuring a further 45.

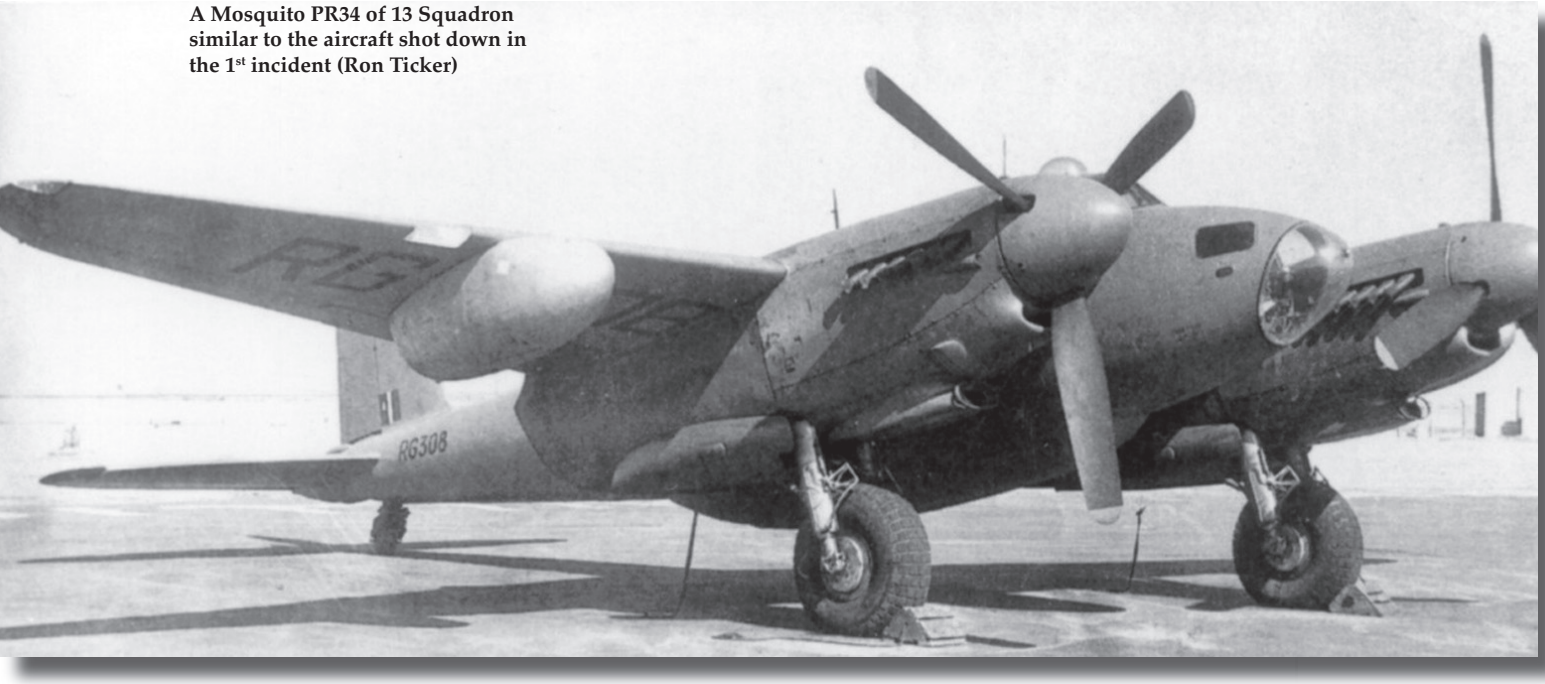
On 29 November, 1947 to the horror of the Palestinian Arabs, the UN General Assembly passed the Plan of Partition by a two-thirds majority, formally dividing up Palestine and creating a home for the Jews — Britain, as the Mandatory power, abstained in the vote and was required to remove all its forces from Palestine by

midnight 14 May, 1948. This decision resulted in increased fighting between the Jews and Arabs that rapidly increased in bitterness. Finding themselves caught in the middle of this conflict, 208 Sqn flying Spitfire FR18s were called on to attack Jewish forces that had engaged British Army units. The British forces were glad to see the back of Palestine and by 14 May, 1948 happily withdrew to established bases in Cyprus and the Egyptian Canal Zone, leaving only a small British garrison in the Haifa enclave to cover the final departure by sea of the remaining British personnel.

**The War of Independence**

On 14 May, 1948, David Ben-Gurion declared the new state of Israel whereupon the five surrounding Arab states immediately pledged to crush this emergent nation as quickly as possible. The only really effective Arab air force arrayed against Israel was the Royal Egyptian Air Force (REAF) equipped predominantly with British aircraft, the most effective being a number of Supermarine Spitfire Mk 5s and LF9s. The newly formed Chel Ha' Avir or Israeli Air Force (IAF) in comparison consisted of a ragbag collection of old transport aircraft and lacked any effective fighter aircraft whatsoever. The REAF made the most of this opportunity and mounted raids on Tel Aviv and other major towns knowing they would encounter only ground fire. Early on the morning of 22 May, 1948, the REAF attacked the RAF detachment at Ramat David airfield, where it was covering the British withdrawal, probably mistaking the airfield for one occupied by the IAF. The early morning raid caught the pilots of 208 Sqn recovering from the after-effects of an exuberant Dining-In Night, during which it had been decided to destroy the Officers' Mess to prevent it falling intact into the hands of the Israelis. The first attack destroyed two Spitfires of 32 Sqn and damaged a number of others, but without loss of life; a second attack shot up a Douglas Dakota as it was landing, killing two of the crew, as well as destroying a hangar and killing two airmen, whilst a third attack did little damage. However, by the second attack the RAF had mounted a standing patrol over the airfield and by the end of the third attack, a total

**A Mosquito PR34 of 13 Squadron similar to the aircraft shot down in the 1st incident (Ron Ticker)**



**An IAF Spitfire LF9 of the type used in the 2nd and 3rd incidents**

of five REAF Spitfires had been shot down, one by ground fire from two RAF Regiment Bren gunners, Sgt Atkinson and AC Waind. Fg Off Cooper and Fg Off Bowie both shot down one REAF Spitfire each and Fg Off McElhaw accounted for the two others — Cooper & McElhaw would later be involved in another incident on 7 January, 1949. The Egyptians later claimed that their aircraft had indeed mistaken Ramat David for the IAF base at Megiddo and even had the cheek to complain that their aircraft in the 2nd and 3rd raids had been shot down — understandably this incident did little to foster good relations or the exchange of information between the REAF and the RAF. On 23 May, 1948, as the final elements of the RAF left Ramat David and moved to the relative safety of Cyprus and the Canal Zone, the fighting between Israel and the surrounding Arab states increased in intensity.

**The 1st Incident**

As the fighting between Jews and Arabs continued, the RAF was tasked to keep an eye on developments and soon mounted almost daily overflights of the Sinai desert and Israel using de Havilland Mosquito PR34 aircraft of 13 Sqn from Kabrit in the Canal Zone. The unknown high-flying aircraft frequently made contrails as they flew over Haifa and Ramat David that were seen from the IAF bases, and became known to the IAF as the 'shufti kite'. Eventually, on 20 November, 1948 when the 'shuftykeit' was sighted over Galilee heading in the direction of Hazor, a guitar-strumming Carolina hillbilly named Wayne Peake hurriedly got airborne from Herzliya, flying one of two IAF North American P-51 Mustangs that had recently been re-assembled following their arrival in crates from the USA. Peake was a highly experienced USAAF fighter pilot, who had flown many combat missions over Germany during WW2 and was one of a number of non-Jewish Americans who eventually flew as volunteers for the IAF.

The Mosquito PR34 VL 620, callsign Graphic III, had departed Fayid at 1100hrs on the routine overflight of various Middle East countries, including Palestine that took place every 48hrs. The intelligence gathered from these missions helped inform a plan known as 'Barter', which entailed the UK going to the aid of Transjordan under the terms of the Anglo-Transjordan Treaty.

After leaving the Canal Zone, the aircraft climbed slowly towards Trans-Jordan then landed at RAF Habbaniya in Iraq to re-fuel. After departing Habbaniya the Mosquito should have climbed to maximum altitude whilst heading for northern Palestine, before turning south along the coastline allowing it to photograph various Israeli airfields. Meanwhile, after climbing up to around 30,000ft, Peake was guided towards the unarmed Mosquito by a South African volunteer pilot, Sid Cohen, who was tracking the aircraft with a pair of binoculars. However, because of a faulty oxygen system on the P-51, Peake was having difficulty seeing clearly. Finally, after struggling to find the aircraft, Peake eventually descended and intercepted the unarmed PR34, at 28,000 ft over Israel, and apparently incorrectly identified the aircraft as a Handley Page Halifax bomber.

Probably because the daily sorties over Israel had become almost routine and the RAF believed that the IAF lacked an aircraft capable of intercepting the PR34, the crew of pilot Fg Off Eric Reynolds and his navigator Fg Off Angus Love failed to spot the P-51 slowly closing from their rear. Peake finally got within range and opened fire, pouring 45 rounds into the Mosquito and observing strikes on the aircraft as well as the beginnings of a fire in the port engine. After a short second burst the guns on the P-51 jammed. Initially, the fire from the six .50 Brownings appeared to have little effect and the Mosquito continued on course. Then the aircraft turned out to sea, losing altitude to around 20,000ft probably in a futile attempt to escape, when it suddenly exploded and crashed off Ashdod, killing both the crew. Why the Mosquito was operating at such a comparatively low altitude, when it was capable of flying at 36,000ft where it would have been almost invulnerable to interception by the P-51, has never been explained. Also, considering that the P-51s had been unloaded in August, before becoming operational in October, the fact that the RAF were completely unaware that the IAF had obtained the P-51s, points to a singular failure in the British intelligence system. Finally, it is now known that ministerial approval for the overflight of various Arab countries and Israel was never sought, and these were authorised by the RAF C in C in theatre to provide the only


**The area of the British Mandate in Palestine (Crown Copyright)**

real source of intelligence on activities in that area. Given the recent history of the area, it was agreed that his decision was not unreasonable, nevertheless, the CAS, ACM Tedder, ordered a halt to further overflights until the appropriate ministerial approval had been obtained.

**More fighter aircraft arrive**

The IAF had to address its lack of fighter aircraft and slowly the first few Avia S-199s, Czech built versions of the Messerschmitt Me-109 that were purchased by Israeli agents in Czechoslovakia, began to arrive and were quickly pressed into service attacking advancing Arab forces. As the aircraft began arriving in Israel, with them also came a variety of foreign volunteer pilots, known as 'Machal' — volunteers in the War of Independence. Some were Jewish idealists with a genuine passion for defending the new state of Israel, some were adventurers who just wanted to fly, whilst others just needed a job and were not too bothered about the fairly basic pay — therefore it would not be unreasonable to describe some simply as mercenaries, although this description is always avoided by Israelis when describing the 'Machal'. However, none of the new IAF pilots liked the Avia S-199, nicknamed 'The Mule'. The Mule was powered by the Junkers Jumo 211F 12-cylinder liquid cooled engine, married to a large three-bladed wooden propeller, intended for the Heinkel He-111H bomber. The combination of engine and propeller generated far too much torque and this, together with the narrow track undercarriage, made the Mule very prone to ground looping when taking off or landing. Overall, many pilots considered the Mule was almost as dangerous to themselves, as it was to the Arabs and, with the REAF quickly replacing any Spitfires they lost, the IAF knew they had to acquire a more effective fighter — like a Spitfire. In their quest they managed to build one Spitfire from scrap parts left behind by the RAF and they also acquired a number of ex-RAF Spitfire LF9s from Czechoslovakia. The Czech Spitfires had originally been supplied by Britain to form the nucleus of the new Czechoslovak Air Force. But when Czechoslovakia came under Soviet domination, they came under pressure to dispose of the aircraft and replace them with Russian aircraft; eventually a total of 76 Spitfires would be sold to Israel by Czechoslovakia. These Spitfires, along with the Avia S-199s, formed 101 Sqn of the IAF and, together with a steady influx of experienced foreign pilots, gradually increased the IAF's capability. However, the REAF were also flying Spitfire LF9s with similar markings to the IAF LF9s and RAF Spitfire FR18s and the confusion this caused was almost certainly the primary reason for the second incident between the IAF and RAF.

