ISSN 1463-6298

ROYAL AIR FORCE

# AIR POWER REVIEW

Volume 12 Number 1 Spring 2009



Centre for Air Power Studies

# ROYAL AIR FORCE
# AIR POWER REVIEW

The Royal Air Force Air Power Review is produced under the auspices of the Director of Defence Studies (RAF). The publication aims to support the British armed forces in general and the Royal Air Force in particular by developing thinking about the application of air power. The intention is to provide a forum for high quality and academically credible articles on air and space power, with the objective of stimulating debate and promoting the evolution of air and space power thinking within the broader military and academic communities. Authors are, therefore, encouraged to challenge accepted norms and offer novel conclusions; consequently, the views expressed in this journal are not endorsed by either the Editor or the Royal Air Force and do not represent statements of official policy.

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Articles should be original and preferably unpublished, although important papers of particular merit will not be precluded. Articles should comply fully with the style guide published at the RAF Centre for Air Power (RAF CAPS) website, www.airpowerstudies.co.uk ; essentially they should be between 2,000 and 10,000 words in length, list bibliographical references as end-notes, and state a word count. Lengthier articles may be published in instalments and contributions from serving military personnel must be made in accordance with 2008DIN03-020.

Material should be submitted in Microsoft Word on CD or by e-mail and should be accompanied, or followed, by a numbered page copy plus any photographs and illustrations. Digital pictures should be saved as TIFFs or JPEGs @ 300dpi. Final design format for article presentation on the printed page will be at the discretion of the Editor.

**Send articles to:**

Director of Defence Studies (RAF)
Headquarters Defence Academy
Shrivenham
Swindon
Wiltshire
SN6 8LA
E-mail: obarnes.dds@da.mod.uk

**Editor**
Director Defence Studies (RAF)

**Production and Design**
Media Services

General enquires on Journal distribution may be made to the following address:

**Deputy Director of Defence Studies (RAF)**
**Headquarters Defence Academy**
**Shrivenham**
**Swindon**
**Wiltshire**
**SN6 8LA**
**Tel: 01793 314847**
**E-mail: obarnes.dds@da.mod.uk**

Those wishing to be placed on the distribution list should write direct to the Editor





**Photographs courtesy of:**
AirTeamImages.com (Commerical)
Defence Image Database (MoD)
Fleet Air Arm Museum (MoD)
US Department of Defense (DoD)

**Print:**
No1 AIDU, RAF Northolt

ROYAL AIR FORCE

# AIR POWER REVIEW

Volume 12 Number 1 Spring 2009

# Foreword

This edition of *Air Power Review* covers a wide and eclectic range of topics, but all – even the apparently historical essays - are linked by their relevance to the current development of air power. For example, while Franco-British co-operation in the air is almost as old as aviation itself, recent initiatives to renew these links, particularly in the sharing of doctrinal and conceptual thinking, are very pertinent, given France's aspiration to return to NATO as a full military partner. In this context, Peter Dye's opening essay is particularly relevant in reminding us how critical the French contribution was to the development of British military aviation, an influence now largely forgotten. He examines the political, social and military aspects of the relationship between Britain and France to demonstrate how Trenchard's vision for an independent air force and the enduring doctrine and ethos of the RAF were shaped by this interaction. As always with effective examples of co-operation, personalities were all-importantand the relationship between Trenchard and his French counterpart, Commandant Paul du Peuty, was key.

Similarly, the recent focus on air-land integration has tended to force the relationship between the air and maritime components into the background. John Abbateilo's essay on the work of the Royal Naval Air Service and Royal Air Force in anti-submarine warfare in the First World War is, therefore, a timely reminder that the joint campaign may be air-maritime as well as air-land. He examines three categories of anti-submarine mission to argue that although bombing and patrolling contributed to the failure of the unrestricted U-boat campaign, convoys served as the ultimate antidote and their effectiveness was hugely enhanced by aviation. Abbateilo challenges some aspects of the accepted historical record and concludes that command and organizational constraints were the root cause of the inconsistencies that were so apparent in the employment of aircraft in the maritime environment.

Brian Armstrong also challenges received wisdom in a fascinating study of the impact of the Spanish Civil War on British air power thinking. Although the RAF is generally perceived to have ignored the lessons of the Spanish Civil War, he uses detailed primary research to demonstrate that rigorous analysis was, in fact, conducted through the work of two special joint air war intelligence committees, and charts the influence of their findings on the RAF's leadership as critical decisions were made in the late thirties about

bomber, fighter, close-support and weapons policy.

The development of doctrine may, on the face of it, be a dry topic, but Chris Finn's article is also particularly timely in providing a historiography of the *AP3000* series of strategic air doctrine; his article provides a very useful background to the genesis of the long awaited Fourth Edition of *AP3000*, which is just about to be published, and it should be noted that this has itself been heavily influenced by the thinking outlined by Air Commodore Paul Colley in his article 'Soldiers are from Mars, Airmen are from Venus – Does Air Power do what it says on the Tin?' in *APR* Volume 11, No 2.

Russia's use of air power in the rapid military victory over Georgia in August 2008 is clearly a topic of real contemporary interest for air power practioners. Despite her success in the South Caucasus, within two months of the end of hostilities, Russia had initiated an ambitious military reform and modernization agenda to reflect lessons learned from the campaign. Stéphane Lefebvre and Roger McDermott examine Russian airpower in the Georgia war in the context of this reform plan, and also consider its implications for Russia's future use of air power; their analysis of the operational failings of Russian airpower and their critical examination of the underlying assumptions of the reform process are of particular interest.

The inauguration of Barak Obama has, if anything, increased the rhetoric about the transatlantic air power capability gap and Europe's contribution to current operations, particularly in support of NATO's mission in Afghanistan. Christian Anrig's essay regarding Europe's 'Quest for Relevant Air Power' is again very timely. He scrutinises the realities of European participation in deployed operations and examines European alliance frameworks, air power deficiencies and potential remedies to propose four potential guidelines for the development of relevant and flexible European air power.

Finally, this edition of *APR* concludes with three regular features: Group Captain Carl Scott's 'Letter from America', which provides a fascinating insight into deterrence in the contemporary world, Air Commodore Neville Parton's historic book review of Lord Tedder's famous 1947 work, *Air Power in War*, an illuminating insight into the thinking of one of the prime architects of air-land integration, and a provocative *Viewpoint* from Squadron Leader Andrew Wilson, who asserts that 'They Did It To Themselves.' He bemoans the consequences stemming

from what he regards as the airmen's tendency to over-promise and under-deliver; this is a controversial contention and *APR* would welcome an alternative perspective to continue this particular debate.

Finally, the next edition of *Air Power Review* (summer 2009) will be another in the recent series of 'specials,' themed around the topic of Space to celebrate the fortieth anniversary of the lunar landing and explore the increasing importance of space in current military operations. Articles on any air power-related themes are now welcome for the winter 2009 edition of *APR*, and potential contributors may also wish to be aware that as 2010 marks the twentieth anniversary of the RAF's deployment to Iraq, the summer edition will be devoted to an analysis of the two decades of continuous air operations conducted in and over that state. As there must be few serving personnel who have been unaffected by Iraq there should be no shortage of contributions and viewpoints, which should be submitted in accordance with the guidance at the RAF Centre for Air Power Studies (RAF CAPS) website, www.airpowerstudies.co.uk.

**RAF CAPS Prizes**

The *Air Power Review* editorial board sat on 12 February 2009 to consider the award of prizes for 2008. The *Gordon Shephard Memorial Prize* is awarded annually to the best essay on an air power-related theme submitted to the RAF Centre for Air Power Studies (RAF CAPS); except for the war years, the competition has taken place annually since 1919, the prize money being provided from the income of a trust established in 1918 by Sir Horatio Hale Shephard in memory of his son, Brigadier G F Shephard DSO MC RAF. The board determined that the Gordon Shephard Memorial Prize for 2007, worth £200, should be awarded to Wing Commander Rob O'Dell, for his article 'Electronic Warfare and the Night Bomber Offensive' published in *APR* Volume 10, Number 1, Spring 2007. The prize for 2008 was awarded to Wing Commander Simon Harper, for his article 'What is Meant by Harmonisation and What are the Implications for the RAF?', published in APR Volume 11, Number 1, Spring 2008, and the subject of Wing Commander Harper's excellent presentation at the Chief of the Air Staff's Air Power Conference in November 2008. Second place in the Gordon Shephard Memorial Prize Competition is worth £175, and was awarded to Wing Commander Bryan Hunt for his timely and informative article in *APR* Volume 11, Number 1, Spring 2008, 'Air Power and Psychological Warfare Operations, Malaya 1948-1960.'

The *Park Prize* is awarded annually to the best essay on an air power-related theme submitted to the RAF Centre for Air Power Studies by a serving RAF junior officer, non-commissioned officer, airman or airwoman. The winner of the Park Prize for 2008 is Flight Lieutenant Kenny Fuchter for a well-researched and original essay 'Air Power and China in the 21st Century,' published in *APR* Volume 11, Number 3, Winter 2008. Finally, The *Salmond Prize* is awarded to the best essay on an air power-related theme submitted by a civilian or non-RAF serviceman or servicewomen of

any service or nationality, and was awarded to Major Andrew Roe for a lively account of interwar counter-insurgency operations in *APR* Volume 11, Number 2, 'Friends in High Places: Air power on the North-West Frontier of India.'

The *APR* editorial board congratulates all prize-winners. Details of the prizes and awards may be found at the RAF CAPS website and the Gordon Shephard Memorial Prize Competition is covered by a separate DIN.

# "Air Power and the Environment: The Ecological Implications of Modern Air Warfare"

**The Conference of:**

**The Air Power Studies Division,**

**King's College London**

**and**

**The Royal Air Force**

**Centre for Air Power Studies**

KING'S College LONDON

ROYAL AIR FORCE

Centre for Air Power Studies

**Concordia res parvae crescent**

*"Work together to accomplish more"*

## Royal Air Force College Cranwell
## United Kingdom
## 26 and 27 August 2009

Environmental responsibility already lies at the forefront of our western world perspective and is constantly growing in importance. Ecological activism, which used to be a fringe movement, has now become mainstream. In 2007 Al Gore and the Intergovernmental Panel on Climate Change won the Nobel Peace Prize (and an Oscar!) for their efforts to raise environmental awareness. Greenpeace, which uses "non-violent, creative confrontation to expose global environmental problems," alone has no fewer than 220,000 members in the UK and 2.8 million worldwide. Ecologists, environmentalists, activists, lobbyists and of course strategists are already turning their attention to ecological aspects of modern warfare, including land mines, cluster ordnance, erosion and soil damage, air pollution, deforestation, nuclear testing and proliferation, oil spillage and fires, DU contamination, the disposal of ordnance, and so forth. It seems likely that such concerns will also become increasingly mainstream.

As a consequence, governments and their armed forces will doubtless be paying more attention to the serious ecological ramifications of conflict. Some already are. The Global Strategic Trends paper published by the MOD's Development, Concepts and Doctrine Centre (DCDC) illustrates the importance now being placed on these matters by cutting-edge British strategists. Balancing strategic and operational needs with both military and environmental ethics is certainly not impossible, and responsible armed forces, including the Royal Air Force, are already thinking deeply about how best to balance what superficially seem to be (but actually are not) competing imperatives.

This highly innovative conference – the first on this topic in the United Kingdom – will touch on several broader security themes and topics but will focus especially on the concepts and practices of modern air power and their environmental implications.

This conference will be held at the historic and prestigious Royal Air Force College, the spiritual home of the RAF. ***The cost to attendees is £95.*** This covers accommodation for the night of Wednesday 26 August, all food including a Conference Dinner in College Hall and basic refreshments for the duration of the Conference.

***Welcome and Closing: Air Marshal Stephen Dalton,*** CB BSc FRAeS FCMI RAF, Chief of the Air Staff (Designate),

***Conference Convenor: Dr Joel Hayward,*** Dean of the Royal Air Force College

***Keynote Addresses: Victor W Sidel, MD,*** "The Impact of War on the Environment, Public Health, and Natural Resources' and ***Dr Phillip S Meilinger,*** "The Role of Air Power in Reducing Collateral Damage in War"

***Speakers (This programme may be subject to alteration):***

- ***Air University,*** Panel Discussion,"Air Power: Environmental Security for AFRICOM"
- ***Heather Hrychuk,*** "The Canadian Air Force's Environmental Evolution"
- ***Peter Lee,*** "Just War and the Environment: Rethinking Proportionality"
- ***Michael J and Sarah Masterson,***"Fighting the Good (Green) Fight?"
- ***Jim Morgan and Terry Yonkers,***"Air Power and the Environment within Combat Threat Zones: A Mission Support Contractor's Perspective"
- ***Evelyn Krache Morris,***"The Forest and the Trees: Aerial Herbicide Spraying and the Environment"
- ***Mark A Olinger,*** US Army,"Air Power and the Targeting of a Nation's Energy Based Sector"
- ***Chris Rein,*** USAF,"The Environmental Impact of the US Army Air Force's Production and Training Infrastructure on the Great Plains"
- ***Sebastian Ritchie,***"The flooding of Walcheren Island, October 1944"
- ***Tara Smith,***"Legal Obligations and Voluntary Commitments: Should the Weakness of Environmental Humanitarian Law be a Cause for Concern?"
- ***Toby Thacker,***"Environmental Considerations in the Planning for the British Strategic Bombing of Germany, 1939-1945"
- ***Mr Siemon Wezeman,***"Cluster Munitions and the Environment"
- ***Mr Dimitrios Ziakkas,***"Building Synthetic Training in the Air"

For more details and Registration go to http://www.airpowerstudies.co.uk/august09conference.htm

# Notes on Contributors

**Air Vice-Marshal Peter Dye** served for 36 years in the Royal Air Force. Commissioned in 1972, he served in a variety of engineering related appointments as well as training and personnel policy. He joined the Royal Air Force Museum in 2008, as Deputy Director General and Director Collections. Awarded a Portal Fellowship in 2007, he is currently researching the Royal Flying Corp's Logistic Organisation on the Western Front. He has written numerous articles over recent years for Air Power Review, largely relating to logistics.