**The 2nd incident**

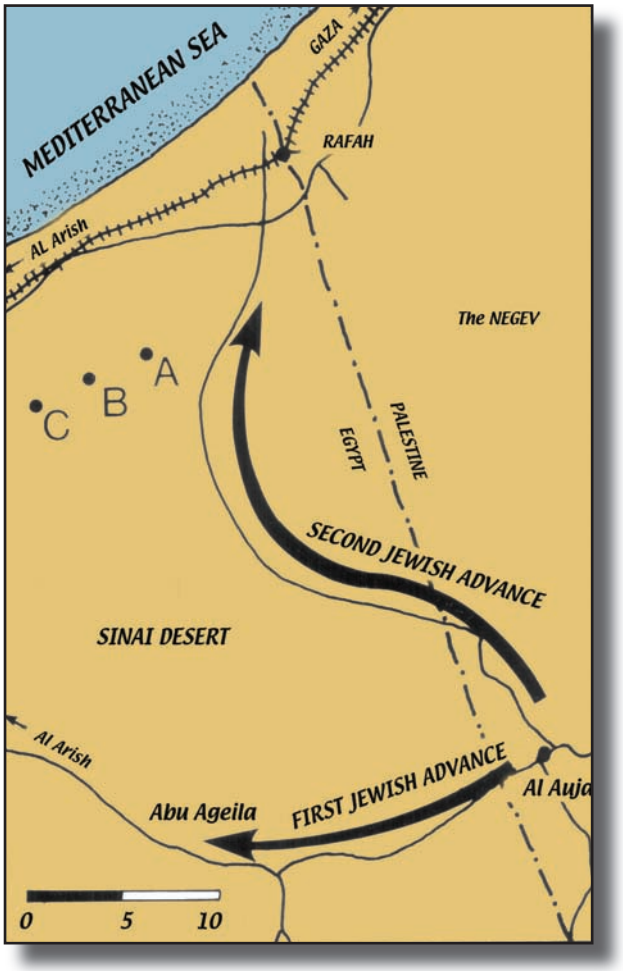
On the evening of 5 January, 1949 the Israeli leaders were informed that the Egyptian government had agreed to a ceasefire to take effect at 1600 hrs on 7 January, 1949; due to an astonishing foul-up in communications this information was never actually passed to the British forces in the Canal Zone. However, at this stage Israeli ground forces had already advanced over the border into Egyptian territory in the Sinai. On January 6, 1949, the AOC RAF Mediterranean and Middle East, Air Marshal Sir William Dickson, following orders from the Chief of the Air Staff, decided to continue to monitor the situation at the frontier between Egypt and Israel. As a result, 208 Sqn were told to prepare four Spitfire FR18s, to escort two Mosquito PR34s of 13 Sqn, who would undertake a reconnaissance sortie along the border. After the aircraft returned and reported that they had observed Israeli ground forces towing a captured REAF Spitfire along the Al Auja-Rafah road towards Israel, Sqn Ldr Morgan of 208 Sqn decided to task a further four Spitfires from his squadron to carry out an additional reconnaissance in this area the next day. The Spitfires were under strict instructions to avoid combat, unless they were attacked.

At 1115hrs on 7 January, 1949 the four Spitfire FR18s of 208 Sqn, flown by Fg Off Geoff Cooper, the formation leader,[1] with his No 2 Pilot/II Frank Close,[2] together with Fg Off Tim McElhaw and his No 2 Pilot/II Ron Sayers, got airborne from Fayid and headed for the Al-Auja-Rafah area in northeast Sinai. Despite some later reports to the contrary, the aircraft were fully armed and capable of returning fire. The formation had been clearly briefed not to cross the frontier into Israel;

however, it had also been made clear that any information they obtained if they 'accidentally' strayed over the border somewhere along the featureless desert, would be most welcome. It should also be remembered that, as Israeli ground forces were now positioned inside the Egyptian border, any route along the Egyptian side of the actual border would, at some stage, involve over-flying territory now occupied by Israeli ground forces. As the formation approached Abu Awiegila, the aircraft split into two sections, Cooper and Close descended to 500ft, with McElhaw and Sayers acting as top cover at 1,500ft. The planned route, along the expanse of desert that constituted the Egypt / Israel border, comprised a number of turning points and it would have been very easy for the formation to have inadvertently penetrated the border. It is now clear that the formation did briefly penetrate Israeli territory, along the Al Auja-Rafah road, as it searched for the REAF Spitfire last sighted being towed towards Israel. Eventually the RAF Spitfires headed back towards the area of Rafah, inside Egyptian territory. However, the RAF formation was unaware that some 15 minutes earlier 5 REAF Spitfire LF9s of 2 Sqn had attacked an Israeli armoured column in that area, setting three trucks on fire. A lack of communication between the REAF and the RAF, a result of the incident on 22 May, 1948, had ensured that the RAF formation was completely unaware that REAF Spitfires would even be in the area. Attracted by the smoking vehicles and curious to discover what had happened, the four RAF Spitfires turned towards the scene of the attack. As they approached the vehicles, Cooper and Close dropped down below 500ft to take photographs of the incident, whilst McElhaw and Sayers continued to provide top cover at 1,500ft.

The sound of the approaching RAF Spitfires alerted the Israeli soldiers who, fearing another attack by the REAF Spitfires, were understandably quick to open fire on the aircraft with machine guns, hitting both Cooper and Close. The Spitfire flown by Cooper sustained only slight damage and he rapidly pulled up to gain height, but Close's aircraft, which had flown very low to get good close-up photos of the burning vehicles, was badly damaged; he also pulled up to gain height but, with his aircraft on fire, he had no option but to bail out. During the descent, Close's feet got caught in the rigging lines of the parachute and he landed on his head, breaking his jaw. Cooper, looking back, saw Close bail out from his stricken aircraft and watched as he eventually landed some 10 miles inside Egyptian territory. Meanwhile, McElhaw and Sayers decided to drop down from providing top cover to see for themselves what had happened. Whilst the three surviving RAF Spitfires were concentrating on seeing what had happened to Close, two IAF 101 Sqn Spitfire LF9s, also alerted by the columns of black smoke from the burning vehicles, arrived on the scene.

Leading the two IAF Spitfire LF9s was a dour, highly experienced Canadian volunteer pilot, John Fredrick McElroy. McElroy had flown with 249 Sqn RAF during the defence of Malta in 1942, shooting down five German aircraft and being awarded the DFC. He later claimed two more German aircraft over Normandy in June 1944 and one more a month later, receiving a bar to his DFC; he eventually ended the war with a total of 13 enemy aircraft destroyed. At a loose end after the war, McElroy was recruited specifically to fly the IAF Spitfires because of his considerable experience on the aircraft. Flying alongside McElroy was an American volunteer pilot, Chalmers 'Slick' Goodlin. Goodlin had learned to fly before WW2 and in 1941 had travelled to Canada to enlist with the RCAF and join the war against the Germans. During military flying training in Canada, he so impressed his colleagues with his flying ability that they gave him the nickname 'Slick'. During WW2 Goodlin was a flight instructor in Canada, then completed a combat tour in England flying Spitfires alongside RAF squadrons, before transferring to the US Navy. Released from active duty, Goodlin joined Bell as a test pilot in 1944. Following the death in a crash of the initial Bell X-1 test pilot Jack Woolams, Goodlin accepted a lucrative verbal agreement from Bell and became, at just 23 years of age, the prime pilot for the experimental X-1. Goodlin went on to make no less than 33 flights in the X-1 between Sept 46 and June 47. However, in June 47, when the initial subsonic testing of the X-1 was complete and responsibility for further test flights of the X-1 was taken over by



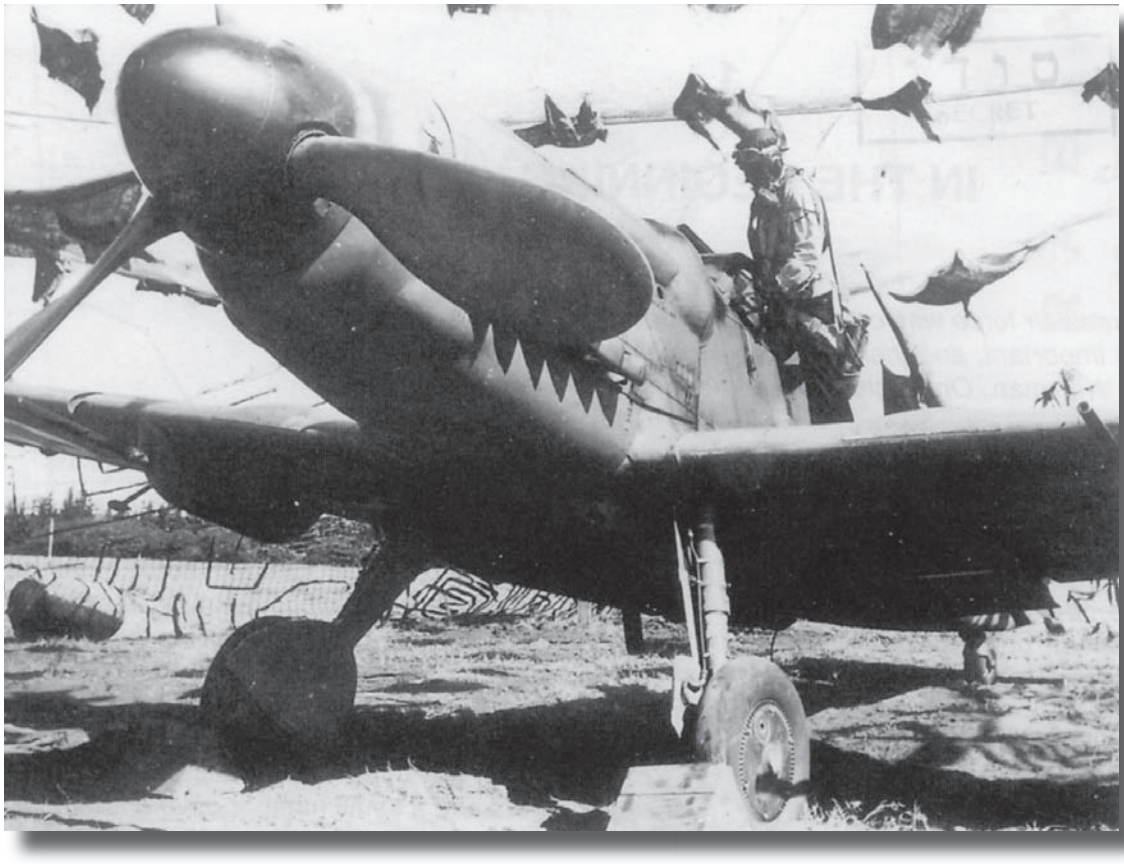

**Location of crashed Spitfires – 7 Jan 1949, during the second incident. A. Close & McElhaw; B. Sayers; C. Cooper**

the US Army Air Force (AAF), they were unwilling to continue the expensive verbal contract for test flights that Bell had previously agreed with Goodlin. Aggrieved by what he considered to be a breach of faith, Goodlin quickly tendered his resignation. Following his departure, an unknown AAF captain, Chuck Yeager, immediately took over as the test pilot for the X-1, later becoming the first man to break the sound barrier in the X-1, before going on to become the most famous test pilot in history and the man recognised as possessing 'The Right Stuff'. After leaving Bell Goodlin found himself looking for work and was eventually recruited by Joseph Berg, a Hollywood producer, to fly as a volunteer for the IAF.

Describing the encounter a number of years later McElroy stated that on the fateful day 'It was pretty uneventful for the first 20 to 25 minutes of the flight. And then, all of a sudden, I said to Slick — he was on my left wing — I said, 'Look at that smoke over here to the left, on the ground.' It seemed to be about eight to ten miles away. We were a good 40 to 50 miles south of Faluja. It was right on the front line and there were three columns of smoke — pretty heavy black smoke — going up about 1,000ft. So I said 'Come on, we'll turn and have a look at this.' And as we got closer, I said 'My God', we could see trucks burning, we could see a couple of light armoured vehicles and a number of jeeps. We saw no airplanes at the time. And then I saw four Spitfires going in, they were strafing. They had three vehicles on fire.'

The Spitfire's flown by McElroy and Goodlin were still fitted with a fairly standard RAF radio and they heard the excited chatter of the RAF formation as they discussed the loss of Close, but failed to connect this situation with the incident they had stumbled across. Not expecting to come under attack, and preoccupied by watching Close descend in his parachute, the three RAF pilots probably mis-identified the two IAF Spitfires turning behind them as being part of their own formation. The IAF Spitfires pounced on the formation, assuming they were actually REAF Spitfires and responsible for the attack on the Israeli column. According to McElroy, 'There were no markings on the Spitfires. Two of them were heading in an easterly direction and there were two that had gotten out of sight in a dive. They were diving and we lost them, so I warned Slick to watch out and we got over the convoy.'

McElroy latched onto the Spitfire flown by Sayers and immediately opened fire, again according to McElroy 'Slick was right beside my wing, he'd crossed over on the starboard side and I pulled another turn and turned south to see if we could pick up the other airplanes. Slick moved over to my left and just as he did I yelled, "*There's an enemy*



**This is the Avia S-199, a combination of the Me-109 fuselage with the engine and propeller from a Heinkel He-111H (IAF Museum)**

*aircraft at 12 o'clock, right in front of us!*" They were about 3,000ft lower than us, so we stuck our noses down and Slick moved off to the left and started firing. We were right on top of them. They pulled up right in front of us and I blasted one, I guess from about 200yds and saw many explosions all around the engine and cockpit — I knocked a few pieces off his wings. They'd just pulled out of this dive, they didn't see us at all, they didn't know we were even in the area. I broke off, looked at Slick, he had disappeared from view, but I saw an airplane going down off my left, it was on fire and smoking, in a fairly steep dive around to the left.'

Sayers was probably killed at the controls, as his aircraft quickly went into a power dive and hit the ground about three miles West of where Close's machine had crashed. McElroy then switched his attention to the aircraft flown by McElhaw, dropped in behind him and opened fire. According to McElroy "I took a quick look around, behind and above, nothing behind me at all and I looked over and saw another airplane off about 2 o'clock to me - just off my right and slightly below. I took one look and saw it wasn't one of ours by the markings, ours had the tails painted with big red and white stripes. I looked for the red and white tail markings of our airplanes, they were all marked the same and they showed up many miles away. It wasn't one of ours, so I dropped my sights on him, it was about 400yds and I let fly. I got strikes all over him, right down the fuselage and the engine, and I didn't wait around, I just broke off. I got a good burst in, probably about

three to four seconds, which is a fairly long burst and well clobbered with cannon and the .50 calibre. I broke off, looked around, but couldn't see Slick." The first thing that McElhaw knew was a call on the R/T from Cooper saying that he had an aircraft on his tail, then suddenly his aircraft was struck by bullets along the fuselage and engine. It was quickly obvious to McElhaw that he needed to part company with his aircraft and he bailed out, landing about five-six miles west of Close's aircraft.

Whilst McElroy was shooting down Sayers and McElhaw, Goodlin engaged the final aircraft flown by Cooper. Goodlin recalled "There was a fiery explosion from John's target and my quarry poured on the coal with me in pursuit. We broke out of a sandy mist at 10,000ft, but I could not gain close proximity to the Spit 18 due to lesser power in my Spit 9. At about 16,000ft the Spit 18 rolled over and dived back towards me at an impossible deflection angle, with machine guns blazing and exhaust smoke rolling out under both wings. I immediately engaged my opponent in an old-fashioned dogfight scissors. The Spit 9 proved to have better manoeuvrability and I was able to get into an ideal firing position. I saw strikes on my opponent's engine cowl just before he rolled over and bailed out about ten miles south of Al Arish. I only recognised the RAF roundel after the Spit 18 had fired on me, when we were in the scissors engagement and I had no alternative but to fight back to save my own bacon."

Sayers remains were later recovered by Egyptian troops and buried in the desert, close to the remains of his aircraft. Cooper landed safely after suffering some wounds to his leg during the engagement and, after walking for a while, he was picked up by some Bedouins who took him to a border post manned by some Arab troops. Then after being transported by camel to Al Arish, he was handed over to the Egyptian Army, who treated his wounds before putting him on a hospital train back to Ismailia and the RAF. McElhaw and Close were captured by Israeli troops and were eventually taken to Tel Aviv for interrogation.

McElroy and Goodlin returned to Hatzor, executed a victory roll over the airfield, and landed. After they had landed, Goodlin told McElroy that the aircraft they had shot down had been British Spitfires. McElroy remembered he replied "Oh no, you're crazy. The British wouldn't be down there, that's behind our line. Now where this convoy was on fire . . . where the strafing around was going, was behind the Israeli lines . . . I would say, roughly three to four miles behind the Israeli front lines. And that's the first thing I knew they were even down that way. I never noticed any markings on them. I knew they weren't ours and that's all I needed." Although their colleagues were initially sceptical of their claim to have shot down three RAF Spitfire FR18s, this was soon confirmed when news of the capture of McElhaw and Close was received by telephone.

**The 3rd incident**

Just after lunch, when the four 208 Sqn Spitfires had failed to return to Fayid, it was obvious that something had happened. The commanding officer of 208 Sqn quickly decided to launch another formation of Spitfires to search for the missing aircraft and understandably wanted an escort from the Hawker Tempest squadrons on the base. However, the Tempests of 6 Sqn had only recently landed, following the return of the Tempests of 213 Sqn that had landed sometime earlier and all the pilots had already stood down to their Mess. After some urgent phone calls a suitable number of Tempest pilots from 213 Sqn and 6 Sqn were rounded up and a rapid briefing took place whilst the planes were hurriedly prepared by the available ground crew.

Eventually at around 1500hrs, four Spitfire FR18s of 208 Sqn, led by Sqn Ldr Morgan, took off to search for the missing aircraft and, after rendezvousing with the Tempests over Fayid, they headed for the border. The Spitfires flew in the lead at 500ft, followed by seven Tempests of 213 Sqn led by Gp Capt A F Anderson, OC 324 Wg, acting as medium cover at 6,000ft, together with another eight Tempests of 6 Sqn led by Sqn Ldr Denis Crowley-Milling[3] providing rear top cover at 10,000ft. To balance up the aircraft numbers, Pilot/III Douglas Liquorish of 6 Sqn was ordered to join the 213 Sqn formation. Then, near Rafah, Anderson suddenly noticed a formation of aircraft diving to attack his section

of aircraft and immediately ordered a break to starboard. However, when the 213 Sqn Tempests engaged the attacking aircraft, they suddenly discovered they were unable to return fire.

The four attacking aircraft were IAF Spitfires led by Ezer Weizman[4] a native Israeli who served in the RAF during the WW2, but only received his wings in 1945 after the war was finished. As his wingman Weizman had Alex 'Sandy' Jacobs, who was born in Palestine of British parents and who also served with the RAF in WW2. The two other pilots were American volunteers, Bill Schroeder and Caesar Dangott, both of whom had flown with the US Navy in WW2. As he dived towards the formation, Bill Schroeder singled out a Tempest flown by Plt Off David Tattersfield of 213 Sqn, a young, inexperienced pilot who had only been on the unit a couple of weeks. Tattersfield was probably concentrating on just maintaining formation and if he did see any Spitfires turning behind the formation, like Liquorish, he had every reason to assume they were friendly. Turning in out of the sun, Schroeder quickly got on the tail of the Tattersfield and opened fire. Tattersfield was probably killed instantly, as his aircraft was seen to turn over on its back almost immediately and dive vertically down to crash onto the desert floor and burst into flames.

As soon as he heard Anderson's warning, Crowley-Milling, flying top cover, led his section of aircraft down to attack the IAF Spitfires — their aircraft's guns operated correctly and they were able to return fire. However, when the Tempest pilots attempted to jettison the drop tanks they were carrying, to increase the aircrafts manoeuvrability, the lever used to jettison the tanks could not be moved. It was later discovered that the release pins were too heavily loaded to be released, because the ground crew had over-tightened the cradle arms after each sortie to ensure the tanks were held firmly in place. A general melee now took place between the remaining 14 RAF Tempests and the four IAF Spitfires — Weizman soon managed to obtain some hits on a Tempest flown by Pilot/III Douglas Liquorish. Flt Lt Brian Spragg of 6 Sqn, an experienced and highly competent pilot,[5] later recalled 'My section broke, rather than turned with me, leaving me on my own. Next minute I had an Israeli on my tail. I tried to drop my tanks, but they wouldn't come off. The Spitfire turned up in front of me and I gave him three or four quick bursts.' Caught up in the middle of this melee were the four Spitfire FR18s of 208 Sqn and it was soon obvious to these pilots that their colleagues in the Tempests were treating all Spitfires as hostile, until proved otherwise. A couple of the RAF Spitfire were fortunate not to be shot down by their own side, before a frantic call for all RAF aircraft to 'waggle their wings' allowed them to be clearly identified. Soon the IAF Spitfires realised the danger of their situation and disengaged, quickly retreating back over the border into Israel where the RAF aircraft were forbidden to follow, bringing an end to the engagement.

After landing at Hatzor, Weizman discovered his Spitfire had suffered some minor damage from the guns of Spragg, but this was quickly repaired. The remaining Tempests returned to Deversoir where, despite damage to the tail fin, propeller and main spar, Liquorish managed to land his aircraft safely. It was discovered that two other aircraft, flown by Pilot/II MAR Heald and Pilot/II EG Waddington, of 213 Sqn, had also suffered damage from bullet strikes. In the subsequent discussions that took place between the RAF pilots involved, it was clear that many had confused the red-painted spinners on the Israeli Spitfire LF9s, with the red-pained spinners of the RAF Spitfire FR18s, whilst others had managed to distinguish the Israeli Spitfires, because of the red and white stripes painted on the aircraft's rudders. The next day 208 Sqn painted their spinners white, together with a white band around the rudder; however, this only made the aircraft more similar to the REAF Spitfire LF9s and would have caused even more confusion if a further engagement with the IAF had occurred.

The accidental dispatch of aircraft into a battle zone with unserviceable guns also came in for considerable criticism from the survivors of the engagement. A number of the Tempests were found to be overstressed, either by exceeding their maximum speed whilst diving away from an attack, or whilst spinning with the long-range drop tanks attached. It goes without saying that

when news of the earlier loss of the four 208 Sqn Spitfires also became known, emotions amongst the RAF pilots ran very high. Before long all available Tempests and Spitfires were armed up and ready to take off and destroy any IAF aircraft they encountered, together with the airfields they were operating from. However, despite the pleas of the squadrons involved in the two encounters, AIR HQ refused to authorise any retaliation. There are persistent rumours that certain members of 208 Sqn later extracted their revenge on the IAF by shooting down any IAF aircraft they encountered, including a number of transport aircraft and that this was subsequently hushed-up to avoid escalating the situation. However, these rumours have never been publicly confirmed by anyone on the squadron at that time.

Back at Hatzor, many of the pilots of 101 Sqn were also decidedly unhappy with the day's events. Almost every pilot had either flown with or alongside the RAF during WW2 and the general view was that the RAF would not allow the loss of five aircraft, and the death of 2 pilots, to go unpunished and would probably attack Hatzor at dawn the following morning. That night, in anticipation of the impending attack, a number of the IAF pilots headed off into Tel Aviv to get drunk at their usual haunts, having decided that if the RAF did stage an attack then they would offer no resistance. However, not everyone adopted this policy and at dawn a number of IAF pilots were strapped into the cockpits of Spitfires, ready to repel the retaliatory attack that never appeared.