**Colonel John J. Abbatiello**, USAF, completed his PhD in War Studies at King's College London in 2004. He is the author of Anti-Submarine Warfare in World War I: British Naval Aviation and the Defeat of the U-Boats (Routledge, 2006), and he specializes in airpower, naval, and Great War history. Abbatiello is a command pilot with over 3,500 flying hours; he flew EC/KC-135, T-37 and E-8C JSTARS aircraft during his 22-year career. He currently serves as Deputy Head, Department of History, USAF Academy, Colorado.

**Squadron Leader Brian Armstrong** retired from the RAF in 1997 following an 18-year career navigating Victor tankers and Tornado in the strike, attack and reconnaissance roles. He joined AgustaWestland Helicopters in 1998 and is currently researching the RAF's attempts to ascertain the progress made in aerial warfare during the Spanish Civil War 1936-39 for his doctoral thesis.

**Group Captain Christopher Finn** was an RAF navigator and weapons specialist with over 3,200 flying hours, mostly on the Buccaneer, and was twice awarded a Queen's Commendation for Valuable Service in the Air. He was the UK laser-guided weapons specialist in AHQ Riyadh during the 1991 Gulf War and subsequently commanded the Navigator & Airman Aircrew School. A graduate of the MPhil in International Relations course at Cambridge University, he became Director Defence Studies (RAF) in June 2002. Upon retirement from the RAF, in October 2005, he became the Senior Air Power Lecturer (Operations) in the King's College London Department at the Royal Air Force College Cranwell.

**Doctor Christian F. Anrig** is a King's College London lecturer in Air Power Studies at the Royal Air Force College, Cranwell. He started his professional career in Switzerland and was a researcher at the Centre for Security Studies, ETH Zurich, from January 2004 until March 2007. His research interests include air power strategy and European security and defence policy.

**Stéphane Lefebvre** is Section Head Strategic Analysis at Defence R&D Canada's Centre for Operational Research and Analysis (DRDC CORA). From 1995 to 2006, Mr. Lefebvre was an intelligence analyst with the Canadian Security Intelligence Service (CSIS). Prior to joining CSIS, he had worked as a Defence Scientist (strategic analysis) at the Department of National Defence, and briefly served at NATO Headquarters and the then North Atlantic Assembly. In 1992-1993, he was the Marcel Cadieux Policy Planning Fellow at the Canadian Department of Foreign Affairs and International Trade. He has also lectured for the Canadian Forces Military College, and served as an army reserve intelligence officer for 12 years.

**Roger N. McDermott** is an Honorary Senior Research Fellow, Department of Politics and International Relations, University of Kent at Canterbury (UK) and Senior Fellow in Eurasian Military Studies, Jamestown Foundation, Washington DC. McDermott is on the editorial board of 'Central Asia and the Caucasus' (Sweden) and recently published a monograph on Kazakhstan's armed forces, Kazakhstan's Defence Policy, Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, U.S. February 2009. He specializes in defence and security issues in the former Soviet Union and has published widely in scholarly journals. He co-edited (with Anne C. Aldis), Russian Military Reform 1992-2002, London 2003.

# France and the Development of British Military Aviation

**By Air Vice-Marshal Peter Dye**

Prior to WW1 no European country embraced powered flight more enthusiastically than France. French aviators, aircraft and aero-engine manufacturers led the world. Inevitable it was a Frenchman, Louis Bleriot, who first flew the English Channel. Not for 3 years was British military aviation was formally established as the Royal Flying Corps (RFC).

The RFC relied heavily on French industry for its aircraft and aero-engines and French experience for its doctrine and organisation; French flying schools trained many of its pilots. The relationship continued through the First World War. Many aircraft and engines were purchased in France to help expand the RFC and to supplement shortfalls in British production. The RFC's doctrine was also influenced by French experience, particularly in the employment of air power at Verdun. This was underscored by the close personal relationship between General Hugh Trenchard and his French counterparts, notably Commandant Paul du Peuty.

The French contribution to British military aviation in its first critical years whilst significant has now largely been forgotten. The French influence was vital to the development of the RFC and central to Trenchard's vision for an independent air service. This paper explores the political, social and military aspects of this relationship, including French influence on British thinking about air power and on the enduring doctrine and ethos of the RAF.

## Introduction

There was no European country that embraced powered flight more enthusiastically than France. The Wright brothers' achievements and particularly their visit to Europe in 1908, when they flew in front of huge crowds, inspired adventurers, entrepreneurs and industrialists alike. French aviators, aircraft and aero-engine manufacturers, soon led Europe – if not the world – in realising the potential of aviation. The names of these early pioneers became as familiar to the British public as those of American and Russian astronauts

*Major General, Later Lord Trenchard, GOC RFC 1915-1918*

half a century later. France was also not slow to appreciate the military potential of aircraft and quickly established pre-eminence in the practical development of this new weapon. Britain, concerned by the growing power of Germany, could only look with admiration, and envy, at the innovation and energy of the French aircraft industry and their government's willingness to invest in military aviation. Indeed, one British pioneer encouraged his fellow experimenters to follow his example and emigrate to France in order to escape the ridicule which greeted all attempts at flight in England.

It was perhaps inevitable that it should be a Frenchman, Louis Bleriot, who first crossed the English Channel by air, but it would be another three years before British military aviation was formally established; in the form of the Royal Flying Corps (RFC). In the years prior to the outbreak of the First World War, the RFC relied on French industry to provide the majority of its aircraft and aero-engines, while drawing heavily on French experience for its organisation and using French flying schools to train many of its pilots. This close relationship would continue, and even strengthen, during the First World War. Substantial quantities of aircraft and aero-engines were purchased in France to help expand the RFC and to make good shortfalls in British production. The RFC's emerging doctrine was also greatly influenced by French wartime experience, particularly the contribution of air power in the defence of Verdun. This was underscored by the close personal relationship between Brigadier-General Hugh Trenchard, Head of the RFC on the Western Front, and his counterparts in the French Air Services, notably Colonel Paul du Peuty. Trenchard readily acknowledged the debt he owed these officers and their influence on his thinking and on the standards of the RFC.

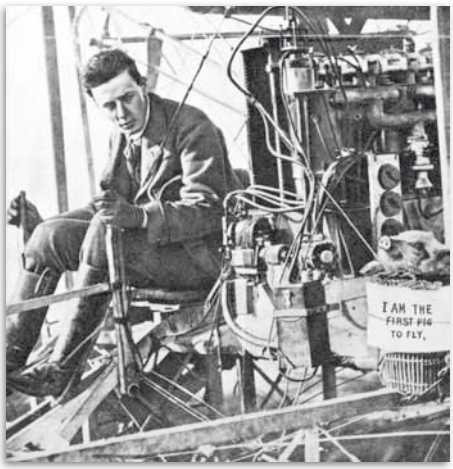
The French contribution to British military aviation in its first critical years was undoubtedly significant, but is now largely forgotten. French ideas, experience, doctrine and equipment were vital to the development of the RFC and were central to Trenchard's vision for an independent air service. The Anglo-American bomber offensive of the Second World War owed much to this legacy – a debt that can still be seen in the history and traditions of the Royal Air Force (RAF). This paper will explore the political, social and military aspects of this relationship, including French influence on British thinking about air power and on the enduring doctrine and ethos of the RAF.

**The Beginning**

The development of aviation in Edwardian Britain is a story of individual endeavour in the face of political and military indifference. For the visionaries, who had wholeheartedly embraced aviation, and instinctively understood its immense potential, the Government's attitude was incomprehensible. But, for those tasked with running the Empire, aviation was seen as an expensive toy that offered little – particularly at a time when military budgets were under pressure from the cost of post-Victorian modernization. These factors weighed heavily in the political debate, as possibly did the view that, invented by the Americans, and enthusiastically taken up by the French, aviation was not something that should properly excite an Englishman.

For the media, notably newspapers such as the Daily Mail owned by Lord Northcliffe, aviation generated considerable publicity and provided a stick to beat the Government. Nevertheless, of all the nations, Great Britain remained uniquely sceptical of the efforts of her own pioneers.[1] Little wonder that John Moore-Brabazon, holder of the first British Pilot's License, should write to the newly established *Flight* magazine that:

*'I have known the difficulties of constructing a machine in England, where everybody is so ready to discourage one, ridicule one and look upon one as an amiable idiot…My advice to anyone about to build a machine is to do it in France: there he will find the enthusiasm without which it is so difficult to really make a machine fly.'* [2]




*John More-Brabazon, the first Englishman to fly a powered aircraft and an ardent aviation pioneer who in 1909 exorted his fellow countrymen to emigrate to France where aviation was taken more seriously*

It was not just Moore-Brabazon who looked across the Channel for inspiration. Aeronautical progress in France had attracted the military's attention since the turn of the Century. Colonel Templar, Head of the Balloon Factory at Aldershot,

had been greatly impressed by the progress made by Santos-Dumont with navigable airships in 1901. Later that year he visited his French opposite number, Colonel Reynard, to learn more, although he was denied access to the latter's workshops at Chalais-Meudon. With the signing of the 'Entente Cordiale' in 1904, such barriers rapidly disappeared, leading to joint military talks as well as the sharing of technology – largely, it has to be said, to the benefit of the British. German aeronautical progress was also of some considerable interest, particularly Count Zeppelin's pioneering achievements, but this was overshadowed by long-standing concerns about Germany's ambitions – further exacerbated by the Agadir Crisis. These two themes, ever closer working with France and the growing belief that war with Germany was inevitable, dominated the development of British military aviation in the decade before the outbreak of war.

Interest in aviation was one thing, political support was another. The arrival of the Wright brothers in London, and the intense media interest they aroused, did little to move the Government.

*'In May 1909 the Wright brothers arrived in London. They received a tremendous welcome. Wilbur and Orville Wright were living symbols of the new air age. Their British contemporaries were at this time distressed by the fact that Britain had fallen behind France and Germany in aeronautical achievement.'* [3]

On 25 July 1909, Louis Bleriot flew the Channel from Calais to Dover in 38 minutes, in a small machine of his own design. For many aviation advocates this was a key turning point.

*'When Monsieur Bleriot landed at Dover he opened a new chapter in the military history of the British Isles.'* [4]

Of course, the argument was not so easily won and aviation in Britain continued to be viewed with apathy, suspicion and even open hostility by naval and military authorities.[5] Indeed, in April 1909, the War Office had prohibited further experiments with aeroplanes as the costs were considered too high.[6] It was probably not helpful when it was pointed out that matters were different in France.

*'I ask you to give publicity to the success of aviation as adapted to military purposes because it is high time that our authorities took some steps to follow the example of the French.'* [7]

*Major General Frederick Sykes, Commander of the Military Wing, who modelled the organisation of the RFC on the French Air Services*

Gradually, however, the arguments and the lobbying began to bear fruit. In October 1911, Major (later Sir) Frederick Sykes was ordered by Brigadier Henry Wilson, Director Military Operations at the War Office, to visit France and write a report on *l'Aviation francaise*. This he duly produced in November 1911. Titled *'Notes on Aviation in France'*, Sykes

outlined the value of aeroplanes in war and the importance of strategic reconnaissance, raids against vital points and tactical reconnaissance, including finding targets for the artillery and facilitating intercommunication between forces.[8] There is little doubt that Sykes' tour of French military aviation establishments provided the organisational blueprint for the RFC.[9]

*'Before the war, France was the recognised world leader in flying and hence Sykes' report from France could be considered one of the most important pre-war organisational influences on British aviation.'* [10]

Sykes, who was appointed Head of the RFC's Military Wing, rapidly set about creating an effective air service, drawing heavily on French aviation practice. Many of these principles would later be incorporated in the RFC's Training Manual, first published in 1915, that provided the foundation for all future British air power doctrine.[11]

Although much was achieved in the next few years, British aviation continued to lag behind both France and Germany. By the end of 1911, France had issued more than 500 pilot's certificates compared to just 110 in Great Britain. On the outbreak of war, the five most important aviation records (including distance, duration, height and speed) were all held by either France or Germany. No British pilot held a world record of any sort.

From the beginning, Britain's aeronautical efforts were handicapped by the lack of reliable aero-engines of adequate power. This single problem effectively constrained the development of the British aviation industry, both before and during the war. In August 1914, there was no aircraft or aero-engine industry to speak of, while a number of key components – such as magnetos – could only be obtained abroad. The pressure of war overcame most of these problems, but the supply of aero-engines continued to bedevil aviation planning right up to the Armistice. Part of the difficulty was that it was found easier to purchase engines in France than to develop British alternatives.

'The unreliability, coupled with the great weight, of contemporary engines drove the pioneers to despair. Monsieur Seguin produced the Gnome much as a conjurer might produce a rabbit from a hat.' [12]

British aviation came to rely almost exclusively on French aero-engines and French aircraft. When the RFC was formed in April 1912, it was able to boast an establishment of just fewer than 200 personnel and 17 machines with another 36 on order – half of these to be supplied by France and all powered by French engines. In comparison, French military aviation possessed at least 100 aircraft and the German air services a similar number.

*'The French authorities, who were naturally gifted with more imagination than our own politicians, had grasped the potentialities of aircraft very early in their development, and had spent large sums of money in order to encourage their experimenters. The results had far exceeded their expectations and the French pilots and constructors were far ahead of the rest of the world in every*

*branch of aviation.'* [13]

It was not just French aircraft and engines that dominated the development of British aviation. French aviators became as well known in England as they were in France. They inspired and entertained the public and, inevitably, excited professional jealousy. Popular, charismatic and embodying the spirit of adventure, they were fashionable in a way that their English counterparts were not.

*'In September 1913, Pégoud flew his Bleriot monoplane above the Weybridge track in a manner which dumfounded the sceptics and silenced every accusation of chicanery. To say that British pilots were staggered would be inadequate to express the complete stupefaction which was felt by all who witnessed his beautiful exhibition of perfect control.'* [14]

For the military, there was no doubt where they should look for a role model. A steady stream of RFC officers visited France over the next few years, either to observe the Army Manoeuvres or to inspect factories and flying fields.[15]

'In aeronautical matters France is without doubt far ahead of any other country, and we must therefore look to her for hints as to the manner in which we may best augment our own resources in this direction' [16]

**Materiel Contribution**

At the outbreak of war the RFC possessed just 50 frontline aircraft, compared to the 141 serving with l'Aéronautique Militaire and over 200 with the German air services. As the full potential of military aviation became clearer, the RFC grew rapidly, but only because it was possible to procure additional aircraft and aero-engines in France. The French contribution to the British air effort was timely, substantial and essential. As the official history of the Ministry of Munitions observes:

*'French assistance was of peculiar value in that it was rendered in the first months of the war, when home industry was incapable of supplying the Services with the necessary equipment. The French rotary engines alone enabled the two Services to carry on through the first two years of the war, and such were the qualities of these engines that they were used in increasing quantities throughout the war. French aeroplanes were also invaluable during the first two years of the war and the Maurice Farman was the standard training machine until nearly the end of 1917.'*[17]

*A Bleriot monoplane supplied to the RFC in the early months of the First World War*

Britain did supply some aeronautical material to France, including aircraft, and machine guns, but this was a fraction of what was provided in return.[18] Entire RFC squadrons were equipped with French aircraft, serving in all theatres. French aircraft also provided a large proportion of the training machines needed to

supply pilots for the Western Front where the strength of the RFC increased from just five squadrons in 1914, to 29 by 1916, and nearly 100 by the Armistice.

Although the direct procurement of aircraft from France became less important as the war progressed, the supply of aero-engines remained vital in powering British manufactured machines. The continued failure in British production, led the Government to encourage companies, such as Rolls Royce, to design and produce aero-engines rather than remaining solely automotive engine manufacturers. Even so, airframe production continued to outstrip aero-engine production.

## Supply of Aircraft and Aero-engines

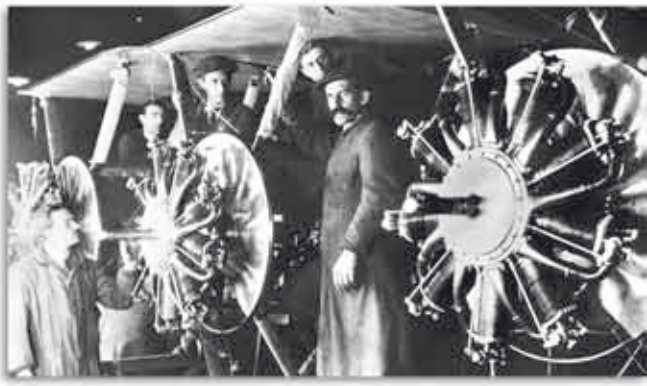
**Table 1:**
**British Aircraft Production, 1914 – 1918**

| Aircraft | 1914 | 1915 | 1916 | 1917 | 1918 | Total |
|---|---|---|---|---|---|---|
| UK | 193 | 1,681 | 5,716 | 13,766 | 30,671 | 52,027 |
| Overseas | 7 | 661 | 917 | 1,066 | 111 | 2,762 |
| **Percentage %** | **4** | **39** | **16** | **8** | **1** | **5** |

**Table 2:**
**British Aero-Engine Production, 1914 – 1918**

| Engines | 1914 | 1915 | 1916 | 1917 | 1918 | Total |
|---|---|---|---|---|---|---|
| UK | 99 | 1,721 | 5,363 | 11,763 | 22,088 | 41,034 |
| Overseas | 39 | 911 | 1,864 | 4,902 | 9,181 | 16,897 |
| **Percentage %** | **40** | **53** | **35** | **42** | **42** | **41** |

From both a qualitative and a quantitative perspective, French aeronautical materiel was hugely important in sustaining the growth of British military aviation. The scale of this contribution is only too evident if we look at the total British aircraft and aero-engine production during the war (Tables 1 and 2). In percentage terms, the supply of aircraft from overseas (largely France) represented some five per cent of total wartime production but nearly 40 per cent in 1915. The supply of aero-engines from overseas (again largely France) represented some 40 per cent of total wartime production and over 50 per cent in 1915.



*The RFC benefited greatly from the supply of French aero-engines throughout the war*

## Moral and Intellectual Contribution

Although the provision of adequate quantities of aeronautical materiel, in the face of significant wastage, was a major problem for the RFC, there were many other challenges to be met before military aviation could make an effective contribution to the war. The RFC and the Service Aéronautique were partners in the struggle to develop a conceptual model for military aviation and, just as importantly, to gain the understanding of army commanders and the support of politicians. In this process the RFC was not necessarily the junior partner, although it soon found that there was much to be learnt from the Service Aéronautique. Close contact with the French in the first months of the war caused the RFC to rapidly reappraise its approach to aerial

photography and map making. By December 1914, the RFC's photographic organisation had been re-modelled entirely along French lines and, when this was changed to a more decentralised arrangement in early 1916, the RFC followed suit.[19] In a similar way, the RFC's procedures for army co-operation, notably the employment of contact patrols to support infantry attacks, was largely drawn from French practice. Although Lord Trenchard is commonly regarded as the father of the Royal Air Force, it is often overlooked that he initially resisted the idea of an independent air service. Moreover, his views on air power and the importance of strategic bombing only emerged over time, changing as the war progressed. Central to this process was his relationship with the Service Aéronautique and, in particular, its senior officers.

Colonel Hugh Trenchard arrived in France in November 1914 to take command of the RFC's Third Wing. In August 1915 he replaced General David Henderson as Head of the RFC in France, commanding the RFC through both the Somme and Third Ypres, before returning to London in January 1918 to become the RAF's first Chief of the Air Staff. He resigned after three months and later commanded the Independent Force, tasked with conducting a strategic bombing campaign against Germany.

Commandant Paul du Peuty was a pre-war cavalry officer who joined the aviation service early in the war.[20] He commanded Escadrille MS 48 on its formation in March 1915 and subsequently a groupe de chasse and reconnaissance on the Artois front

*Commander of the French Air Services, a personal friend and staunch ally of Trenchard, Commandant Paul du Peuty*

before, in the autumn of 1915, being appointed to the French 10th Army – at that time located between the British First and Third Armies. Following General Nivelle's arrival as CinC in December 1916, du Peuty replaced Colonel Barès as Head of the Service Aéronautique at GQG. He resigned his post in August 1917 to return to the Army, being killed in action in March 1918.

Both Trenchard's personal papers, and the Official History, describe the importance of his French opposite numbers, notably du Peuty, in the development of his thinking on operational and tactical matters. Neither airman was fluent in the other's language, but through Maurice Baring, Trenchard's liaison officer, they were able to develop a shared view of how air power should be employed in support of the ground battle.

All the evidence suggests that Trenchard and du Peuty had a warm professional and personal relationship. Although Trenchard was a few years older and had learnt to fly before the war, du Peuty had been wounded in air combat while commanding a squadron

and had considerable operational experience.[21] It would also appear that Maurice Baring's unique character and abilities made him the ideal go-between in the relationship and that both Trenchard and du Peuty valued him highly.

In the autumn of 1915, Trenchard and du Peuty met to distil their collective experience into fundamental principles governing the employment of aircraft in war. The need to co-ordinate the 10th Army's air activities with adjacent RFC formations may have been the instigation for this debate, but there were matters of real substance to be addressed which would have long-lasting implications for British air power doctrine.

*'This policy (the Strategic Offensive) was thrashed out in the autumn of 1915 in many conversations between General Trenchard and Commandant du Peuty, talking and arguing over the experiences of the two air services.'* [22]

It has been suggested that the concept of the strategic offensive was uniquely Trenchard's, not least by Trenchard's biographer, and that in turn it shaped the French response to the German air effort at Verdun.[23] In my opinion, the evidence is far from conclusive. What seems more likely is that the two airmen contributed to a process in which theory, experience and analysis were woven into a new orthodoxy that employed aircraft as a weapon of attack rather than of defence.[24] Just as importantly, they both concluded that the effective employment of military aviation was only possible through centralised control and decentralised execution. With the move of the French 10th Army, in early March, both Trenchard and Du Peuty were determined to establish liaison officers in the other's headquarters to facilitate their continued communications.[25] Du Peuty was now based on the Verdun front from where he provided regular reports, willingly sharing his experience and reinforcing Trenchard's views about the need for a continuous offensive in the air: [26]

*'The lessons that can be drawn with the greatest certainty from the experience of the Battle of Verdun are:*

- *The necessity of grouping in each Army the fighting machines employed on offensive duties under a single commander.*
- *The primary importance of the work done for the higher command.*
- *The need for great adaptability in the organisation as well as the necessity of a high degree of training.'*

These lessons were incorporated in the RFC's planning for the Battle of the Somme, which saw the German air services severely handled, conceding air superiority to the British for several months. Indeed, such was the success of the RFC that it caused a major reorganisation of the German fighter force.

An important step in the RFC's preparations for the Somme, based on the French experience at Verdun, was Trenchard's decision to withdraw the fighter aircraft provided to the corps (army co-operation) squadrons for self-defence and to organise them into dedicated fighter squadrons.[27]

Trenchard and du Peuty's influence had wider implications when America joined the war in 1917.

Lacking both equipment and experience, several military missions were sent to Europe to address these shortfalls. One of those involved was Lieutenant Colonel William (Billy) Mitchell – later to command the air combat units of the United States Air Service (USAS) in France. Mitchell met Trenchard and du Peuty in the spring of 1917 and had extensive discussions with both. His views on air power were greatly influenced by these conversations.[28]

Du Peuty's decision to resign his command, in September 1917, and return to the army was a great blow. Good relations between the RFC and Service Aéronautique continued under his successor, Colonel Marie Charles Duval, but du Peuty's abilities were greatly missed. According to Maurice Baring, du Peuty had *'proved himself to be the most daring of pilots and the soundest of flying officers and organisers.'* Du Peuty wrote a personal letter to Trenchard explaining his reasons for leaving.

*'Dear General, I have been appointed into the 4th Zouaves with the promise of being shortly given a battalion. In leaving the Flying Corps, I want to thank you for the very valuable help you have been kind enough to give me when I commanded the flying units of the 10th Army and later when I was at GQG.*

*I want to tell you how much I admire the British Flying Corps with which we have fought together and to which we are bound by ties of such affectionate comradeship. Lastly, thank you for the personal affection which you always showed me and which was the most valuable of stimulants for me.*

*I need hardly tell you that if I am leaving the Flying Corps, to which I had given myself wholly, it is because I feel I have not only ceased to be of use to it but that I might do harm and be a source of trouble. Soon, from the trenches, I will applaud the services of our allied forces in the air.'*[29]

Trenchard and du Peuty were destined to meet just once more, in November 1917, when the General visited Epernay (enjoying an obligatory tour of the Moet et Chandon factory). Baring commented that with du Peuty's death *'the French lost a great soldier and an example of the finest type of man that France can produce. He had all the noblest qualities of the French nation, and as one of our pilots who knew him very well said to me: "It makes one feel a worm to be with him."'*[30]

It should not be thought that Trenchard was without criticism of the Service Aéronautique. While he acknowledged their innovation and leadership, he felt that they lacked something in delivery:

*'Generally speaking, I would say that the French Air Service excels in conception, but to a certain extent fails in execution. The development of aerial methods especially in the case of aerial fighting owes a very great deal to French thought and initiative and* ***we have based our tactics largely on their teaching.'***

*'Their organisation for making use of aerial information, studying photographs, reporting the result of bombardments, keeping the command in touch with the advance of their troops is extremely good. Its execution, in my opinion, leaves something to be desired and this is principally due I think to a lack of real discipline.'*[31]

In some ways I find this more nuanced view more encouraging, and

credible, suggesting that, in private, the interaction between the two air services was more robust and challenging than has so far been suggested. When Trenchard left France in 1918, there was no doubt about his public feelings:

*'I would be grateful if you could express to all those involved with the French Air Services the heartfelt debt and gratitude that I feel towards them for all the assistance that they gave me whilst in command of the Air Services in France. I can state categorically that it was the example shown by the French aviators at Verdun and at other important battles that influenced me directly. I also wanted to learn from the French Air Service's modus operandi; the perfection they demonstrated whist undertaking artillery and photographic missions were the benchmarks that I applied to our own artillery missions.'*[32]

**The Legacy**

The French contribution to the development of British military aviation, although readily acknowledged in official histories and individual memoirs, was rapidly forgotten in the difficult post-war years and any residual obligation was effectively swept away by the catastrophe that was 1940. More long lasting, and certainly as important, was the French contribution to the evolution of air power doctrine in both the RAF and the USAS. The Strategic Offensive, and the model of central control with decentralised execution, were integral to Trenchard's vision of an independent air service and were echoed in the inter-war writings of American air power theorists. This doctrine, ultimately, would find its expression in the Combined Bomber Offensive. How much of this is directly owed to du Peuty and his colleagues can only be guessed at. According to Maurice Baring, du Peuty's personal contribution was incalculable.[33] The French view was equally positive. According to Ferriere, du Peuty's liaison officer at Trenchard's headquarters, effective collaboration between the respective air services could be traced directly to Verdun and the interplay of ideas between two men who implicitly trusted each other.[34]