**The aftermath**

The British reaction to these incidents was supplied by the Foreign Office, who forwarded to the Israeli Government a demand for compensation for the loss of personnel and equipment in the incidents.[6] Even the Air Ministry was only slightly more robust and issued the following statement: 'In view of these unprovoked attacks, our aircraft have now been instructed to regard as hostile any Jewish aircraft encountered over Egyptian territory'. The day after the attack the pilots of 101 Sqn sent a message to 208 Sqn as follows: 'Sorry about yesterday, but you were on the wrong side of the fence. Come over here and have a drink sometime. You will see many familiar faces.' Considering that the unprovoked attacks by 101 Sqn had cost the lives of two RAF pilots,

**Tattersfield's wreckage — the Tempest F6 shot down by Bill Schroeder in the 3rd incident (Israeli Government Press Office)**

together with the loss of four aircraft, it was hardly surprising that the RAF pilots involved failed to take such a light-hearted view of the incident. A subsequent RAF investigation confirmed that all four Spitfires of 208 Sqn had crashed within 3nm of a point 15nms west of the border with Israel, well within Egyptian territory. However, when an RAF salvage team arrived, they could only find the wreckage of the Spitfires flown by Cooper and Sayers. It was later confirmed by local Arabs that the Israels had visited the four crash sites, removed various parts and then buried the other aircraft. It was assumed, correctly, that the Israelis had captured the two missing pilots and taken them back over the border into Israel. The team also discovered the wreckage of the Tempest flown by Tattersfield, which had ended up north of Nirim, four miles inside Israeli territory. The Israelis had buried Tattersfield near the wreckage and his body was removed and later reburied on 11 January, 1949 in the British War Cemetery at Ramleh — at the service, in a gesture of reconciliation, six members of the IAF carried his coffin. The two pilots captured by the Israelis, McElhaw and Close, were interrogated in Tel Aviv and received a number of visits from 101 Sqn pilots, including McElroy. Close was allowed to talk to various press correspondents, who quoted him as saying the formation had crossed the border into Israel. However when this was reported the Air Ministry issued a statement saying that the RAF formation were under strict instructions not to cross the frontier into Israel.

Several weeks later Tattersfield's father received, via the Air Ministry, an anonymous letter about the death of his son. In the letter (believed to have been written by Bill Schroeder who had shot Tattersfield down) the author stated that the first formation of RAF Spitfire's had been strafing Israeli troops before they were shot down. In the actual incident, he stated that the Spitfires were loaded with bombs and were heading for Israeli bases when they were attacked. It's clear that the author had confused the actions of the REAF Spitfire LF9s with those of the RAF Spitfire FR18s, and mistook the long-range drop tanks on the Tempests for bombs. Nevertheless, it's also very apparent from the tone of the letter that the author deeply regretted his role in the death of Tattersfield. Of his role in the second incident McElroy later said "We certainly regretted it. We didn't want to get mixed up with the British. However, as I've explained to many people, we were flying and fighting for the Israelis. There were aircraft, at the time it didn't matter whose they were to me, attacking Israeli vehicles and Israeli personnel. It was our job and our duty to stop it and that was the only way we could stop it. It was too bad, as I say, but we had no indication that the British were in the area."

Close and McElhaw were soon released by the Israelis and placed on a ship heading for Cyprus where they were re-united with their comrades of 208 Sqn. However, to prevent them becoming involved in another encounter with the IAF, they were quickly posted back to the UK. All those involved in the incident were required to give evidence at the official RAF Court of Enquiry into the incident, held on 27 January, 1949 at RAF Fayid and led by AVM JN Boothman ACC Iraq. Although a summary of the finding exists, in accordance with normal policy, a complete copy of the final report, with appropriate witness statements, has not been retained on the de-classified file.

**The questions**

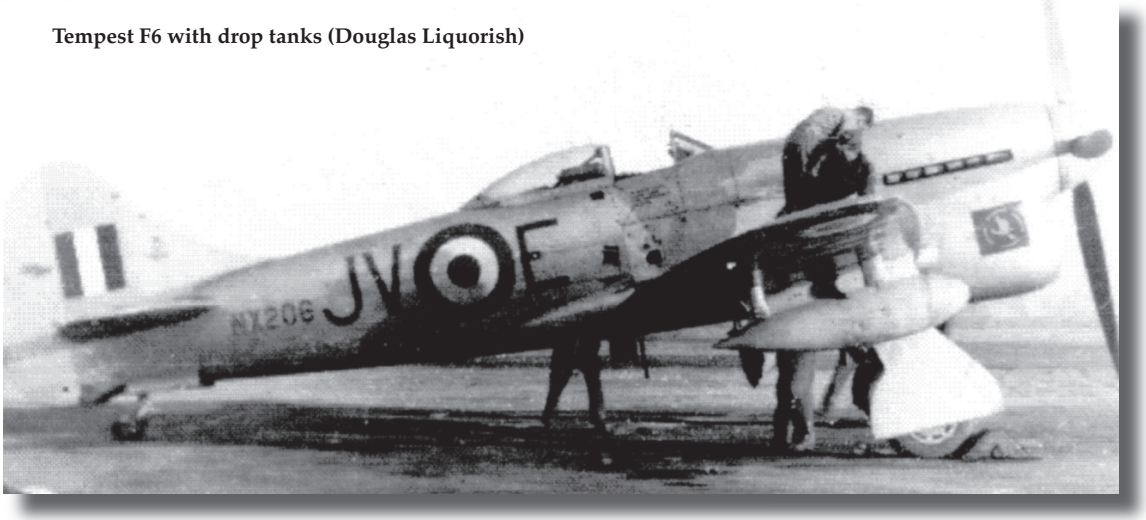
After reviewing these incidents, a number of obvious questions need to be addressed. The most obvious is whether in the second incident McElroy and Goodlin knew the Spitfires they were attacking were RAF and not REAF. On balance I think that they probably did genuinely mistake the RAF Spitfires photographing the burning Israeli vehicles, for the REAF aircraft that had actually made the attack. Goodlin has admitted that they heard "excited English chatter on the R/T", presumably discussing the shooting down of Frank Close, before they attacked, but they failed to understand the significance of what was being discussed. Although the RAF aircraft's spinners were painted in a similar fashion to the REAF Spitfires, the RAF FR18s were a much larger aeroplane than the Egyptian LF9s. However, the difference would not have been obvious at range in poor visibility, even to experienced pilots like

McElroy and Goodlin and, as the formations merged, the 'red mist' of anger probably clouded any further attempt at establishing their correct identity. Goodlin has admitted that he recognised the RAF roundel on one aircraft, but only after the aircraft had fired on him and he was then forced to continue the attack to save himself.

In the third incident, a number of the pilots in the Israeli Spitfire formation must have known from the start that the aircraft they were attacking were RAF Tempests, rather than REAF Spitfires. Firstly, the Tempests were considerably different to the REAF Spitfire LF9s, although the REAF had actually 'borrowed' a single Tempest from the Iraqis. Douglas Liquorish[7] clearly remembers seeing a formation of Spitfires pass down the port side of the 213 Sqn formation at around 7,000ft, about half a mile away. He then ignored the aircraft, assuming they were just another formation of RAF Spitfires and, like the rest of the formation, didn't see them turn in behind the Tempests and attack out of the sun. Secondly, it should have been obvious to the Israelis that the RAF would mount a sortie into the area in search of the missing Spitfires. Certainly, Ezer Weizman has admitted that he was "keen for just one more victory to finish up the war", and didn't seem particularly concerned which country the aircraft actually belonged to. As far as the IAF pilots involved were concerned, it appeared to be a question of shoot first and positively identify later. In Weizman's defence, given the fragile state that Israel was in and the limited number of IAF fighter aircraft, he knew that any aircraft they encountered were either Arab or RAF and probably thought that alone justified an immediate attack. However, it's stretching the imagination to believe that Weizman didn't clearly identify the aircraft as Tempests and knew full well that the aircraft belonged to the RAF. Who else in that region could have put together a formation of aircraft of eight Tempests? The loss of the RAF aircraft and pilots in the 2nd and 3rd encounters are often described as examples of the 'Fog of War'; however, I believe that although the 2nd incident does fall into this category, the 3rd incident was simply an unprovoked attack. Although Weizman appears to have positively relished the opportunity to get one over on the RAF, it's doubtful that, in retrospect, all of his colleagues were quite as enthusiastic; if he was the author of the letter, then certainly Bill Schroeder deeply regretted his involvement.

Was there also a degree of arrogance in the higher echelons of the RAF who believed that nobody in the region would dare attack a formation of RAF fighters? On paper the Spitfire LF9 was no match for the Spitfire FR18 and more especially the Tempest. However, as has so often been the case in air-to-air engagements over the years, a more manoeuvrable aircraft, aggressively flown by experienced pilots staging a surprise attack,

**Tempest F6 with drop tanks (Douglas Liquorish)**



**Weizman's Spitfire — the Spitfire LF9 flown by Weizman in the 3rd incident**

can frequently prevail against larger formations of more powerful aircraft, containing some less experienced pilots, particularly if hit and run tactics are employed. Nevertheless, in the third incident had all the Tempests been able to get rid of their drop tanks and return fire, the IAF Spitfires would not have escaped so lightly — so luck was most certainly on their side that day. The inability of the 213 Sqn aircraft to return fire was almost certainly caused by simple human error. Although it has often been reported that it was official policy for aircraft guns to be uncocked, I have failed to discover any evidence of this order in the de-classified file.[8] Certainly, we know that 6 Sqn and 208 Sqn had loaded and cocked guns, which would have contravened such an order, so I believe there is a much simpler reason. The Tempests of 213 Sqn had landed earlier than 6 Sqn and, as part of the after landing checks for obvious safety reasons, the squadron armourers would routinely have uncocked the aircraft guns. In the later rush to depart, for some unknown reason, the evidence suggests that the 213 Sqn armourers simply forgot to re-cock the guns. Luckily, as they landed later, the armourers of 6 Sqn hadn't got around to un-cocking their Tempests guns when the order to get airborne again was received and so their aircraft were able to return fire when they later encountered the IAF Spitfires.

What might have happened had the RAF been allowed to immediately retaliate against the IAF following the two incidents? Had the will been there, then there is little doubt that the RAF could easily have decimated the small embryonic IAF, destroying most if not all of their available aircraft and their aviation facilities. This in turn would have left the skies clear for the REAF and might have resulted in the war between Israel and the surrounding Arab states re-commencing, with the IAF having lost control of the skies. However, provided sufficient IAF pilots had survived an attack by the RAF, its probable that, thanks to their already well established supply chain, the IAF would have been able to quickly replace their aircraft and eventually restore their supremacy in the sky, regardless of how many aircraft had been destroyed by the RAF.

Many years later, Gp Capt Anderson probably spoke for all those involved when he expressed his expert opinion on the 3rd incident by commenting that 'This fantastically misplanned operation afforded a lively illustration of how an unbeaten Air Force appears able, at the drop of a hat, to disregard every lesson learned in five and a half years of victorious total war. It was remarkable that only one aircraft was lost, considering that we were sent off unarmed to meet aircraft of greater manoeuvrability in a highly confused area of operations. It is, however, only fair to remark that nobody concerned would have willingly allowed further aircraft from 208 Sqn to enter the operational area without some form of cover — even though it was a total bluff. This presumably explains the event, even if only partially.'[9]

Throughout aviation history, air-to-air engagements have frequently been confused encounters; these three incidents were no

exception and nobody will ever be able to establish the precise details of what actually happened. It's rather ironic that, during the War of Independence, the RAF were attacked by both protagonists, with lives being lost as a result, despite attempting to remain neutral — the almost inevitable result of getting in the middle of someone else's war. It's also a rather surprising fact that the second REAF Spitfire shot down by Fg Off Tim McElhaw on May 22, 1948, is the last occasion that an RAF pilot in an RAF aircraft shot down another aircraft in an air-to-air engagement - an unusually long time ago, particularly considering the numerous conflicts that the RAF have been involved in over the intervening 56 years.[10]

This article is dedicated to the memory of Fg Off Eric Reynolds, Fg Off Angus Love, Pilot/II Ron Sayers and Plt Off David Tattersfield — Per Ardua ad Astra. The author has donated all the proceeds from this article to the RAF Benevolent Fund.