There is, of course, another lasting legacy – one that is readily visible to this day. When the RFC arrived on the Western Front in August 1914 its aircraft were without national markings – unlike French military aircraft that had featured a roundel

*French and British aviation personnel at a joint medals ceremony, France 1918*

of blue, white and red since 1912.[35] Indiscriminate fire by friendly forces led GHQ to instruct that all RFC aircraft should be marked with the Union Flag. It was soon discovered that this was easily confused with the German black cross. On 29 October 1914, General David Henderson wrote to the Chef de Mission Francaise to the effect that 'Many reports have recently been received from both French and British sources as to the difficulty of recognising British aeroplanes. It is therefore proposed to try a system similar to those on French machines which are more clearly visible. Have you any suggestions or remarks, please?' The answer must have been positive as from December 1914 all British aircraft were marked with a red, white and blue roundel – a marking that continues to be used to this day – if only the Service Aéronautique had retained the licensing rights![36]

**Notes**

[1] Driver, The Birth of Military Aviation (Woodbridge: The Royal Historical Society & The Boydell Press, 1997), p. 26.
[2] JTC Moore-Brabazon, Flight, 2 January 1909.
[3] Alfred Gollin, *The Impact of Air Power on the British People and their Government, 1909-14* (London: Macmillan, 1989), p. 22.
[4] Colonel Charles Repington, Military Correspondent of The Times, Blackwoods Magazine, July 1910.
[5] Sykes, *From Many Angles* (London: George Harrap, 1942), p.88.
[6] Broke-Smith, *The History of Early British Military Aeronautics* (Bath: Library Association, 1968), p. 33.
[7] George Holt Thomas, Letter to the *Daily Mail*, 17 September 1910.
[8] Sykes Papers, RAF Museum *MFC77/13.*
[9] Sykes, Op cit, *p.93-96.*
[10] Ash, *Sir Frederick Sykes and the Air Revolution 1912-1918* (London: Frank Cass, 1999), p.24-25.
[11] The Training Manual (Part 2), sometimes known as the War Book, described the functions of the RFC including its strategical and tactical employment. The Training Manual was conceived by Sykes in February 1913 to provide guidance on how the Military Wing should operate in war. TNA *AIR 1/785/204/4/565* refers. Neville Parton, 'The Development of Early RAF Doctrine', *The Journal of Military History*, Vol 72, No 4, October 2008, identifies the importance of the Training Manual in the development of British air power thinking.
[12] At the first British Aero Show held in March 1909 - Dallas Brett, *History of British Aviation 1908-1914* (London: The Aviation Book Club, 1933), p.25.
[13] Dallas Brett, *Op cit*, p. 69-70.
[14] *Ibid,* p. 69-70.
[15] This included Major Herbert Musgrave, Assistant Commandant and Officer in charge of experiments who attended the Army Manoeuvres of 1912, expressing great admiration for all that he saw, and Major Robert Brooke-Popham who toured French aviation establishments in May 1914. *TNA AIR1/783/204/4/515.*
[16] Barrington-Kennett, Military Aeronautics in France, *Royal United Services Institute Journal*, February 1912, p.171-178. Barrington-Kennett was later the RFC's first Adjutant.
[17] Ministry of Munitions, *History of the Ministry of Munitions Vol 12* (London: HMSO, 1922), p.177
[18] At a meeting held between the French Aviation Service and the RFC held in London on 15 December 1915, it was agreed that the British would provide Sopwith 1 ½ Strutters, as well as hydrogen bottles and an example of the CFS Mk4 bombsight. *TNA AIR1/625/17/11.*
[19] Chasseaud, *Artillery's Astrologers* (Naval

and Military Press: Uckfield, 1999), p. 26 and p.52.

[20] Born on 6 July 1878, Paul Fernand du Peuty was an officer of the Spahis who came late to aviation. He commanded MS 48, equipped with Morane-Saulnier Parasol fighters, from 29 March – 8 September 1915 (he was shot down and wounded in air combat on 1 July 1915), before taking over as Head of the Air Services at GQG on 21 February 1917. Evidently a talented man, he fell foul of politics and resigned when Petain appointed Colonel Marie Charles Duval, an infantry officer, over his head on 2 August 1917. He joined the 4th Zouaves later that year and served with them as a battalion commander, being awarded the l'Ordre de l'Armée before his death in action at Orvilliers on 30 March 1918.

[21] Trenchard was born in 1873, making him five years older than du Peuty.

[22] Jones, *The War in the Air*, Vol 2 (Oxford: Clarendon Press, 1922), p.164-166.

[23] Boyle, *Man of Vision* (London: Collins, 1962), p 166-168.

[24] *Fighting In The Air*, Issued by the General Staff, April 1918, p. 2.

[25] Lt Ferriere and Captain Cooper respectively.

[26] Conclusions of the report by Commandant du Peuty, forwarded to Brigadier-General Trenchard, *The Working of Aviation in the Vaux-Douaumont Sector.*

[27] Jones, *Op cit*, p.167-168.

[28] Mitchell, *Memoirs of WW1 From Start to Finish of Our Greatest War* (New York: Random House, 1960), p.21-25.

[29] Personal letter to General Trenchard from Colonel du Peuty dated 23 September 1917.

[30] Baring, *Flying Corps HQ 1914-1918* (London: Bell & Sons, 1920), p.256-257.

[31] *Secret Memorandum on the French Air Services*, dated 28 August 1917. Trenchard Papers.

[32] Letter from Major-General Hugh Trenchard to Colonel Duval, Head French Air Services in the Field, dated January 1918.

[33] Baring, *Op cit*, p. 129.

[34] Boyle, *Op cit*, p. 171.

[35] The Inspection Permante de l'Aeronautique issued instructions to this effect on 26 July 1912. Robertson, *WW1 British Aeroplane Colours and Markings* (Albatros Productions: Berkhampstead, 1996), p.24.

[36] *Op cit*, p. 25-26.

# The Myths and Realities of Air Anti-Submarine Warfare during the Great War

**By Col John Abbatiello**

Although the historical record often got it wrong, the efforts of Royal Naval Air Service and Royal Air Force anti-submarine aviators met with varying degrees of success during the Great War. Anti-submarine missions fell into three categories: bombing German U-boat bases in Flanders, patrolling the sea lanes around Britain, and escorting convoys. Though bombing and patrolling certainly contributed to the failure of the unrestricted U-boat campaign, convoys served as the ultimate antidote and were made even more effective by the contribution of aircraft. First World War naval aviators did not enjoy guidance from existing doctrine; they invented it in the field. This essay highlights inaccuracies in the historical record and explains the challenges, successes, and failures of early air anti-submarine warfare (ASW). The author concludes that command and organizational constraints were the root cause of inconsistent employment techniques.

On 22 September 1917, a Royal Naval Air Service flying boat destroyed a small German U-boat in the English Channel. The Dunkirk-based flying boat despatched *UB32* with two 230lb bombs, striking the submarine behind the conning tower as the U-boat tried to dive for safety. Flying boat crewmembers and escorting Sopwith pilots confirmed that a mass of oil and wreckage resulted from the explosions.[1]

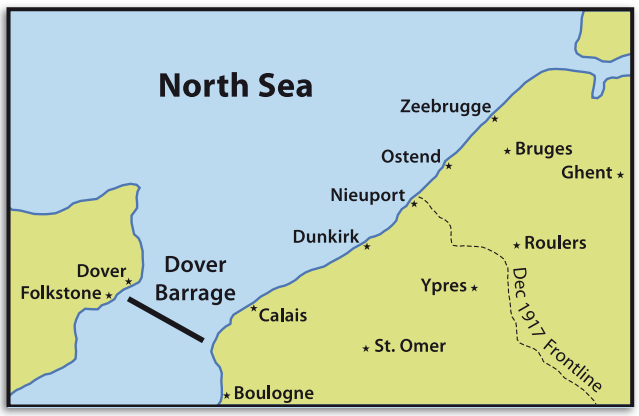
This engagement was the only confirmed case during World War One of a U-boat being destroyed by a British aircraft on its own, that is without the aid of surface vessels. There were at least five, and perhaps six, additional instances where British aircraft working with destroyers or patrol boats sank U-boats. However, if one considers that the Germans lost 178 submarines to all causes during the Great War, it is obvious that aircraft played a minimal role in thwarting their operations.[2] At least, that is what much of the literature of World War One has led us to believe.

In reality, aircraft served an important function in trade defence during World War One. Airplanes, seaplanes, and flying boats, as well as non-rigid airships and kite balloons, performed three anti-submarine roles during the Great War. First, RNAS and (from 1 April 1918) RAF bombers raided German U-boat bases in Belgium, damaging only a few U-boats, but forcing the Germans to invest heavily in defending their facilities and naval units from air attack. Secondly, aircraft patrolled the waters surrounding the British Isles, contributing to anti-submarine warfare by hunting and attacking U-boats and then using wireless, or other signalling techniques, to call in supporting naval forces. The third and final anti-submarine role for aircraft was convoy escort work. From the earliest days of convoy until the end of the First World War, U-boats were able to sink only five convoyed vessels when the convoy enjoyed both air and surface escort. In fact, U-boats did not attack an air-escorted convoy until December 1917, and there were only eight occasions when U-boats even attempted such attacks in home waters during the entire war.[3]

Since the end of the Great War, historians generally recognised this important contribution of aircraft to the U-boat war, but the details of this issue have remained clouded for a number of reasons. One of the primary causes is the simple fact that naval aviation did not fall neatly into aviation history on the one hand, or naval history on the other, meriting only secondary coverage in these sorts of studies. With the exception of the British and Canadian official air histories, pertinent details of the campaign are widely scattered across a range of texts. Air and naval general histories of the Great War see the campaign as only a minor issue in a greater conflict and offer only a few paragraphs, or at best a chapter, to explain it.[4] Likewise, the numerous extant surveys of naval aviation tend to view the RNAS's air campaign against U-boats simply as a forerunner to operations in World War Two. These brief treatments do not adequately explain this campaign and over-generalise the key issues. This essay will examine some of the misunderstandings surrounding

these innovative roles – again, consisting of bombing U-boat bases, conducting over-water air patrols, and escorting convoys – for British naval aviation and will present the myths and realities behind each. This discussion will deal only with British maritime air operations in and around home waters, which arguably was the decisive theatre of the naval war.

**Bombing: Was it continuous?**




*Map of Dunkirk Area*

The establishment of German U-boat bases in the Belgian ports of Zeebrugge, Ostend, and Bruges in early 1915 provided the RNAS with an opportunity to use aircraft offensively, which they took on with vigour. Actually, the RNAS was ordered to Dunkirk in September 1914 to aid Royal Marines hastily deployed to the Belgian coast. The projected force of 36 aircraft was meant to establish air superiority in Flanders 'with a view to attacking any German airships on their way to England, and preventing any temporary airship base being established' within a 100 mile radius from Dunkirk.[5] The initial bombing objectives were German Zeppelin sheds, but at the end of January 1915, RNAS pilots first spotted and attacked U-boats temporarily berthed at Zeebrugge. The combination of Germany's first unrestricted submarine campaign, beginning in February 1915, along with the obvious development of the Flanders ports into permanent U-boat bases soon after meant that RNAS squadrons operating in northern France and Belgium now had good reason to remain in the Dunkirk area. Attacks against enemy bases and sources of supply, or 'attacks at source,' reflected a long-standing tradition in the Royal Navy – going back to the wars with Spain, France, and America during the Age of Sail – and were especially useful when the enemy was difficult to locate once at sea.[6]

The RNAS establishment around Dunkirk fell under the overall operational command of the Vice-Admiral Dover Patrol, Sir Reginald Bacon. Bacon was deeply immersed in the new technology of the Fisher Era and was a proponent of submarines and airships. Wing Captain Charles L. Lambe, a torpedo specialist who had worked with Bacon previously in the Naval Ordnance Department, led the naval air forces themselves. Lambe was not a pilot, but had commanded the RN's first seaplane carrier, *HMS Hermes*, which was torpedoed and sunk by a German U-boat in the English Channel in October 1914.

Under Lambe and Bacon, naval air power grew steadily in the Dunkirk area. In 1918, after the RAF had

absorbed the RNAS, the bombing campaign continued, still under Lambe, now a Brigadier General, RAF, and reached its peak in June of that year. By September 1918, the bombers around Dunkirk switched completely to supporting the advance of the northern Allied armies, and in October the Germans abandoned their Flanders bases. However, attempts to bomb Zeebrugge, Ostend, and Bruges had met with only limited success during the war. Although they were forced to adopt some drastic defensive measures, such as building large concrete shelters, relocating ammunition stores away from the harbours, and investing in large numbers of anti-aircraft batteries, the Germans continued to operate their U-boats from Flanders at a furious pace. And, only about a third of Germany's U-boats operated there anyway; the rest were in bases in Germany, beyond the range of British bombers.[7]

There are a number of misperceptions associated with this campaign. The first was largely sparked by Sir John Jellicoe in his book *The Crisis of the Naval War* where he said that:

*'During the year 1917 aerial bombing attacks were persistently carried out on the German naval bases in Belgium by the Royal Naval Air Force at Dunkirk, which came within the sphere of the Dover Command. These attacks had as their main object the destruction of enemy vessels lying in these bases, and of the means for their maintenance and repair. The attacks...were as incessant as our resources and the weather admitted, and our gallant and splendidly efficient airmen of the R.N.A.S. were veritable thorns in the sides of the Germans.'*[8]

Likewise, Admiralty and Air Ministry staff studies, stating that attacks against the bases were 'frequent' and 'unremitting,' helped to mislead other historians of the period.[9] Such descriptions steer the reader into thinking that these bombing raids were persistent.[10] This was not the case. In fact, the bombing campaign against the Flanders bases waxed and waned with the strategic situation.

The establishment of multiple RNAS bomber squadrons during spring 1916, and their subsequent assault on the Flanders U-boat bases, was largely a response to the second German submarine campaign of March and April 1916. By late May 1916, Vice-Admiral Bacon was seeing some improvement in the anti-submarine war, which he thought to be the result of his new net and mine barrage installed off the Belgian Coast earlier in the month. Actually, the reduction in sinkings during this time was caused by the abandonment of the second submarine campaign after the Sussex Pledge and Scheer's plans to use some of his U-boats in conjunction with the High Seas Fleet.[11] Nevertheless, in late May, Bacon ordered that all bombing raids against the Flanders bases were to be suspended, after a raid sent to bomb a nearby aerodrome could not see its target and instead unloaded its bombs on Ostend Docks. Bacon saw this type of raid as counterproductive to his overall scheme of operations.[12]

Two weeks later, in a report on air operations in Belgium, Bacon stated that his aviators were just starting to understand that air operations were to be subordinated to land and sea campaigns. He also warned

that these 'indiscriminate bombing' missions were 'useless' and even 'harmful to well thought-out military operations' because they provoked enemy retaliation, caused a strengthening of German defences, and were ineffective unless massed.[13] Instead, Bacon offered the services of

*DH4s – RNAS Dunkirk – 17th March 1918*

his bomber squadrons to the British Expeditionary Force (BEF), which was preparing for the ill-fated Somme Offensive. The lack of a co-ordinating infrastructure and the relatively extended distances from Dunkirk to the Somme Front, meant that RNAS involvement with the offensive was limited to a few attacks against German aerodromes along the northern shoulder of the attack area. In late 1916 and early 1917, the Germans began to use the Flanders ports as staging bases for destroyer attacks against the Dover Patrol. Simultaneously, U-boat attacks against merchant shipping began to increase at a dramatic rate, which culminated in the new, final, unrestricted submarine campaign that began in February 1917. The combination of these factors offered Charles Lambe a superb opportunity to argue for a renewed bombing campaign against the German bases. Bacon agreed. In November 1916, the RNAS launched six raids against Ostend and five against Zeebrugge.[14] These November raids were the heaviest of the year and, according to the Canadian official air historian, succeeded in forcing the Germans to withdraw one of the raiding destroyer flotillas back to Germany.[15] Poor weather and extremely cold temperatures grounded the bombers through December and January thus limiting further attacks. Raids resumed in February 1917, but again weather prevented attacks in March. During this time the RNAS at Dunkirk took delivery of its first fast DH-4 and massive Handley Page bombers, both aircraft bringing greater payloads and speeds to the bomber force.

*Handley Page o/100 - Dunkirk - 7 Squadron - 1917*

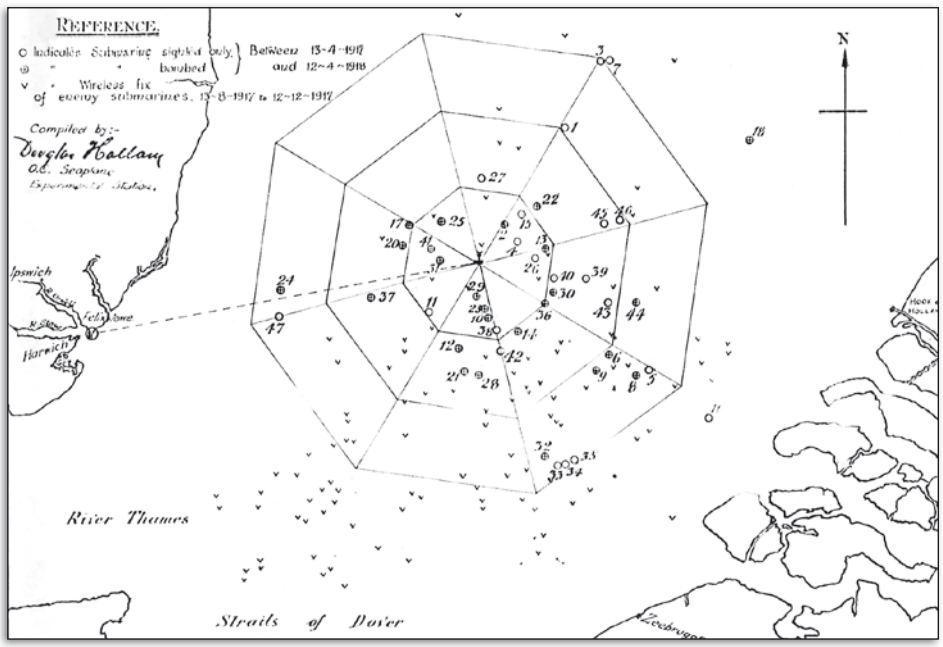
However, just as these newly-equipped squadrons became operational, Bacon offered them to the BEF to support the Ypres Offensive during the summer of 1917. Also, German Gotha raids against England necessitated RNAS attacks

against German aerodromes in Belgium. Gotha raids and the Ypres Offensive made aerodrome attacks a high priority, and RNAS bombers only occasionally flew against naval targets. The third quarter of 1917 serves to highlight the trend. Out of 137 bombing raids during the quarter, 79 were aimed at aerodromes, 15 at Bruges, 12 at Ostend, and 9 at Zeebrugge. The remaining two dozen attacks sought various military targets, including railway centres and ammunition dumps.[16] The end of the quarter serves to illustrate the new priorities clearly: during the last two weeks of September, Lambe sent only three raids to Zeebrugge with none against Bruges or Ostend. Twenty-one attacks were made against other targets.[17]

The lack of emphasis against the U-boat bases would continue until May 1918, when a new Vice-Admiral Dover Patrol, Sir Roger Keyes, pushed the Admiralty and the Air Ministry to support air attacks in the aftermath of his Zeebrugge and Ostend raids. Now under the RAF, Lambe's bomber forces would have the senior support required to carry out a proper bombing offensive against the U-boat bases. Attacks during the summer of 1918 increased dramatically in frequency and violence. In June alone, British aircraft bombed Bruges, Zeebrugge, or Ostend on 24 days of the month, some days seeing five or more attacks.[18] As mentioned above, September 1918 would see this campaign close as Lambe's bombers supported the Allied advance in the north. In the end, Lambe really conducted three separate bombing campaigns during his three and a half year tenure at Dunkirk: one against military targets, one against aerodromes, and one against the U-boat bases. Of the more than 1,000 tons of bombs expended against the enemy by Dunkirk-based naval bombers during the last 21 months of the war, only about half of them fell on naval targets – far from a persistent campaign mentioned in the literature.[19]

This first misperception leads to a second one: the official air historian later wrote in *The War in the Air* that the reason for such a disjointed bombing effort was that there was no independent air force to guide policy until very late in the war. In both Volumes IV and VI, H. A. Jones suggested that had there been a truly independent air force – that is, a force free from slavishly supporting either service and their constantly changing demands – it would have made these kinds of targeting decisions beforehand and been able to 'formulate a real policy.'[20] Such a focused assault on U-boat bases would have been highly unlikely under an independent air service had it been formed earlier. The Admiralty already had difficulty in acquiring the air support it needed in May 1918, a time when there was actually a lull in the fighting on the Western Front.[21] Had a more bombing-minded Vice-Admiral Dover Patrol been in place from the start, such as Sir Roger Keyes, then the naval bomber forces may have been able to conduct a more focused campaign earlier.

There were two underlying factors that caused the breakdown of the bombing effort against the Flanders bases. The first was the way in which the Admiralty controlled its air




*Maps of Spider Web and SW patrol schemes*

forces. Except for a very brief period in 1915, the system was generally straightforward: the Board of Admiralty and Air Department in London provided personnel and aircraft to regional C-in-Cs and formulated policy regarding personnel and equipment. Regional C-in-Cs, even in home waters, were typically provided an air group, and they were in complete control of how those air forces were employed against the enemy. This system remained in effect even after the RAF took over on 1 April 1918. Just as before, RAF Naval Air Groups would work directly for regional C-in-Cs; there was no Coastal Command HQ during the First World War. Thus the system allowed Sir Reginald Bacon, who as he said himself 'always gave the Army, during an advance, the prior call on our machines,' to employ his forces on three different air campaigns, where Sir Roger Keyes focused on the U-boat bases.

This command arrangement leads to the second factor. Naval aviation was brand new during the First World War; there was no historical experience to guide operational and organisational doctrine. Technique developed in the field. The Admiralty was willing to provide only general guidance, such as what missions the aircraft were expected to carry out.[22] Thus, each regional air group struggled to work out the best ways to use its aircraft **on its own.** This phenomenon will become even more pronounced as we move to a discussion of patrols and escorts.

### Patrol: Was it useless?

The second Great War role for aircraft in anti-submarine warfare was patrol. In general terms, there were three types of patrol a given aircraft could fly. An aircraft might be sent out

to fly an assigned track or within a given block of airspace. Such area patrols normally remained within approximately 75 miles of the coast. The Spider Web and Southwest Air Group patrols, initiated in spring 1917, are typical of such patrol systems and were designed to catch U-boats either hunting in these coastal areas or cruising to their patrol stations.

An aircraft might also fly what was called an 'emergency patrol.' Here, aircraft would search a specific area where a U-boat had actually been spotted, had been identified through wireless direction-finding, or where a steamer had been torpedoed. Coastal air groups typically held aircraft on short-notice readiness for immediate launch. It is interesting to note that by 1918, and in some regions even earlier, a telephone system linked the Naval Intelligence Division at the Admiralty with regional C-in-Cs and their air groups in order to disseminate such intelligence.

Finally, aircraft were at times assigned to patrols in conjunction with naval vessels. The Southwest Air Group led the way in this technique. For a given mission, flying boats or seaplanes were typically assigned a specific rendezvous time and location with local patrol flotillas.

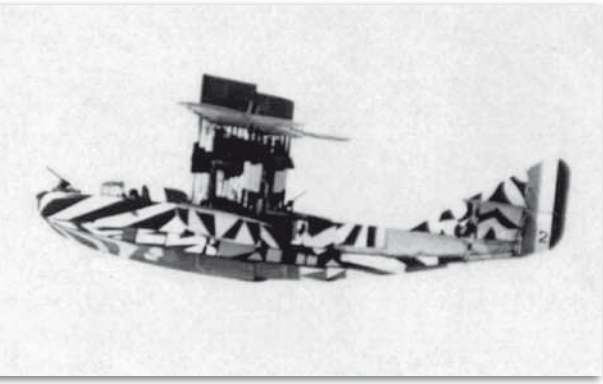
By summer 1917, the air patrol system around the coast of Britain had been firmly established. Patrol aircraft covered coastal waters from the Orkneys along the east coast of Scotland and England, to the Channel and around into the Irish Sea. The only gaps were the northwest coast of Scotland, where presumably traffic was too light and weather too rough to require the support of maritime aviation, and the coast of Ireland. Here, the C-in-C Queenstown, Vice-Admiral Sir Lewis Bayly, was initially sceptical about the use of seaplanes for patrol. On too many occasions in 1916 his destroyers wasted precious patrol time towing seaplanes home to port after many would have to ditch from engine failure. By late 1917, Bayly warmed to the idea of air patrols and by this time the US Navy had agreed to establish four seaplane bases and two kite balloon stations in Ireland.

During the first two years of the war, coastal patrols were rather haphazard; the few naval aircraft available occasionally flew multipurpose reconnaissance patrols searching for enemy Zeppelins, enemy surface forces, and finally enemy submarines. But, there was no real system. By late 1916, four key developments made a new patrol system necessary.

The first development defined the need: shipping losses to U-boats increased dramatically during the autumn of 1916 and the Admiralty recognised that something needed to be done. The start of the unrestricted submarine campaign in February 1917 added impetus to these efforts.

A second development soon followed in December 1916. Admiral Sir John Jellicoe, as the new First Sea Lord, established the Anti-Submarine Division under Rear-Admiral Sir Alexander Duff to coordinate all anti-submarine measures. One of the first memos that Duff wrote after arriving at the Admiralty was a call for a comprehensive air patrol system around the coast of Britain. This

memo planted the seed which grew into the system described earlier.



*British Felixstowe F2 Flying Boat*

Thirdly, in order to ensure adequate supplies of aircraft and trained personnel, the Admiralty needed a senior officer to oversee naval aviation. The Board appointed Commodore Sir Godfrey Paine as 5th Sea Lord in January 1917 to fill this post. Paine had been the commander of the joint Central Flying School and later commanded the Naval Air Service's training establishment at Cranwell. As 5th Sea Lord, Paine also sat on the Cowdray Air Board, which Lloyd George had given control over all army and navy aircraft production. Paine nevertheless became the focal point for the expansion of naval air forces in home waters in 1917.

Finally, none of this would have been possible without improved aircraft designs reaching full production in 1917. The Large America flying boat, able to carry four 100lb bombs for a six-hour patrol, became available during the spring. Non-rigid airships, the brain-child of Sir John Fisher, were now being improved and were able to fly missions of eight hours duration or more. Superior engine designs gave aircraft of all types better performance and hence more carrying capacity and endurance. Improved maintenance practices meant that more aircraft would be 'in-commission' on a given day.

This overview of the patrol system begs the question: how effective was it? Most historians have taken the view that schemes to use aircraft in the hunting patrol role were ineffective. Barley and Waters, in their famous Admiralty staff study *Defeat of the Enemy Attack on Shipping, 1939-1945*, argue that air patrols were ineffective in destroying U-boats and the proper use of aircraft was in the convoy escort role.[23] Likewise, Arthur Marder, strongly influenced by Waters in writing *From Dreadnought to Scapa Flow*, goes a step further and referring to 1917 air patrols offers that 'All this busy work was singularly unproductive' and for 1918 'As patrols they [aircraft] proved ineffective.'[24]

Convoy escort was certainly the most important and most effective role for naval aircraft in the Great War; on the other hand, the claim that patrols were a waste of time is not supported by the evidence. Obviously, without the development of patrol aircraft and infrastructure, especially regarding the sheer growth of naval air stations at home, convoy escort would never have been as effective as it was.