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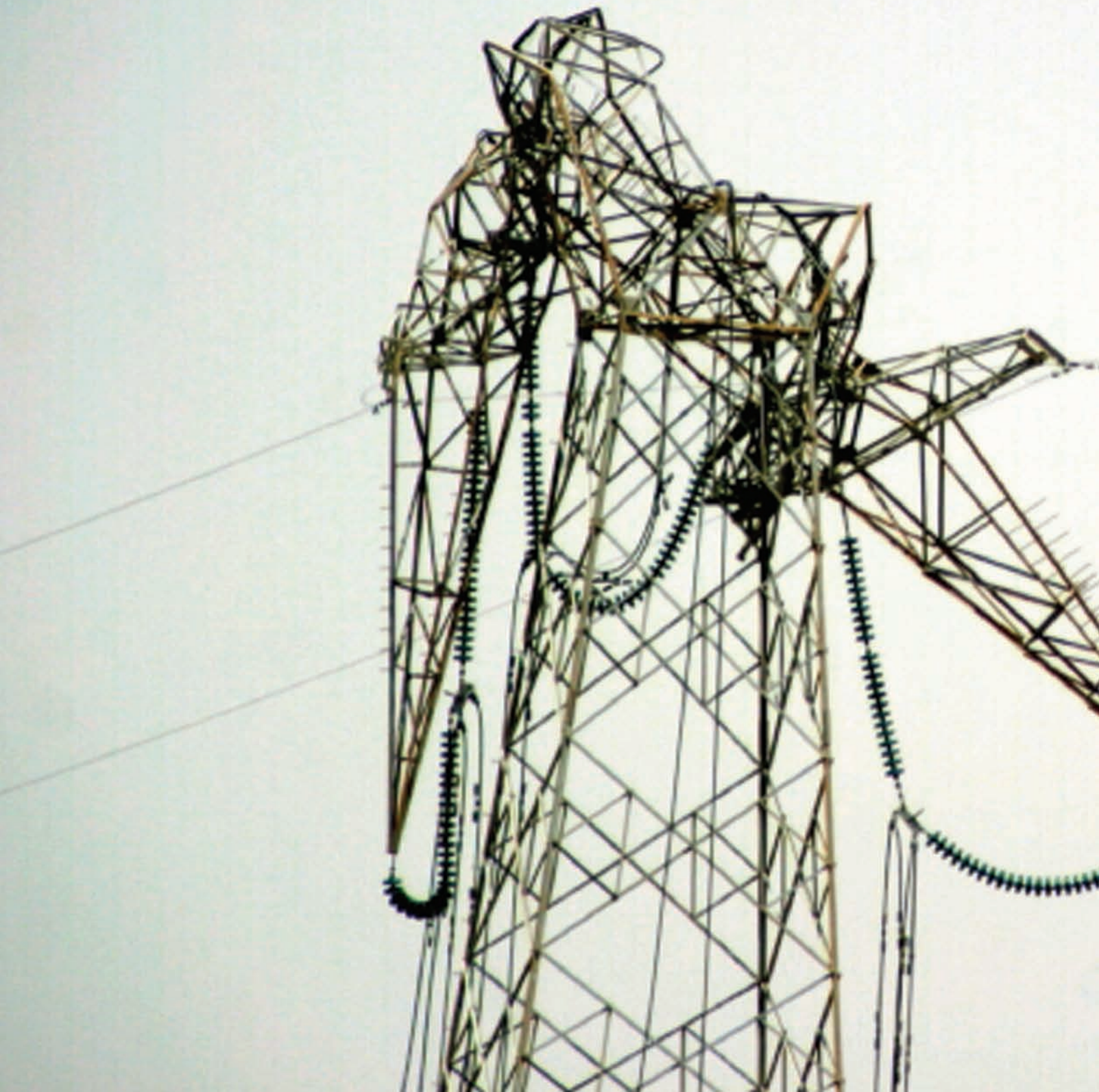
**Notes**

1 Cooper retired as an air commodore and became the aviation correspondent for The Daily Telegraph.
2 At this time in the RAF, Pilot/I equated to WO, Pilot/II equated to FS and Pilot/III equated to Sgt.
3 Later Air Marshal Sir Denis Crowley-Milling, KCB, CBE, DSO, DFC.
4 Weizman became a legendary Commander of the IAF and finally the President of Israel.
5 Conversation Spragg - Williamson 23 Dec 03. Flt Lt Brian Spragg had flown Typhoons with 257 Sqn in WW2, later flew F-86 Sabre's in Korea and retired as a wg cdr.
6 No compensation was ever paid by Israel.
7 Conversation between Liquorish & Williamson - 14 Nov 03.
8 PRO AIR 19/587 – Attacks on RAF PR aircraft 1949.
9 Letter from Gp Capt A F Anderson DSO DFC RAF Retd to the AHB dated 16 Feb 75.
10 The rumours regarding an RAF Javelin of 60 Sqn downing an Indonesian C-130, together with the 20 Sqn RAF Hunter manoeuvre kill against an Indonesian MiG-17 in the mid-1960's are both unconfirmed. The infamous 92 Sqn F4 v 31 Sqn Jaguar incident in Germany on 25 May 82 was an unintentional & uncontested blue-on-blue and therefore doesn't count!

**An Iraqi transmission tower damaged by Allied forces**



# Proportionality and the Laws of War

## A Critical Analysis of the Principle of Proportion under Additional Protocol I, 1977

By Flight Sergeant Laurie-an D'Alderley

*"Eye for eye, tooth for tooth, hand for hand, foot for foot."*
(OT, Exodus 21:24)

Proportionality is an enduring remnant of chivalric code codified in Additional Protocol I to the Geneva Conventions, 1977.[1] The principle is a limitation on the method and means of warfare that requires parties to a conflict to exercise judgement as to whether the anticipated military advantage of a planned attack outweighs the expected degree of loss of life and damage to civilian property. Simply put, 'proportionality consists of a reasonable relation of means to ends'.[2] The tenor of the principle is thus creditable to the tenets of international humanitarian law but is lamentably ambiguous and difficult to apply.[3] Practically, the principle demands relative values to be assigned to unrelated factors: politico-military profit and the value of human life. The Principle of Proportion is a fundamental feature of the law of armed conflict; aimed at providing due protection to the civilian population from the unnecessary and worst effects of war.

During and post recent international conflicts, attended by heavy media dialogue,[4] the legal principle of proportionality has been drawn on both to condemn and to justify whole and individual military actions. From the Coalition's destruction of the Iraqi electric power network in 1991 to the NATO attacks on the Belgrade television station in the Kosovo conflict, proportionality has been raised simultaneously as both a flag of integrity and an alarm of dereliction. Both those claiming and those disclaiming

**Destroyed Iraqi Tu-22U aircraft**

*The rule of distinction is another deep-rooted principle of humanity requiring that such distinction be made between military objectives and civilian objects with a view to sparing the latter as much as possible*

integrity appear to believe in the veracity of their statements. So, how can interpretation of this one principle translate into contradictory assertions?

Does this ambiguity and potential for discord render the principle unfeasible or is the law succinct enough to require adherence? In answering, I will examine the detail of the principle, focusing on Protocol I, and explore the continued validity of the principle of proportionality as a legal obligation by assessing it in relation to two factors: interpretation and application.

First I will examine how this principle is incorporated into military manuals and political rhetoric to understand how the principle is interpreted. I will show that, whilst interpretation is internationally uniform in its larger meaning, the detail is significantly vague. Then, in assessing the factors influencing the application of the principle during conflict, the disparity exposed in interpretation will be reinforced. I will conclude that although the principle has merit in warfare, its indistinct interpretation and application, together with the partialities of both parties to the conflict and observers, causes it to be inherently flawed.

**Proportionality: Historical foundations**
What is meant by the principle of proportionality and how does it contribute to the law of armed conflict? The principle extends from the just-war tradition established by Thomas Aquinas, who held that war was moral if it met the conditions of proper authority for its initiation, the cause was just, and if the state waging war had the right intention.[5] The just-war tradition was advanced by the work of two scholars, Francisco Vitoria (1480-1546) and Francisco Suarez (1548-1617) who contributed the concept of proportionality.[6]

However, it was not until the latter half of the 19th Century that the essential nature of the concept appeared in crude military doctrine and

*Incidental effects causing injury to civilians and damage to civilian property, commonly known as collateral damage, can occur as a result of an attack for several reasons: weapon blast and fragmentation spreading beyond the perimeter of a military objective; errors in intelligence directing the weapon to the wrong target; misidentification of a target; or, weapon malfunction.*

**Collateral damage, Iraqi apartments belonging to civilians**

international statute. Defining limitations on the methods and means of warfare, the Lieber Code of 1863 recognized that civilians[7] and their assets[8] should be protected in warfare and, further, that enemy combatants should not be afflicted by unnecessary suffering.[9] The latter was codified by the St. Petersburg Declaration of 1868 in its prohibition of *maux superflus*,[10] which was later to appear in the subsequent Hague treaties.[11] The fourth 1907 Hague Declaration states that [t]he right of belligerents to adopt means of injuring the enemy is not unlimited.[12] Such limitations include the use of weapons calculated to cause unnecessary suffering,[13] or which are used against undefended towns, villages or buildings,[14] or to destroy . . . the enemy's property, unless such destruction . . . be imperatively demanded by the necessities of war.[15]

Attempts at articulating proportionality can be detected here in the text of the Hague Declaration in demanding imperative military necessity for attacks on the civilian structure, summarized as only that amount of force should be used that is necessary to succeed in one's objective.[16] Military requirement must not exceed the precepts of humanity. Humanity effectively places a restraint on military necessity to protect both combatants and non-combatants from the worst of war.

The rule of distinction is another deep-rooted principle of humanity requiring that such distinction be made between military objectives and civilian objects with a view to sparing the latter as much as possible. As recognition of its customary status,[17] the principle was adopted in a resolution at a meeting in Edinburgh of the Institute of International Law in 1969[18] and was later incorporated in Protocol I.[19] The Protocol prohibits attacks where by its nature or application a weapon cannot be directed at or limited to the military objective.

**Additional Protocol I**

Although no reference is made to proportionality, its principle is composed in Art 51(5)(b) of Protocol I, stating that the following types of attack are to be considered indiscriminate:

'A*n attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated*'[20]

Together, the principles of necessity and distinction under the mantle of humanity form the basic premise of the proportionality principle and the first part of the above text. These principles demand that the effects of military force be limited to the minimum needed to achieve military success whilst sparing the civilian population and its assets[21] as far as possible. In saying that civilians must be spared *as far as possible* the law recognizes here that loss of life and injury to civilians is an inevitable consequence of war,[22] though it is specific in stating that such consequences are to be the incidental effects of a lawful attack[23] on a military objective and not the result of a direct, illegal attack on the civilian population. Incidental effects causing injury to civilians and damage to civilian property, commonly known as collateral damage,[24] can occur as a result of an attack for several reasons: weapon blast and fragmentation spreading beyond the perimeter of a military objective; errors in intelligence directing the weapon to the wrong target; misidentification of a target; or, weapon malfunction.

The balancing requirement for incidental effects, or collateral damage, is phrased in the latter half of the text of Art 51(5)(b), stating that an attack must be weighed against military advantage. In this sense, military advantage is the phased progress towards the realization of a clearly defined aim; the ultimate aim being to defeat the enemy's will or capability to wage war.[25] As a consequence each phase may be pictured benignly as a game of chess where the ultimate aim is to capture the opponent's king. Every move made and every piece played during the game follows a strategy formed in order to advance towards that goal. The progression of play is to create advantages over one's opponent that force him to play according to one's strategy, so making it easier to advance towards a position of check, or checkmate. This strategic advance of each chess piece can be equated to military advantage and the progressive

advance towards the ultimate submission or defeat of one's enemy.

The concept that the expectation of incidental damage, where innocent people are killed or maimed, should be balanced with the expected, and possibly esoteric, advancement towards the ultimate aim is, on the face of it, an uncomfortable premise. Yet, in accepting that innocents will suffer as a natural consequence of war, the fundamental nature of the principle is a necessary and important stricture to minimize suffering to non-combatants. The measure of whether the principle has proven effective in doing so is to establish how it is interpreted and applied as according to law.

**Proportionality: A critical analysis**
The following analysis will look at the problematic features of the principle of proportionality raised in Part I of this paper. Firstly, how the principle is interpreted and incorporated into military doctrine and government policy will be assessed and any nuances identified. Secondly, and as a result of its interpretation, I will determine how the principle is applied to identify whether doctrinal interpretations of the laws of war suffer in a practical sense.

**Interpretation**
**In military manuals**
The nature of the laws of armed conflict dictates their incorporation into military doctrine and manuals of warfare.[26] One can argue, therefore, that such handbooks offer an insight into how the obligation of proportionality is interpreted by states. For example, whilst the principle of proportionality is given due prominence in the manuals of both the UK and US,[27] the wording reflects a disparity of emphasis. In the UK's primary operational law doctrine, the advice is that

*'[M]ilitary objectives should not be attacked if the attack is likely to cause civilian casualties or damage to civilian objects which would be excessive in relation to the concrete and direct military advantage which the attack is expected to produce.'*[28]

Note that the operative term is *likely* to cause collateral damage balanced against the *expected* advantage. The terminology would suggest one has to be more certain of the military gains of the attack than one has of the chances of injury to the civilian population. I would contend here a slight adjustment in emphasis of the proportionality text. Whereas Protocol I requires an expectation of collateral damage to be weighed against the expectation of military advantage, the UK implies that commanders have to take account of the *possibility* of excessive collateral damage. The balance is rightly phrased on the side of protecting the civilian population but it could be argued, not just in terms of semantics, that probability is easier to quantify in mechanical terms versus a possibility.

In comparison, the US military treat their introduction of proportionality somewhat differently. In the US Operational Law Handbook the paragraph addressing the principle[29] is transcribed more or less exactly from Protocol I (merely substituting 'expected' for the synonym probable) but is enveloped in advice that calls attention to mitigating circumstances of an otherwise disproportionate attack. The Handbook states in the succeeding paragraph that '[i]n judging a commander's actions one must look at the situation *as the commander saw it* in light of all circumstances'.[30] The law echoes this message of mitigation in Protocol I in that the commander 'should do everything feasible'[31] to ensure an attack complies with the laws of war. However, the US manual seems to lessen the importance of the constraint when the mitigation is stressed immediately after it. The treatment of proportionality is given a different slant in the US' Air Force Intelligence Targeting Guide where it is given that '[i]f an attack is carried out efficiently, using the principle of economy of force, against a military installation, it would not be likely to violate this rule'.[32] This assertion would seem to be true, as investigation of alleged disproportionate attacks involving the US, in NATO or *ad hoc* coalitions, have resulted in clearing them of any unlawful act. For instance, following the Kosovo conflict, the Final Report[33] determined that instances of collateral damage were either the result of mistakes or proportional to the military advantage earned.

*By state organs*

Military manuals are just one product evidencing state practice; statements of state organs serve the same purpose. Both the US and UK reiterated prior to and during the two conflicts in the Gulf that the requirements of proportionality were a significant factor of policy:[34] so too did most of the NATO states during the Kosovo campaign.[35] It is arguable, however, that such declarations of policy interpret the principle the same way, especially when addressing whether the principle applies to single or multiple attacks or to the campaign as a whole. The text of Art 51(5)(b) does not illuminate this issue and several countries inserted reservations on its meaning. For example, Italy submitted a Reservation to the purpose that in interpreting the article, the advantage anticipated from an attack refers to the attack 'as a whole and not only from isolated or particular parts of the attack'.[36]

As a further seven countries, including the UK, submitted similar if not identical reservations, this interpretation attracts some weighty support but does not resolve the question. In its commentary on Art 51, the International Committee of the Red Cross (ICRC) merely states that the preceding constraints on warfare in Protocol I succeed in tempering the permissible level of collateral damage, especially in the text of Art 48.[37] However, in discussing the provisions of Art 57(a)(iii) the ICRC provides us with some clarification. The commentary pronounces the interpretative statements as redundant in that 'it goes without saying that an attack carried out in a concerted manner in numerous places can only be judged in its entirety'.[38] The commentary goes on to state that this interpretation 'does not mean that during such an attack actions may be undertaken which would lead to severe' collateral damage.[39] This interpretation would accord with the views of the US and UK in a report published on the conduct of the Gulf War of 1991, where it was stated that proportionality should be, and was, assessed on a target-by-target basis as well as the campaign as a whole.[40] Furthermore, in several cases presented to the UN Security Council involving Israel, the judgements concur with this approach to

*NATO's rationale for including the Serbian television station in the attacks on the command and control structure was that it was an essential node in military radio relay and in the Milosevic propaganda machine. At the time of the attack the television station was occupied by civilian workers and resulted in 16 deaths*

calculation.[41] Thus, one could infer that the component parts of a concerted attack must comply with the proportionality principle as well as the concerted attack as a whole.

The attack on the Serbian communications network during the Kosovo conflict is one such case of an individual attack within a concerted offensive. NATO's rationale for including the Serbian television station in the attacks on the command and control structure was that it was an essential node in military radio relay and in the Milosevic propaganda machine.[42] At the time of the attack the television station was occupied by civilian workers and resulted in 16 deaths.[43] Even leaving aside the question of the station's legitimacy as a military objective, because it was broadcasting again within three hours of the strike calls that the attack was disproportionate seem to be, *prima facie*, merited.[44] However, the Final Report to the Prosecutor reviewing the NATO bombing campaign accepted that the attack was proportionate on the grounds that the attack on the television station must be assessed within the confines of the concerted attack on the command and control system and that the sixteen deaths were in this way proportional to the advantage gained.[45]

The report's conclusions[46] were based upon the judgement of the Court in the *Kupreskic* case,[47] which ruled that individual legal attacks, may, when viewed as a whole, 'not be in keeping with international law'.[48] There is some argument that the report's authors were guilty of misrepresenting the opinion of the Court in taking an opposite viewpoint,[49] yet I would suggest that in turning the question around the report in no way changes the answer.

Despite the ICRC and The Final Report, both regarding the problem of single or multiple attacks in similar ways, there remains some ambiguity. There is also some room for dispute in attempting to quantify the term excessive.[50] What level of collateral damage would be excessive exactly, and will excessiveness change with the tempo of the conflict or in the type of conflict? There is no answer in Protocol I and the ICRC's commentary relies on observance of distinction and military necessity to ensure collateral damage is not excessive in proportional language. Despite the dissatisfaction on these points the principle is not 'a graveyard of good words',[51] merely that whilst doubt exists, dispute will always follow where an attack causes collateral damage. Moreover, any difficulty or difference in interpretation of the proportionality principle will be compounded in its application. It is the application of the proportionality principle that I will next analyze.

**Application**

*Guidance*

The precautionary measures to be carried out by the commander in planning an attack are laid out in Art 57 of Protocol I. Sub-section 2(a)(iii) directs him to the measures to be undertaken to avoid excessive collateral damage in relation to the military advantage. How the commander applies the measures or assesses the probability in quantitative terms is not stated, although requiring the commander to 'take all feasible precautions'[52] to avoid incidental damage suggests the use of intelligence and all other information to advise the assessment.[53] Although the governments of those states involved in the international conflicts of the last two decades have reiterated their intention to minimize collateral damage, both in component form and as a whole, they do not publish the means by which it is calculated.[54] It is a presumption then that an estimation of the number and degree of casualties is made using intelligent surveillance of the military objective and its environs, geo-populational data and the known effects of the weapon. The resulting information is weighed against the military advantage and whether this advantage is solely to be gained from the concerted attack or that of the campaign aim is, again, not provided for in law. In its Commentary the ICRC interprets the expression 'definite military advantage anticipated'[55] to mean "that the advantage concerned should be substantial and relatively close, and that advantages which are hardly perceptible and those which would only appear in the long term should be disregarded".[56] However, it is perhaps naive to think that the campaign's long-term aim will not be a dynamic in the equation. In point of fact, one could argue that the ICRC's interpretation forces a bit-by-bit

**One of the most shocking images of the Kosovo conflict was the attack on a convoy comprising mainly civilians near Djakovica**

*It is not the disproportionality of this shocking incident that is in question, rather the underlying principle that the routine nature of the policy of flying above 15,000 may have led to a greater degree of collateral damage in cumulative terms*

approach to campaign planning rather than a focussed strategy, which could affect the direction and duration of the conflict.

The absence of explicit guidance is not an obstruction to the principle, as factors such as the size of the military objective, its location and the intensity of an operation will be conflict and objective specific. One cannot provide for a low-intensity conflict, such as Bosnia in 1995,[57] in the same way as for a high-intensity one such as the Gulf War of 1991. Similarly, the Protocol can offer no guidance on what would be termed excessive incidental damage for much the same reason.

*Military strategy*

There is a natural impulse on behalf of states to protect one's own forces from attack and they will use all means to facilitate a zero-casualty war.[58] Examples of how the protection can manifest itself can be seen in restrictions imposed on aircraft operating altitudes[59] or in mounting the operational tempo to bring the conflict to an early close. The former policy led to arguably the most memorable images of the Kosovo conflict — the attack on a convoy comprising mainly civilians and civilian vehicles near Djakovica. However, it is not the disproportionality of this shocking incident that is in question, rather the underlying principle that the routine nature of the policy of flying above 15,000 may have led to a greater degree of collateral damage in cumulative terms out of proportion to the military advantage gained. Of course, the military advantage is, as already stated above, just the politico-military gain achieved at the expense of the adversary. Those whose role it is to calculate the advantage and assess the probable effects on civilians are part of the same military machinery, so the question is: can one trust any assessment of proportionality to be equitable? Some scholars feel that the planners will by nature tend to exaggerate the military advantage in weighing the legitimacy of an attack.[60] It is difficult to assess this point, as any analysis of individual attacks will be unable to replicate the circumstances in which the decision was made and it is hard to be objective when benefiting from hindsight.

Additional problems are caused by the inherent secrecy of the military planning environment and the reluctance for the military to show its hand by explaining the strategy in the military advantages of an attack. The reliance is, and will undoubtedly remain, on the guidance laid out in Protocol I. Dependence will also remain on the responsibility for military planners to ensure that attack plans are assessed with the degree of impartiality necessary to protect civilians from the effects of war.

Further ambiguity within the guidance given in Protocol I is in the onus or division of responsibility for acting proportionally when not all relevant factors are under the control of the commander. Most causes of collateral damage, as I have shown, are in consequence to the actions of the attacking forces or their equipment. Nevertheless, actions not under the control of the attacking force can influence the normal course of an attack that apportions liability with the other party to the conflict. For example, military objectives might be deliberately sited or placed in close proximity to, or amongst, civilians and civilian infrastructure, or an adversary might go even further by employing human shields in order to protect his military assets.

*Military objectives and human shields*

The law of armed conflict prohibit the placing of military objectives in or near areas where there is a high concentration of civilians[61] and the employment of civilians to shield targets from attack.[62] That it nevertheless occurs as a matter of norm is not to say that the parties have acted illegally. Quite often the inter-relationship of military objective and civilian object is obscure and is becoming more so with the advances in technology. The technological and infrastructural features are usually the same: both use electrical power, telecommunications pathways and transportation. Economic factors, therefore, dictate that some degree of merging of military and civilian will occur — not in function necessarily but in the feed and use of joint primary resources. In cases like these, it is clear that the responsibility for minimizing incidental damage is that of the attacking force in the requirement to distinguish between civilian and military.