But there were other reasons as well. Air patrols were, in essence, a powerful contributor to an area denial strategy against the U-boats. The evidence strongly indicates that in certain areas, when weather conditions and adequate numbers of aircraft permitted, U-boats were literally forced to operate elsewhere

due to air patrols. In May 1917, six war cruises of Flanders U-boats accounted for only about 3,000 tons of shipping off the Dutch coast, a failure largely resulting from extensive air patrols originating from Dunkirk, Felixstowe (Spider Web), and Great Yarmouth.[25] Examples of aircraft patrols frustrating U-boat operations abound in the German sources from spring of 1917 onward, and wartime British commanders were aware of the contribution of aircraft from captured documents. One captured report confirmed that airship patrols off the Scottish coast 'were most unpleasantly active,' 'repeatedly compelling the boat [*UB35*] to submerge for long periods.' The commander of *UB34* confessed in his war diary that the combination of three airships, calm seas, and clear weather forced him out of his patrol area, while *UC77's* skipper explained that air-sea patrols north of the Firth of Forth 'hampers our operations in the same way as the centralisation of ocean-going shipping [convoy] had done.'[26] Spindler's German official history of the U-boat war and U-boat command war diaries support this argument; air patrols frustrated U-boat operations often, especially during the summer months of 1917 and 1918.[27]

There is one further point worthy of consideration regarding the positive impact of air patrols. The improved visibility afforded to aircraft by their height was not only an advantage in spotting submarines and their periscopes, but it also contributed to the ability to detect German mines. German mine-laying submarines, particularly the *UC* classes based in Flanders, had the potential to wreak havoc on busy shipping lanes by laying small fields unexpectedly along mercantile routes and at the entrances to harbours. The Admiralty recognised the usefulness of air patrols in spotting mines (albeit as a lower priority to enemy submarine and aircraft searches) as early as March 1916.[28] In 1917, mines accounted for 404,000 tons of British, Allied, and neutral shipping; the total losses to mines in 1918 was only about 60,000 tons, with only 12 ships being lost in areas under British minesweeping responsibility.[29] These figures demonstrate a clear defeat of the German mine-laying effort, but the question of how these mines were initially detected remains unexplained in the literature. The contribution of aircraft patrols may shed light on this issue.

According to the Admiralty's staff study on the minesweeping effort during the Great War, mines were located by three primary methods: through using the minesweepers themselves to sweep up unknown mines in suspected areas, such as the approaches to a port or in front of a convoy; by 'scouting by means of aircraft or shallow draft craft at or near low water'; or simply by a vessel striking a mine or otherwise sighting it. Although aircraft could not spot submerged mines in clouded waters, such as those found around most coastal areas in eastern Britain, they were certainly useful in spotting these weapon systems when they appeared on the surface after breaking free of their moorings or at low water. Aircraft had the advantage of speed and safety over surface vessels which hunted for mines; the British alone lost 214 minesweepers

and small patrol craft to mines during the war—all but nine of those in home waters.[30]

Between June 1917 and October 1918, airships detected 134 mines and destroyed 73 of them.[31] Although this seems like a miniscule contribution, given that German submarines laid about 11,000 mines in 1,360 small minefields during the course of the war, sightings led to detection of further mines and their neutralisation. For example, air reconnaissance led directly to the sweeping of 215 mines in the Dover area alone 'without accident' in 1918.[32] Seaplanes also made a significant contribution to mine detection, especially off the Thames Estuary and East Anglia coast.

Overall, air patrols made an important contribution to anti-submarine warfare from mid-1917 until the end of the war. A synergistic effect, leveraging the height and speed advantages of aircraft with the endurance and weaponry of surface vessels, developed dramatically during this period and denied the U-boats the ability to operate in certain areas. Between January 1917 and November 1918, aircraft sighted U-boats on 361 occasions, and followed with attacks on 237 of them, the vast majority resulting in the U-boat being forced to dive.[33] It is interesting to note that most of these air attacks occurred during area patrols and not while the aircraft were escorting convoys. This was hardly a wasted effort. A final comment from Admiral Sir William Jameson might help to conclude the patrol versus convoy debate:

*'Convoy was by far the most important factor in robbing the U-boats of victory, but the fact that submarines were destroyed in large numbers was highly relevant, and most of them met their fate not whilst attacking convoys, but elsewhere. Without these casualties quality would not have fallen away, as it did from late 1917 onwards, and convoys would have been subjected to heavier and more skilful attacks. Convoys also relied for their protection on the A. S. weapons which had been developed; the depth charge, the hydrophone and, that very successful deterrent, the air.'*[34]

This leads us to the final role for Great War aircraft in anti-submarine warfare: convoy escort.

### Convoy: Were aircraft universally employed as escorts?

In general, the overall tactical benefit of the convoy system was that it forced the U-boats to attack a relatively well-defended area.[35] The shipping, which formerly stretched out across the trade routes, was now concentrated in small groups, providing larger *but fewer* targets for submarine commanders. If a U-boat sighted a convoy, it would normally have to proceed on the surface at high speed in order to position itself for an attack. Even if the U-boat was able to gain an adequate firing position, it usually only had one attempt to fire a torpedo, since the escorts' counterattack would normally be so powerful that a subsequent attack would be extremely difficult.[36]

Aircraft were a nearly perfect complement to the surface escorts of a convoy. Airships, seaplanes, and kite balloons brought increased visibility to the tactical picture. As one Admiralty technical history reported,

the track of a torpedo was easily seen from the air, even in a rough sea; the beginning of the track would deliver the position of the submerged U-boat to aircraft observers and pilots.[37] The inability of aircraft to deliver more than a couple of depth bombs, however, was offset by the availability of dozens of heavier depth charges onboard the surface escorts. Finally, aircraft orbiting further away from the convoy – as a distant escort a few miles ahead, behind, or on the flank – would most likely be able to observe a surfaced U-boat manoeuvring to gain a firing position. Thus, as Arthur Marder neatly concludes, 'air escorts deprived U-boats of their chief advantage – surprise attack after unobserved approach.'[38]

There is, however, a common misperception about air escort during World War One. The Barley and Waters staff study, which heavily influenced Arthur Marder's more well-known volumes, states that by the middle of 1918, anti-submarine air units 'shifted from area patrol to convoy close and distant escort.'[39] Marder failed to recognise that much of the evidence provided in the Barley and Waters study came from one area: the north-east coast of England, an area that led the way in air escort, but by no means typified a widespread, accepted policy.[40] Likewise, John Morrow's (air) and Paul Halpern's (naval) surveys generalise the role of aircraft in 1918 and imply that air units spent most of their time escorting as opposed to patrolling.[41]

In fact, using aircraft for convoy escort typically took second place to the patrol mission. Although the Admiralty generally supported the air escort of convoys, it refused to issue specific orders to district commanders regarding air policy in this role. A September 1917 Admiralty letter to all district commanders at home demonstrates this phenomenon clearly. The letter discussed methods for protecting convoys as they entered or departed a harbour, a vulnerable period for every convoy. Aircraft were considered valuable in this role, 'in order to immobilize all submarines as far as possible and sight any submarine that may be unwise enough to remain on the surface,' but no directives regarding their employment were issued.[42] In May 1918, the Admiralty strongly recommended the use of aircraft generally in the convoy escort role, which explains the overall statistical rise in air escorts during the summer of 1918. The Admiralty's Air Division certainly supported this policy.[43] The Air Division's role, however, was not to command, but was simply to advise the Admiralty on the use of aircraft and to liaise with the Air Ministry regarding naval air matters. The Director, Air Division, recommended doctrine, but could not enforce it across the commands. Except for cases of special projects, such as proposed air attacks on the High Seas Fleet, the Admiralty Board itself was hesitant to provide specific operational orders, instead allowing regional Senior Naval Officers (SNOs) to employ aircraft as they saw fit.

The following statistical analysis will serve to summarise the differences between the home commands regarding the use of aircraft in the escort role. The three tables below

are based on information provided in the Air Division's monthly Naval Air Operations Reports.[44] The 'Patrols' columns indicate the number of single-aircraft sorties flown from the air stations within the designated operational area. The 'Escorts' columns represent the number of occasions when a single aircraft escorted a convoy; a single patrol may have escorted more than one convoy and this could have been logged as two or three 'escorts' in one 'patrol.'[45] The ratio figure on the right of the table is a direct percentage of escorts relative to total patrol missions and must therefore be regarded as an approximate figure, valuable only for comparative purposes. Finally, the last five to six months of active anti-submarine flying will serve to highlight the fact that the use of aircraft for convoy escort was not the predominant role by the end of the war.[46]

For fixed-wing aircraft, including aeroplanes, floatplanes, and flying boats of all types, the following table demonstrates the sharp differences from area to area.

**Table 1. Aeroplane and seaplane patrols and escorts, May – October 1918.**

| Area | Patrols | Escorts | Ratio |
|---|---|---|---|
| Orkneys/Shetlands (No. 28 Grp and Grand Fleet) | 255 | 6 | 2% |
| Coast of Scotland (No. 22 Grp) | 537 | 119 | 22% |
| East Coast of England (No. 18 Grp) | 6509 | 3434 | 53% |
| East Anglia Coast (No. 4 Grp) | 2542 | 55 | 2% |
| Dover/Dunkirk Area (No. 5 Grp) | 1127 | 72 | 6% |
| Portsmouth (No. 10 Grp) | 5107 | 846 | 17% |
| Plymouth (No. 9 Grp) | 5356 | 109 | 2% |
| Irish Sea (Nos. 14 and 25 Grp) | 1189 | 29 | 2% |

Note that No. 18 Group outpaced the other areas in using fixed-wing aircraft as escorts. The Coast of Scotland and Portsmouth Commands, both strong in seaplane complements, made efforts to fly more escorts, but in no way can this work be considered a primary emphasis. Finally, the remaining five coastal areas clearly preferred fixed-wing aircraft for routine patrols, contact patrols, and 'emergency' hunts.

Airships appeared to produce a much more consistent rate of escorts across the commands. It is surprising, however, to observe that the number of escorts generally (except for No. 18 Group) gave way to area patrols. Thus, the convoy escort role was not 'the principal use of the airships' as John Terraine overstates in *Business in Great Waters*.[47]

**Table 2. Airship patrols and escorts, May – October 1918.**

| Area | Patrols | Escorts | Ratio |
|---|---|---|---|
| Orkneys/Shetlands (No. 28 Grp and Grand Fleet) | nil | nil | — |
| Coast of Scotland (No. 22 Grp) | 697 | 249 | 36% |
| East Coast of England (No. 18 Grp) | 470 | 241 | 51% |
| East Anglia Coast (No. 4 Grp) | nil | nil | — |
| Dover/Dunkirk Area (No. 5 Grp) | 657 | 301 | 46% |
| Portsmouth (No. 10 Grp) | 1002 | 82 | 8% |
| Plymouth (No. 9 Grp) | 859 | 341 | 40% |
| Irish Sea (Nos. 14 and 25 Grp) | 1491 | 347 | 25% |

It is interesting to note the small number of airship escorts in the Portsmouth Group. Also, the three major airship stations serving the Irish Sea varied in their emphasis; Pembroke's ratio was 18 per cent, Anglesey's 20 per cent, and Luce Bay's a much greater 39 per cent. Thus, even within an area, the focus of missions was not consistent.

Finally, the statistics regarding kite balloons appear to be the most surprising. This weapon system, perhaps perfectly suited for convoy

escort since it was physically attached to a convoy escort vessel, was employed in drastically different methods from area to area. The figures below demonstrate that Marder's assertion that kite balloons were employed 'frequently to provide air escort to convoys' did not paint a complete picture.[48]

**Table 3. Kite balloon patrols and escorts, June – October 1918.** [49]

| Area | Patrols | Escorts | Ratio |
|---|---|---|---|
| Orkneys/Shetlands (No. 28 Grp and Grand Fleet) | 21 | nil | 0% |
| Coast of Scotland (No. 22 Grp) | 14 | nil | 0% |
| East Coast of England (No. 18 Grp) | 15 | 15 | 100% |
| East Anglia Coast (No. 4 Grp) | 7 | nil | 0% |
| Dover/Dunkirk Area (No. 5 Grp) | 32 | nil | 0% |
| Portsmouth (No. 10 Grp) | 44 | 9 | 20% |
| Plymouth (No. 9 Grp) | 58 | 53 | 91% |
| Irish Sea (Nos. 14 and 25 Grp) | 19 | 19 | 100% |

Three commands stand out as clear supporters of the kite balloon escort philosophy: East Coast of England, Plymouth and the Irish Sea. The Plymouth and Irish Sea kite balloon units supported inbound and outbound ocean convoys, a suitable role when protection at a greater distance from shore was required. The remaining commands obviously chose to employ their kite balloons in the hunting role with patrol flotillas. Finally, between June and October 1918, kite balloons escorted convoys on only 96 occasions. Given a finite number of kite balloons available and with differing methods of employment from command to command, there were hundreds of daily convoys, as part of the ocean-going and coastal systems that did not benefit from the protection of kite balloons. During the entire year of 1918, kite balloons made only 131 escorts.[50] Thus, a relatively small proportion of convoys enjoyed this protection.[51]

The convoy system was the key innovation in the anti-submarine war and aircraft generally contributed to its success. Air escort of convoys was an effective means of employing aircraft, but the percentages of aircraft allocated to this mission differed from region to region – differences ignored in the works mentioned earlier. At least 37 squadrons of naval cooperation aircraft – amounting to 285 flying boats and floatplanes, 272 landplanes, and 100 airships – participated in trade protection in Britain by the end of the war.[52] But since tactical philosophies and operational requirements for the use of these resources differed from region to region, we find that the majority of these aircraft were used for air patrols and not for convoy escort. Only in northeast England did airship, seaplane, and aeroplane escort missions outnumber other forms of patrol work and here only barely. The absence of a centralised organisation to command all naval air contingents operating in home waters, such as RAF Coastal Command of later years, led to a situation where the benefits of air escort would not be equally enjoyed in all regions.