If, however, a party to the conflict was to deliberately locate a military objective in or near the civilian population the onus of responsibility appears, in the absence of Protocol I provisions to say otherwise, to remain with the attacking force; even though such an act is in categorical contravention of the rules of war. The wording of the applicable rules, Arts 51(5)(b) and 57(2)(a)(iii), neither implies joint responsibility, nor that prohibited positioning of military objectives or civilians somehow diminishes the responsibilities of the attacking commander. During the NATO campaign in and against Serbia, an attack on a command post in the village of Korisa caused extensive damage and the death of a great number of displaced Albanians.[63] NATO responded to criticism of the attack by insisting the command post was a legitimate military objective and that from intelligence it had been understood that the village had been evacuated of all civilians.[64] The Final Report to the Prosecutor on the NATO bombing campaign stated that reports suggested that the civilians had been moved into the village for the purpose of shielding the command post.[65] If true, in locating the command post in a village and employing human shields the Serbian military were in violation of the law of armed conflict. Whether they were also complicit in ensuring disproportionate results of the NATO attack appears to be of little consequence in comparison.

Less clear is the responsibility for the disproportionate deaths of a reported 300[66] civilians from the Coalition attack on the Al-Firdus Bunker during the 1991 Gulf War. The bunker had been built as a civilian air-raid shelter during the Iran-Iraq War but the Coalition believed, a decade later, that it was being used as a command and control bunker. Coalition intelligence identified the presence of camouflage and barbed wire around the entrances, and armed guards posted at control of entry points. In briefings during and after the war, the Coalition said that they believed that the Iraqi authorities had allowed the families of officer personnel working in the bunker to use the upper floors above the command and control facility to shelter from aerial attack.[67] According to international humanitarian law, a civilian object loses its protection from attack once its purpose

changes from that of a civilian nature to a military one.[68] In this sense the Coalition calculated the probability of civilian casualties taking into consideration their understanding of the revised purpose of the bunker, and not taking into account the (unknown) presence of civilians on the night of the attack. One can carefully state that the renewed status of the bunker and the attack upon it was consequently proportionate. This stance was put forward by the Coalition in placing responsibility for the resultant deaths at the door of Saddam Hussein and his regime for failing to 'honor his own law of war obligations'.[69]

Hindsight renders the attack, like that of Korisa, wholly disproportionate yet one has to take into consideration that hindsight is a wonderful but future-dependent thing and only those circumstances ruling at the time can dictate the course of events.

**Conclusion**

The lack of precision found in the principle as it stands in the codified light of Protocol I would seem to operate in the interests of the military.[70] The Protocol delegates to the commander the responsibility to ensure the tenets of proportionality are met, yet offers minimal guidance on how he is to execute this responsibility. It is perhaps, then, not surprising that this delegation encounters divergent opinions of the proportionality of attacks during conflict.

To compound the probability of misunderstanding, the nature of secrecy in military planning dictates that the military planners are most able to verify that the obligation of proportionality was met subsequent to their attack. They and they alone knew the military advantage sought, what was the acceptable level of collateral damage balanced against that advantage, and the intelligence that informed the assessment. Without making observers and the other parties to the conflict privy to the set values or to the desired advantage, it seems that this situation will not change. Similarly, in the reliance of those circumstances ruling at the time and the impossibility of retrospective assessment, it is difficult to imagine that any international tribunal could successfully prosecute disproportionate acts.[71]

However, rewording the proportionality articles in Protocol I to add more detailed guidance for its application would be unachievable. The task of importing text that could contend with the multi-faceted conflicts of, say, Kosovo while retaining enough flexibility for the new hybrid of internationalized internal conflict would be overwhelming. Less evasiveness on the part of the states' militaries to reveal their techniques of calculating collateral damage would go some way in assuring a degree of adjudication after the fact, as well as substantiating their observance of the law.

The one area in which the articles would benefit from further study would be in the manner of clarification. Statements of clarification on what constitutes a calculable attack, multiple and single, and the associated proximity, duration and extent of military advantage would certainly fortify the principle. That the principle remains a viable if frail rule of international law would seem, in lieu of the inadequacies raised in this essay, to ignore its manifest iniquities. But if the principle were to be declared obsolete, the consequences for those civilians caught up in warfare would indeed be dire.

**ANNEX A**
**British Defence Doctrine**
**Joint Warfare Publication 0-01 — Extract**
**JWP 0-01**

**The Selection and Maintenance of the Aim**

In the conduct of war as a whole, and in every operation within it, it is essential to select and clearly define the aim. The ultimate aim in war is to break the enemy's will to fight. Each phase of the war and each separate operation is directed towards this supreme aim, but will have a more limited aim, which must be clearly defined, simple and direct. Once the aim is decided, all efforts are directed to its attainment until a changed situation calls for re-appreciation and probably a new aim. Every plan or action must

be tested by its bearing on the chosen aim. The selection and maintenance of the aim is regarded as the' Master Principle'. It has therefore been placed first in the list. The remaining principles are not given in any particular order since their relative importance varies according to the nature of the operation.

**Maintenance of Morale**
Success in war often depends more on moral than on physical qualities. Numbers, armament and resources cannot compensate for lack of courage, energy, determination, skill and the bold offensive spirit that springs from a national determination to succeed. The development and subsequent maintenance of the qualities of morale are, therefore, essential to success in war.

**Offensive Action**
Offensive action is the necessary forerunner of success; it may be delayed, but until the initiative is seized and the offensive taken, success is unlikely.

**Security**
A sufficient degree of security is essential in order to obtain freedom of action to launch a bold offensive in pursuit of the selected aim. This entails adequate defence of high value assets and information that are vital to the nation or the armed forces. Security does not, however, imply undue caution and avoidance of all risks, for bold action is essential to success in war. On the contrary, with security provided for, unexpected developments are unlikely to interfere seriously with the pursuit of a vigorous offensive.

**Surprise**
Surprise is a most effective and powerful influence in war and its moral effect is very great. Every endeavour is made to surprise the enemy and to guard against being surprised. By the use of surprise, results out of all proportion to the efforts expended can be obtained and, in some operations, when other factors are unfavourable, surprise may be essential to success. Surprise can be achieved strategically, operationally . . .
[3-2 2nd Edition]

**ANNEX B**
**UK Doctrine for Joint and Multinational Operationa**
**(Joint Warfare publication 0-10) — Extracts**
**JWP 0-10**

**ANNEX 6A — LAW OF ARMED CONFLICT**

6A1. Those involved in joint operations should first be aware of the distinction between the law which governs the right of States to resort to armed force and the rules in the Law of Armed Conflict (LOAC) which have to be observed by the combatants in the prosecution of the conflict.

6A2. **Limits on the Use of Force**. Until the early twentieth century, international law imposed no real limitation on the right of states to go to war to resolve their differences. However, following the First World War, the major world powers, through the Covenant of the League of Nations in 1919, agreed to restrictions on the recourse to war. Later, in the Pact of Paris of 1928, those same powers agreed to renounce the use of war as an instrument of policy. The United Nations (UN) Charter took this process further by requiring states to 'refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the purposes of the UN'. So the UN Charter requires that international disputes be settled by peaceful means. Armed force may only be permitted in the following circumstances:

a. When mandated by resolution of the Security Council (to restore international peace and security).

b. When used for the purposes of the individual or collective self defence (under Article 51 UN Charter). This includes defending one's own state against an armed attack and coming to the aid of other Allied nations (NATO Treaty Article 5), but might also encompass intervention in another state to protect or rescue one's own nationals.

In addition, international law appears to recognise a further category of intervention. Although the

principle of state sovereignty is paramount in the UN Charter, the international community appears to have accepted the principle of humanitarian intervention in another state's affairs in breach of its territorial integrity and sovereignty where extreme humanitarian need exists (eg. No Fly Zones in North and South Iraq).

6A3. **Proportionality and the Law**. In the event that force is used in these circumstances, it should be only that necessary and proportionate to meet the threat or restore peace and security; this has significant implications for commanders at the operational and tactical levels in planning and conduct of operations in terms of geographical area of operations, size of forces and type and nature of targets and weaponry which can legally be brought to bear. In all cases, members of the Armed Forces, irrespective of their rank or command responsibility, are obliged to act within the law.
[6A-1 2nd Edition]

**JWP 0-10**
c. Distinction. Attacks should be limited to military objectives only and the civilian population and civilian 'objects' shall not be made the object of attack. Specifically a military objective is an object which by its nature, location, purpose or use makes an effective contribution to military action and whose total or partial destruction, capture or neutralisation in the circumstances ruling at the time offers a definite military advantage. The civilian population as such and individual civilians shall not be the objects of attack. (Civilians lose such protection if they take direct part in hostilities and civilian objects may become legitimate military objectives if they contain military personnel or equipment or supplies or are otherwise associated with combat activity incompatible with their civilian status).

d. **Proportionality**. Military objectives shall not be attacked if the attack is likely to cause civilian casualties or damage to civilian objects which would be excessive in relation to the concrete and direct military advantage which the attack is expected to produce.

6A8. **The Application of Law of Armed Conflict in Joint Operations**. The increased destructiveness of modem weapons has led to much greater emphasis on the importance of targeting. As well as restating the principles set out in paragraphs 6A2 -6A5 above, Protocol I to the Geneva Conventions clarified a number of other rules on targeting as well as introducing a number of additional rules. These include the following:

a. Attacks which are indiscriminate are forbidden. Methods or means of warfare which would cause unnecessary suffering are prohibited.

b. Attacks against the civilian population are prohibited.

c. Acts of hostility against cultural objects or places of worship, which are not military objectives, are prohibited.

d. It is normally prohibited to destroy remove or render useless objects indispensable to the survival of the civilian population.

e. Works or installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations, shall not be attacked unless those objects are being used other than for their normal function and are providing regular, significant and direct support to military operations and such attack is the only feasible way to terminate such support.

However, the mere presence of civilians in a zone or armed conflict does not necessarily prevent military action, and the risk that civilians will be killed or injured as a result of an attack on a military objective does not render that attack unlawful, provided that the proportionality rule is satisfied.
[6A-3 2nd Edition]

**Notes**

1 Hereafter Protocol I.

2 Schachter cited in Arend & Beck, 1993: 166.

3 See the Final Report to the Prosecutor on the conduct of the NATO Bombing Campaign in Kosovo (hereafter Final Report) (2000) at para. 19. In addition, see inter alia, Dinstein, 2001: 184; Fischer, 1999: 88; Gardam, 1993:405; Gasser, 1995: 221 at 509(3); Nardin, 1993: 291; Robertson, 2002: 179. For an assessment of the principles application in the wars of the future, see Gilbert, 2003: 77, 125-26.