## Conclusion

When Barley and Waters wrote *The Defeat of the Enemy Attack on Shipping* in the mid-1950s, their purpose was to provide a convincing argument in favour of convoy as the antidote to enemy submarine attacks against British commerce. This assertion was

intended to highlight the Admiralty's alleged poor preparedness for World War Two, after clear lessons from World War One, a trend that some saw as being repeated during the early Cold War.[53] Unfortunately, Barley and Waters' discussion of the Great War experience of air anti-submarine warfare (ASW) was over-generalised and did not provide a clear picture of the real situation; later historians, such as Arthur Marder and John Terraine, quoted from the work directly since it apparently provided evidence to support their own contentions about the Admiralty in World War One.

The real historical record of RNAS and RAF accomplishments in their campaign against German U-boats provided key lessons in other ways. The three air ASW missions of the Great War – bombing U-boat bases, patrolling the sea lanes, and providing air convoy escort – met with varying degrees of success. Bombing the Flanders U-boat bases forced the Germans to invest heavily in their defence, but failed to destroy or damage U-boats at a rate commensurate with the effort. That effort suffered from a lack of focus; loaning RNAS bombers to the army in support of ground offensives and the need to attack Gotha bases pulled missions away from naval targets. A persistent campaign against U-boat bases at Zeebrugge, Ostend, and Bruges may have forced the Germans to abandon these forward bases in favour of more secure dockyards in Germany.

RNAS and RAF air patrols along Britain's littoral waters became increasingly effective against U-boats as aircraft inventories grew and improved designs took to the air. German U-boat war diaries and flotilla records, recovered after World War Two, indicate anxiety over increased British air patrols above the sea lanes. Flooding the air with patrols – in order to deny U-boats their ability to move at speed on the surface – hindered German hunting operations. Air patrols may also have thwarted Germany's mine-laying tactics by the last year of the war.

Finally, the most effective use of aircraft in the ASW role was convoy escort. Aircraft of all types provided increased visibility and almost immediate detection of surfaced U-boats or torpedo wakes. The ability of aircraft to 'force multiply' surface escorts was a lesson employed with deadly effectiveness during the Second World War, but in the First it was not a widespread technique. Why not? We really do not know for certain. We do know that the use of aircraft in convoy was a recommended tactic that was publicized in monthly reporting. The command structure of naval aviation during the Great War might offer one explanation.

As stated above, there was no single commander or headquarters responsible for naval air operations during World War One. Advised by his air group commander, each naval C-in-C was free to employ his air assets as he deemed necessary. The Admiralty's Air Department, or later Air Division, could formulate and recommend naval air doctrine, but these organizations had no authority to force regional units in the field to employ it. Perhaps the most important lesson of the Great War

was the need for a single command to oversee such operations. RAF Coastal Command thus owes much of its success in World War Two to the experience of the Great War.

**Notes**

[1] Crew of Seaplane 8695, Report of Bombing Submarine, RN Seaplane Station Dunkerque, 22 Sep 1917, TNA ADM 137/377, 311-12, Public Record Office, The National Archive [TNA], Kew; Report of Operations, Dunkerque Seaplane Station and Seaplane Defence Flight, 22 Sep 1917, TNA AIR 1/1880/204/221/8; C. E. S. Lusk Logbook, 22 Sep 1917 entry, Fleet Air Arm Museum, RNAS Yeovilton.

[2] Robert M. Grant, *U-Boats Destroyed* (London: Putnam, 1964), 159. There were an additional 14 U-boats scuttled, bringing the total lost to 192.

[3] *RNAS Anti-Submarine Report*, Dec 1917, TNA AIR 1/2105/207/41/7, 15-23; Technical History Section, *The Technical History and Index, Part 4: Aircraft vs. Submarine, Submarine Campaign, 1918*, March 1919, Naval Historical Branch, UK, 19 [Hereafter TH4].

[4] For example, Paul G. Halpern, *A Naval History of World War I* (Annapolis: Naval Institute Press, 1995), 424-27; Dwight R. Messimer, *Find and Destroy: Antisubmarine Warfare in World War I* (Annapolis: Naval Institute Press, 2001), Chapter 15; Lee Kennett, *The First Air War, 1914-1918* (New York: Free Press, 1991), 189-97; John H. Morrow, Jr., *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington: Smithsonian Institution Press, 1993), 245, 324-25.

[5] Air Department, Orders for Dunkirk, 12 September 1914, TNA AIR 1/2301/212/2. The force also included 60 motorcars for reconnaissance purposes.

[6] Norman Friedman, *Seapower as Strategy* (Annapolis: Naval Institute Press, 2001), 83.

[7] Vice Admiral Sir Arthur Hezlet, *Aircraft and Sea Power* (London: Peter Davies, 1970), 98.

[8] Admiral of the Fleet Sir John R. Jellicoe, *Crisis of the Naval War* (London: Cassell, 1920), 203.

[9] Admiralty Historical Section, *The Defeat of the Enemy Attack on Shipping, 1939-1945*, edited by Eric Grove (Aldershot: Aldgate, 1997), 10; Air Ministry, *Synopsis of British Air Effort during the War*, 1 Jan 1919, TNA AIR 8/13, 8.

[10] Robert D. Layman, *Naval Aviation in the First World War* (Annapolis, Naval Institute Press, 1996), 84-85.

[11] V. E. Tarrant, *The U-Boat Offensive, 1914-1945* (London: Arms and Armour Press, 1989), 30-31.

[12] Bacon to Admiralty, Cover Letter: Report of Attack on Mariakerke Aerodrome and Zeebrugge carried out on the 21st May 1916, 24 May 1916, TNA AIR 1/633/17/122/83.

[13] Bacon to Admiralty, Report: Air Service Operations in Belgium, 6 June 1916, TNA AIR 1/633/17/122/90.

[14] Air Department, 'Bombing raids from Dunkirk Listed by Objective, 1916-17', TNA AIR 1/296/15/226/145.

[15] S. F. Wise, *Canadian Airmen and the First World War, The Official History of the RCAF, Vol I* (Toronto: University of Toronto Press, 1980), 162.

[16] Dunkirk Résumé of Operations, July to Sep 1917 Summary, TNA AIR 1/629/17/117/3.

[17] Dunkirk Résumé of Operations, 16-30 September 1917, TNA AIR 1/629/17/117/5.

[18] Walther Gladisch, *Der Krieg in der Nordsee, Vol VII* (Frankfurt: E. S. Mittler, 1965), 319.

[19] Report of the Aircraft Bombing Committee, March 1919, 68, TNA AIR 1/2115/207/56/1.

[20] H. A. Jones, *The War in the Air*, IV: 107-08; and VI: 392-93.

[21] Halpern, 415-16.

[22] JWAC Memo AIR 4: Policy of the

RNAS, 3 Mar 1916, TNA AIR 1/2319/226/26.
[23] Historical Section, *Defeat*, 6-10.
[24] Arthur J. Marder, *1917: The Year of Crisis*, vol. IV of *From Dreadnought to Scapa Flow: The Royal Navy in the Fisher Era, 1904-1919* (London: Oxford University Press, 1969), 82; Marder, *Victory and Aftermath (January 1918 - June 1919)*, vol. V of *FDSF* (London: Oxford University Press, 1970), 91. In his preface to Vol. IV, Marder thanks Waters as well as RNAS veterans for their advice (vii). The anti-patrol arguments are repeated in Tarrant, *U-Boat Offensive*, 42-43, and elsewhere.
[25] Training and Staff Duties Division, *Naval Staff Monograph No. 35 (Historical), Vol. XIX: Home Waters, Part IX, 1 May 1917 to 31 July 1917*, Aug 1939, NHB, 84-5. The Flanders-based boats were *UC62, UC63, UC64, UB20*, and two cruises of *UC71*.
[26] Naval Intelligence Division, 'Extracts from German Secret Instructions for War Against Commerce, November 1916 - June 1917', Nov 1917, TNA ADM 137/3886, 33-40.
[27] Messimer, *Find and Destroy*, 131. Also see John J. Abbatiello, *Anti-Submarine Warfare in World War I: British Naval Aviation and the Defeat of the U-Boats* (London: Routledge, 2006), Chapter 7.
[28] JWAC Memo AIR 4: Policy of the RNAS, 3 Mar 1916, TNA AIR 1/2319/226/26.
[29] Marder, *FDSF*, V: 79.
[30] Training and Staff Duties Division, *History of British Minesweeping in the War*, Dec 1920, NHB, 123-28.
[31] Development of the Airship Service, Nov 1918, TNA AIR 1/2314/221/1, 22.
[32] *Minesweeping*, 76.
[33] *TH4*, 14.
[34] William Jameson, *The Most Formidable Thing* (London: Rupert Hart-Davis), 263.
[35] Historical Section, *Defeat*, 4; William S. Sims, *The Victory at Sea* (Annapolis: Naval Institute Press, 1984), 164.
[36] Messimer, *Find and Destroy*, 155.
[37] *TH4*, 12.
[38] Marder, *FDSF*, V: 93.
[39] Historical Section, *Defeat*, 8; Marder, *FDSF*, IV: vii.
[40] Marder, *FDSF*, V: 92; Historical Section, *Defeat*, 5-10.
[41] Morrow, *GWA*, 324-25; Halpern, *Naval History*, 426-27.
[42] Admiralty Memo M.011622/17, 12 Sep 1917, TNA ADM 137/1323, 428-36.
[43] DAD, Statistics and Notes on Escorts by Aircraft, 25 Jun 1918, TNA Air 1/284/15/226/136 Part I, AD2831.
[44] TNA AIR 1/626/17/59/1-7.
[45] Statistics and Notes on Escorts by Aircraft, TNA Air 1/284/15/226/136 Part I, AD2831.
[46] As inferred by Marder and Barley/Waters. Marder, *FDSF*, V: 91; Historical Section, *Defeat*, 7, 355.
[47] Terraine, *Business*, 126.
[48] Marder, *FDSF, Volume V*, 92. This statement counters an assertion in the previous volume (IV:271) that kite balloons 'were used mostly with destroyers for independent submarine hunting.' This inconsistency probably led a recent study to conclude incorrectly that the Admiralty abandoned kite balloon use with convoys. Messimer, *Find and Destroy*, 134.
[49] The kite balloon figures for the Irish Sea include the bases at Lough Swilly (Rathmullen) as well as Milford Haven. Additionally, this chart is based on returns beginning in June 1918, since numbers of patrols were not reported by base prior to this month.
[50] *TH4*, 19.
[51] Layman, *Naval Aviation*, 124.
[52] Peyton-Ward, *RAF in Maritime War*, TNA AIR 41/45, I: 44; Halpern, *Naval History*, 425.
[53] Historical Section, *Defeat*, Ed.'s introduction.

# Through a Glass Darkly: The Royal Air Force and the Lessons of the Spanish Civil War 1936-1939

**By Sqn Ldr Brian Armstrong**

The Spanish Civil War (SCW) 1936-1939 saw participation by 'volunteer' air forces from Germany, Russia and Italy, in order to test out the new realities of aerial warfare. Although the RAF is generally believed to have ignored the SCW to concentrate on preparing for war against Germany, in fact between 1937-39, the British armed forces purposely studied the SCW through two special joint Air War intelligence committees. This paper provides a broad picture of the work of the Air War committees, exploring the influence of SCW air power lessons as applied by the RAF leadership to bomber, fighter, close-support, army co-operation and weapons policy.

*'For now we see through a glass darkly: but then face to face…'*

**I Corinthians 13, verse 12**

The Spanish Civil War of 1936-1939 saw direct participation by the air forces of Germany, the Soviet Union and Italy in the guise of volunteers, seemingly intent to test out the new realities of aerial warfare and to learn vital lessons. Yet, in Great Britain, the Royal Air Force – the very torchbearers of air power – apparently regarded Spain as little more than an alarming distraction from the urgent need to plan and prepare for war against Nazi Germany. One historian bluntly stated that '…the attitude of the RAF towards the events in Spain can be described as one of general indifference.'[1]

It is difficult to believe that the RAF would choose to pay little heed to the first air war since 1918 and not seek to draw lessons from it, particularly when the stakes were so high. Some authorities claim that this decision created the ignorance of the developments that threatened to be Britain's nemesis in France during 1940 – the *blitzkrieg* weapons of the tank and close air support.[2] Instead, the RAF remained devoted to strategic bombing, their 'matter of faith', which was quickly shattered, in disastrous early raids on the German fleet.[3] An inevitable episode given one commentator's belief that the RAF was prepared to '…blithely ignore the lessons of Spain about the vulnerability of bombers to modern fighters…'.[4] The question has to be asked: Why should such perceptions have arisen?

Most studies of the interwar RAF have concentrated on the rise of strategic bombing as the central pillar of RAF strategy.[5] However, Air Ministry analysis of the Spanish Civil War resides in the Air Intelligence branch files, most of which were opened long after the release of most official documents. Many well-known works were written before the files were available and research naturally centred on better-known, more accessible sources. Furthermore, the picture was blurred by the ambivalent attitude of many RAF leaders, whose biographies often portrayed Spain as a dark cloud on the international horizon, not as a subject worthy of attention *per se*.[6] Yet, clear indications that the RAF did take note of the lessons of the Spanish Civil War do exist.