4 See, inter alia, BBC News Online (1998); BBC News 24 (2003a);

BBC News 24 (2003b); Macwhirter, 2001; Radio Netherlands (2004); Rosenblatt, L. (1998); Sky News (2003); Weigel, G. (2002).
5 Arend, 1993: 14.
6 Ibid.
7 Art 44.
8 Arts 34 and 35.
9 Art 13.
10 Oeter, 1995: 115.
11 See The Hague Declaration (1899); The Hague Convention IV (1907) Art 23(e); and, further, Protocol I Art 35(2).
12 Art 22.
13 Art 23(e).
14 Art 25.
15 Art 23(g).
16 See inter alia, Greenwood, 1995: 30; Lacey & Bill, 2001: 8-9; JWP 0-10, 2002: 6A-1.
17 Nicaragua Case (Merits), at 176; The Caroline Case xxx. 193.
18 Schindler & Toman, cited in Green, 200: 47. Green reproduces the Resolution at ibid 48-9.
19 Art 48, and further Art 51(4) & (5) and 57(2)(a)(iii).
20 Roberts & Guelff, 2000: 449. Emphasis added.
21 Protocol I Art 57.
22 Fischer, 1999: 88.
23 Protocol I Arts 51(5)(b) and 57.
24 The San Remo Manual Art 13(c) defines collateral casualties or collateral damage as "the loss of life of, or injury to civilians or other protected persons, and damage to or destruction of . . . objects that are not in themselves military objectives".
25 JWP 0-01, 2001: 3-2.
26 Indeed, this is an obligation built into most international humanitarian law. See Protocol I, Art 83(1).
27 Although not parties to Protocol I the US have affirmed the principle of proportionality to be declatory of customary international law. Lacey & Bill, 2001: 8.
28 JWP 0-10, 2002: 6A-3.
29 Lacey & Bill, 2001: 9.
30 Ibid, emphasis in the original.
31 Art 57(2)(a)(i) and (ii). Italy inserted a statement of understanding that 'the word feasible means that which is practicable or practically possible, taking into account all circumstances ruling at the time' (at B). Several states inserted the same or similar statements.
32 USAF 14-210, 1998: 149 at A4.3.1.2.
33 2000: passim.
34 E.g. BBC News 24, 2003b; Sky News, 2003; US DoD, 1992: 99-100.
35 Clark, 2001: 218, 221, 226-27.
36 See Italy's Reservation (E).
37 ICRC: 625-26.
38 Ibid: 685 at 2218.
39 Ibid.
40 US DoD, 1992: 611.
41 UNSCR 262 (1968): 12; UNSCR 573 (1985): 23.
42 The Final Report, 2000: at 74.
43 Amnesty International, 2000:64.
44 Ibid.
45 2000: at 78.
46 Ibid.
47 No IT-95-16-T, 207 at 526, 14 Jan 2000.
48 Ibid at 526.
49 Ronzitti, 2000: 7; Lausen, 2000: 792.
50 Art 51(5)(b).
51 Robertson, 2002: 179. See, inter alia, Gray, 2000: 106-07; Dinstein, 2001: 197-98; US DoD, 1992: 611.
52 Art 57(2)(a)(ii).
53 See the Reservations inserted by Italy (at D) and the UK (at c).
54 The Daily Telegraph reported Prime Minister Tony Blair's speech to the House of Commons on 20 March 2003 when he said that the 'British forces will do everything' to ensure the minimization of civilian casualties (Jones, 2003). Following a more than usually candid press briefing by senior military officers and legal advisers, The Daily Telegraph set out the nation's policy on the political and legal clearance of targets for the war in Iraq. The briefing, however, fell short of revealing the process of calculation and the threshold of acceptable collateral damage (Tweedie, 2003).
55 Art 51(5)(b).
56 ICRC: 684 at 2209.
57 NATO conducted air strikes on two ammunition storage bunkers in response to Serbia's breach of the cease-fire.
58 The term is used by Rogers, 2000.
59 NATO's aircraft adopted a height limitation during the Kosovo conflict in 1999. The aircrew routinely operated at a height of 15,000 feet, placing them above the range of Serbia's anti-aircraft fire but well within the range of criticism as being unable to effectively distinguish their targets. See Amnesty International, 2000: 60; The Final Report, 2000 at 69; Rogers, 2000.
60 Gardam, 1993: 407; Rowe, 2000.
61 Art 48, comprising the Basic Rule of the protection of civilians, and specifically Arts 56(5) and 58(b).
62 Ibid and also Arts 12(4), 51(7) and 58(a).
63 Amnesty International, 2000: 71-72. Serbia put the death toll at 87, and a further 78 people wounded (ibid).
64 Final Report, 2000: 88
65 Ibid: 88-89.
66 Smyth, 1999: 164.
67 US DoD, 1992: 615.
68 Art 52.
69 US DoD, 1992: 615.
70 Gardam, 1993: 407.
71 Gilbert, 2003: 125-26.

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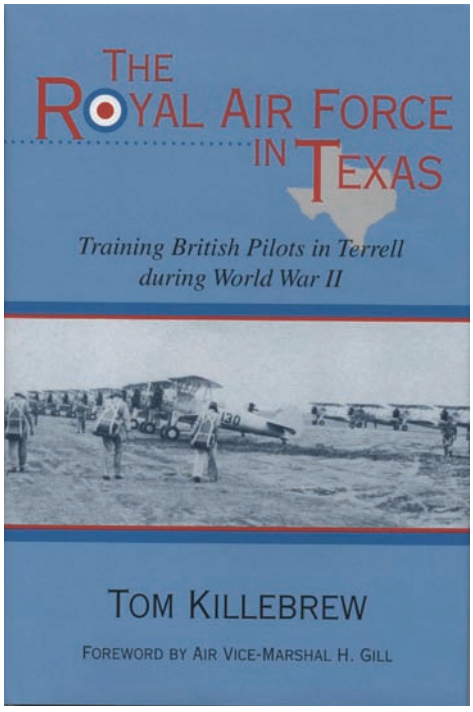


## The Royal Air Force in Texas

### By Tom Killebrew

Publisher: University of North Texas Press

ISBN 1-57441-169-1

Price $26.95 (208 pages, hardcover)

Reviewed by Gp Capt Neville Parton

There are many aspects of the Royal Air Force's history that are not well known, and this engaging book fills in an important part of one of these — namely the training of RAF pilots in the United States in general, and in Texas in particular. Whilst many are aware of the instruction carried out in the Dominions under the Empire Air Training Scheme (later to become the British Commonwealth Air Training Plan), the story of the 13,000-plus pilots who trained in America is far less familiar. The need to instruct pilots outside of the United Kingdom was recognised early on by the RAF: limitations imposed by poor weather, blackouts, and in the early war years the threat of attack by enemy aircraft, all combined to limit the number of aircrew that could be produced on the home front.

The first and second chapters provide the background to the setting up of the three programmes which allowed British pilots to train in the United States, these comprising the Arnold and Towers Schemes (integrating British students into extant US AAC and USN flying training programmes) and the British Flying Training Schools (BFTS), and it is the story of one such school in particular - Number 1 BFTS — that this book concentrates on. However, it includes both the most senior-level policy discussions between Governments as well as detailing the individuals at a local level in Texas who would play such a pivotal role in bringing the School to fruition. Chapters three and four examine in detail the setting up of the School, the aircraft and associated training programme, and the experiences of the very first course members who arrived before America had even entered the war. The author does not shy away from some of the more problematic issues either, such as differences over attitudes towards racial segregation — and the culture shock of arriving in affluent America from a war-torn and much rationed Britain. The entry of America into the war, and the impact of this on the School, are covered in chapters five and six; looking at such aspects as the replacement of non-essential staff with women, who rapidly took on the roles of Link Instructors and running the control tower, as well as the take-up of surplus places on the courses by US AAC cadets. The growing interaction of the

RAF cadets with the local population, to their obviously mutual benefit, is well described, as is the obvious pride that the citizens of Terrell had in the exploits of 'their' ex-students, including Flight Sergeant Arthur Aaron who was (posthumously) awarded the Victoria Cross in 1943.

The penultimate chapter follows the School through to its closure as the need for pilots rapidly reduced — although not before showing how clearly the training requirements for pilots had changed over the four years of operation. The original 150 hour all-through training programme involved cross-country flights of up to a couple of hundred miles in length, but by 1945 two thousand mile flights were being carried out by up to 15 aircraft operating together. The epilogue provides a link between the past and the present in the shape of the story of the final memorial to those airmen who had died whilst training such a long way from home. It is clear throughout that the town of Terrell, Texas, is still proud of its British visitors and the part that they played in what is accurately described as "One of the greatest wartime cooperative ventures ever undertaken between nations".

Killebrew's book is an entertaining read at both the macro- and micro- level, describing the policy-level considerations that led to the setting up of the various United States training schemes, as well as conjuring up the emotional responses of both the cadets undergoing training and the local inhabitants who showered them with hospitality. This book clearly illustrates, at the most personal of levels, the special relationship that exists between the United States and the United Kingdom, and is a salutary reminder of whence the foundations of such a relationship come. At times comic, occasionally extremely poignant, it tells its story in a straightforward and eminently readable manner and is recommended to anyone with a specific interest in RAF pilot training during World War 2, as well as the more general reader who appreciates a small slice of social history.


# Lettice Curtis – Her Autobiography

## By Lettice Curtis

Published by Red Kite, Walton on Thames, 2004

ISBN 0-9546201-1-9

Price £19.95 (250 pages, hardcover)

Reviewed by Chris Hobson

The name of Miss Lettice Curtis is well known in British aviation circles. One of a small number of women pilots who joined the Air Transport Auxiliary during the Second World War,

# Books

she ferried a wide variety of aircraft throughout the United Kingdom and became the first female ATA pilot to be qualified on four-engine bombers. In 1971 she wrote *Forgotten Pilots*, the closest thing there has ever been to an official history of the ATA, and a most valuable reference book on this unique and often overlooked organisation.

Her long-awaited autobiography is a remarkable record of a very full and active life. Although best known for her years with the Air Transport Auxiliary, Lettice Curtis has had a long and very distinguished career in aviation starting with her first flying lesson in 1937. After the wartime years with the ATA, she had test flying jobs at Boscombe Down and with Fairey Aviation and also found time to take part in the light aviation scene in Britain. One of her final achievements in aviation came in 1992 when she obtained her helicopter pilot's licence. Through the pages of this book it is obvious that she has pursued this career with great determination, often in the face of male prejudice and official indifference. A lesser person might have admitted defeat or become embittered by the experience, but Lettice proved her value through her professionalism and dogged determination to become accepted as an equal. Today's female aircrew can thank Lettice Curtis and her contemporaries for blazing the way towards acceptance of the fact that women can fly aircraft just as well as men.

This book is a most enjoyable read, a story told with verve and good humour. There are some excellent anecdotes about the 'seat-of-pants' flying days of wartime ferry flying where ATA pilots sometimes had no formal training on the types they were asked to fly and were expected to become competent simply by reading the Pilot's Notes! It is amazing that the accident rate of the ATA was as low as it was and that this was the case was probably due to the experience of the pilots, many of whom were ex-Service or commercial airline pilots. The story of Lettice's only serious accident, which happened when a Typhoon's engine failed on the approach to the Hawker factory at Langley, is well worth reading for the saga of her trying to obtain medical attention after the accident (it happened on a Saturday!). The tales of post-war tropical trials with the Miles Marathon and Fairey Gannet in East Africa and an epic delivery flight of a Lincoln bomber to Australia are also highly entertaining. Another job that Lettice had after the end of the War was to fly the Spitfire XI that belonged to the American Civil Air Attaché to Britain. This included flying the aircraft in several air races that were a popular event in the immediate post-War years.

This is one of those books that are very difficult to put down once you pick it up. It tells a great story of more than 50 years of British aviation as seen through the eyes of one very remarkable lady.

# Notices

## ROYAL AIR FORCE HISTORICAL SOCIETY

Formed in July 1986 to study the history of air power, the RAF Historical Society examines such topics as the Strategic Bomber Offensive of World War ll, the V-Force, various air campaigns, and further aspects of modern air power. The Society holds lectures, seminars and discussions, bringing together those involved in RAF activities past and present, at a membership fee of £15 a year.

Please contact:
Dr Jack Dunham, Silverhill House, Coombe, Wotton under Edge, Glos, GL 12 7ND.
Tel: 01453 843362.

## ST. CLEMENT DANES, STRAND, LONDON CENTRAL CHURCH OF THE ROYAL AIR FORCE

This beautiful Wren Church, which is also the Royal Air Force Central Church, has a world-wide following and is open daily from 09.00 am – 4.00 pm. There is Choral Eucharist or Matins every Sunday at 11.00 am, sung by the famous choir. Civilians and all members of the Armed Forces are welcome to visit the church and attend the services.

# Air Power Review Reader Survey

## Make a Difference to the future of Air Power Review

**APR kindly requests your opinions about the Journal — past, present & future — from reading requirements and publication frequency, to editorial content and future changes.**

**Tell us about your likes and dislikes. We would like to know what you think!**

**Please cut along the dotted lines as indicated overleaf and mail your completed survey to:**

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## MILITARY READERS

| | | | Tick box |
|---|---|---|---|
| 1 | **What rank are you?** | JNCO/Airman | |
| | | SNCO | |
| | | Fg Off-Flt Lt/Lt-Capt | |
| | | Sqn Ldr/Maj | |
| | | Wg Cdr/Lt Col | |
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| | | Air Cdre or above/Brig or above | |
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| 3 | **What motivates you to read Air Power Review?** | Personal interest | |
| | | Professional development | |
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| | | Occasionally | |
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| | | Some articles | |
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| | | Reduced frequency of publication | |
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| | | More academic content | |
| | | Less academic content | |
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Cut along line

Cut along line

## CIVILIAN READERS

| | | | Tick box |
|---|---|---|---|
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| | | More academic content | |
| | | Less academic content | |
| | **Other changes** *(Answer below)* | | |

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