John Terraine's impressive 'The Right of the Line', does not ignore Spain, but makes several telling points about the influence, or lack of it, on the RAF. Terraine cites the Air Staff (AS) as having a tendency to learn the wrong lessons or to simply refuse to face the facts. To RAF eyes, the German Condor Legion '…gave the world a new lesson on the meaning of air power with the destruction of Guernica. Unfortunately, this lesson was so much taken to heart *that equally important ones were discarded* [author's italics]'.[7] There was little mileage in seeking to identify Spanish Civil War lessons if such lessons were to be considered heresy:

*…the airmen could not see – let alone admit – that others might think differently [about strategic bombing]. Practical demonstrations did not convert them…the Madrid and Barcelona air raids…obscured the day-in and day-out activities of the air forces of both sides in*

*close support of ground operations.*[8]

Although Hinsley's classic work on the WWII British Intelligence effort was compiled from official sources before most *intelligence* files were opened, he offers definite evidence of an alternative approach to the Spanish Civil War. While detailing the pre-war intelligence organisation, he states that of the Joint Intelligence Committee's activities '…the only one…which spawned sub-committees, *was the attempt to discover what could be learned about air warfare by studying the available information on operations in Spain and China.*'[9] He outlines the activities of two joint-service sub-committees that existed specifically to identify the Spanish Civil War lessons which the RAF is believed to have so 'blithely ignored'. In 1987, Wesley Wark, author of a perceptive history of British pre-WWII intelligence, illustrated the difficulties of learning lessons in peacetime by examining the RAF Air Intelligence Branch 1935 – 1939.[10] Wark's paper remains the only history of the Air War Spain and China Committees (AWSCC) between March 1937 and June 1939.[11] In a complete rebuttal of the belief that the British armed forces ignored Spain, Wark concluded that *Britain was the only country to make a directed effort to identify the military lessons of the Spanish Civil War*. The decision to form joint committees was both original and highly innovative, and deserved success. Unfortunately, it was destined to fail. Although considered by the Chiefs and Deputy Chiefs of Staff (COS/DCOS):

'*…a total of eight detailed reports on aspects of this small war failed to establish the right aperture for seeing the Spanish War…Both the CIGS and CAS responded…by perceiving them to contain threats to the doctrine and role of their services, based upon a failure, as they saw it, to understand the general irrelevance of the Spanish Civil War.*'[12]

Like St Paul in the opening quotation, the COS/DCOS peered through 'a glass darkly'. Straining through the mists of strategic orthodoxy, mirror-imaging and inadequate sources, they could only see '…the inappropriateness of taking Spain as any kind of a model for the conduct of war between first-class powers.'[13] They did not ignore Spain, *it was examined in detail and its relevance discounted*. The chance to learn germane lessons 'face-to-face' had to wait for WWII.

Wark acknowledges that the closure of the detailed Air War Spain and China Committees records and papers at his time of writing rendered his picture incomplete. Consequently, he makes no attempt to examine other questions. Were the Air War Spain and China Committee's findings accurate? Was the information disseminated appropriately? Should any lessons have influenced RAF policy and decision-making?

This paper attempts a more holistic approach to the subject of the RAF and the Spanish Civil War. It draws upon extensive original research conducted in the UK National Archives, (TNA) and aims to provide a broad picture that goes beyond intelligence to address those intriguing, unanswered questions. It starts by examining the shape of pre-war Air Intelligence and the formation, work and findings

of the Air War Spain and China Committees. It explores the decisions taken by the COS/DCOS on the Air War Spain and China Committees reports and considers the influence of Spanish Civil War lessons on other great powers. Finally, it attempts to follow the influence of the Spanish Civil War as applied by the RAF leadership to the vital areas of bomber, fighter, close-support, army co-operation and weapons policy.

## The Evolution of Air Intelligence

Williamson Murray wrote that although modern military budgets devote vast sums to the collection, analysis and dissemination of intelligence, intelligence in peacetime still plays an ambiguous role in the evolution of national security. The utility of intelligence is often undermined both by the influence of the political leader's perceptions on the strategic analysis and the inability of analysts and decision-makers to view their opponents through anything other than a mirror image of their own courses of action and risk-assessments.[14] It is hardly surprising then, that the small, British interwar intelligence organisation found it difficult to evaluate the strategic situation and respond effectively.[15] To understand the development of the Air War Spain and China Committees reports and the COS/DCOS reactions, we must understand the evolution of RAF Air Intelligence.

Like the army, the Air Staff embedded Air Intelligence in the Directorate of Operations and Intelligence (DOps & I). However, Hinsley writes that the higher levels of the military showed both antipathy and disinterest in intelligence, '... intelligence was thought of as a professional backwater, suitable only for officers with a knowledge of foreign languages and those not wanted for command'[16]

Nevertheless, the RAF was aware of the need for increased intelligence. In 1935, the Air Ministry created a Group Captain Intelligence deputy to DOps & I, who would be appointed to Director status on declaration of war. Despite considerable Treasury opposition, an increase of staff was approved.[17] The Air Intelligence focus slowly shifted from the Middle East to Europe and Air Intelligence staffs were created at Home Command level. Air Intelligence's structure was geographically based, with the German section – AI3b – becoming increasingly heavily employed. Each section had a technical officer who collected data rather than proactively studied the technical progress of potential enemies.

Following a 1936 DCOS report on the central machinery for co-ordination of intelligence and discussions with the Secretary of the Committee of Imperial Defence (CID), two major revisions of British Intelligence occurred. The Committee of Imperial Defence's Industrial Intelligence in Foreign Countries Sub-Committee (FCI) gained an Air Targets Sub-Committee, with responsibility for all target information including photographic intelligence. The creation of the COS Joint Intelligence Sub-Committee in July 1936 was intended to assist the Joint Planning Staff (JPS) to co-ordinate the work of the three services in planning and conducting operations.[18] The Joint Intelligence Committee was intended to improve the intelligence

flow by providing a conduit to supply the JPS with intelligence of a joint-service nature.

By now, Air Intelligence staff were engaged in a constant battle to estimate the *Luftwaffe's* changing front-line strength and '…already at loggerheads with the Foreign Office (FO) over intelligence assessments. Neither department prepared to trust the expertise or judgement of the other.'[19] Worse still '…the Air Ministry's assumptions as to how the *Luftwaffe* would be used were so much modelled on the RAF's own plans that it not only neglected the available intelligence but also omitted to subject its acceptance of the prevailing opinion to technical study…'.[20] The 1936 move towards jointery should have increased the efficiency of the service intelligence departments, but the Joint Intelligence Committee:

*'…remained a peripheral body; one which had considerable difficulty in developing a function to supplement those already being performed by the intelligence branches of the service departments, the Industrial Intelligence in Foreign Countries Sub-Committee and the Joint Planning Staff, for several reasons. The planners did not call for its views except on topics on which intelligence was either of a routine nature or hard to come by. Nor did the Joint Intelligence Committee show any initiative in volunteering appreciations on important questions…partly because Service opinion in Whitehall frowned on speculation.'*[21]

Wing Commander Goddard, AI3,led the German section. He commented bluntly:[22]

*'The Air Ministry founded a clandestine intelligence section section within Plans & Ops, CDS DQ – Is this correct or should it read Plans & Ops intelligence section? capable of giving air interpretations of the trend of military and economic potential in foreign countries in relation toAir Power [but even after 1936]…those highly responsible "policy proposers" preferred still to depend for intelligence chiefly upon their own two man illicit intelligence bureau…[who] had constituted themselves…as the filter through which all our advice was sieved…'*[23]

Thus, from 1936 – 1939, British Intelligence was a flawed structure operating under considerable pressure. Wark notes that their contribution was essentially negative because each service portrayed a 'worst-case' scenario. This attitude caused the four JPS strategic appreciations produced between 1936 and 1939 to present a seriously skewed picture of German strength.[24] Despite clear successes in estimating the post-1936 *Luftwaffe's* front-line strength, the quality of long-range prediction was poor. There was an overemphasis on *Luftwaffe* striking power evidenced by the exaggerated fear of the 'knock-out blow'.[25] Official criticism of the likelihood of a knock-out blow appears to have been actively discouraged. The '…operating factors governing Germany's power to deliver a knock-out blow were not critically examined or the scale of attack questioned.'[26]

## The Formation of the Air War Spain Sub-Committee

The Spanish Civil War not only posed a threat to international peace, but also offered the intelligence

community a potential laboratory in which to study the techniques and equipment of likely enemies. This was not lost on Air Intelligence. Within a month of the Spanish Civil War starting, Goddard had supplied the Deputy Chief of the Air Staff (DCAS) with details of aerial fighting and foreign participation. By October 1936, he was counselling that reliable data would be hard to obtain.[27] He informed Air Plans that 'The enclosed papers do not provide what you want…but you will see the nakedness of the hand of intelligence…'[28] However, by February 1937, a stream of intelligence had replaced 'the nakedness' and Air Intelligence were convinced of the importance of studying the Spanish Civil War:

*…The amount of information is already more than the section – AI3d – can deal with… certain foreign countries are employing their aircraft and war material…as a means of trying them out for fitness for war, and since the tactics being employed by the air forces will undoubtedly have much to do with the tactics adopted in their respective countries, it is essential that a thorough investigation should be made…*[29]

The Admiralty sought to persuade the Joint Intelligence Committee to formally study the Spanish Civil War. Surprisingly, Admiral S. H. Philips advocated a special sub-committee to study air warfare *alone*. He argued that the only information available on air warfare derived from 1914 – 1918 and was both limited and potentially misleading when applied to *modern* war. In the first use of a caveat that became much applied, he argued that '...this warfare may not be as intensive or as highly technical as that which may be visualised *in a future war between first-class European powers…'*.[30] Instead of welcoming Admiralty support, the Air Ministry reacted with a mix of anger and suspicion. One officer minuted '…the Admiralty may be seeking support for a theory that the effect of bombing operations is exaggerated.'[31]

*German "Condor Legion" pilots and aircrew at La Cenia airbase, 1938*

In Joint Intelligence Committee debate, the Deputy Director of Intelligence (DDI), Group Captain Medhurst, was unyielding. He stated that three officers were already engaged in sifting and collating Spanish Civil War information; he couldn't envisage '...what functions the Sub-Committee could usefully perform over and above the investigations now in progress in the Air Ministry.' He was prepared to let the Sub-Committee look at the accumulated detail, but was certain that '…it was undesirable that this work should be side-tracked.'[32] This is a clear example of 'collegiality'- the practice of intelligence assessments being made on the unchallenged

assumption of the superiority of the professional judgement of each service in their individual sphere of warfare and which marred the first three pre-war strategic appreciations.[33] The Deputy Director of Intelligence simply could not see what a *joint* committee could add to the Air Ministry's expert assessments. However, he was not to have his way. In May 1937, Goddard was ordered to chair the Joint Intelligence Committee Sub-Committee on the Air War in Spain – Joint Intelligence Committee (S).[34] The Joint Intelligence Committee Secretary instructed him 'To examine all available information on air warfare in Spain…', but reiterated the Admiralty's view of the relevance of the Spanish Civil War '…since we are not dealing with the operations of the metropolitan air forces of first-class powers [reports] should not include questions to which the air warfare of the Spanish Civil War cannot possibly provide the answers.'[35]

*The Fiat CR32 was flown by the Italian "Aviazione Legionaria" and the Spanish Nationalist Air Force*

Goddard had in fact already agreed this approach with the Deputy Director of Intelligence. He thought it necessary to '…show that Air Warfare as talked about nowadays, does not apply to the Spanish Civil War except in a minor degree.'[36] This decision automatically reduced the likely impact of the Sub-Committee's findings by accepting that Spanish Civil War lessons would probably not be applicable to Britain, but Goddard briefed Joint Intelligence Committee (S) members *not to merely list facts* – as proposed by the Admiralty – t*hey must draw conclusions and deductions,* '…otherwise the advantages of their combined expert knowledge would be lost.'[37]

The Joint Intelligence Committee (S) agreed a framework of reports and a comprehensive data collection matrix. This data bank has not survived, but consisted of 18 main headings and 103 separate sub-headings, covering everything from political background to bomb types.[38] Faced with the lack of sources in the country, the Joint Intelligence Committee (S) intended to use all data effectively.

**Sources**

The normal source of Spanish foreign and military intelligence was from diplomats and military attachés located at British embassies in Lisbon, Paris and Madrid. However, the embassy in Madrid soon evacuated to Hendaye, exiling the only air attaché in Spain, Flight Lieutenant Pearson, to Valencia. Goddard's hopes for useable intelligence were dashed. He wrote to the Foreign Office '…Pearson has done his best, but I think that the Government authorities…[believe] our attachés are probably informers for Franco...Our efforts to get in touch with authoritative opinion on Franco's side have been abortive…'.[39] Wark comments that Air Intelligence

attempted to make up for the loss by '...harrying these consuls [the British consuls in Madrid, Barcelona, Valencia and Cartagena]…for a volume of air raid reporting on the effects of air raids…'.[40] Certainly, Goddard was convinced that '…it is one thing to refrain from intervention but quite another to be ignorant of military developments in the air in which we cannot possibly afford to lag behind.'[41] However, the results were very patchy.[42]

The many visitors to Spain offered alternative sources of information. These included MPs, retired officers and press representatives; the media was very active in debate about the Spanish Civil War. The disaster of Guernica, the bombing of Madrid and Barcelona, all attracted shocking newsreel footage which, when shown before popular film matinees, cemented the image of the 'air menace' and the 'knock-out blow' in the mind of the British populace.[43] The poor quality of press reports meant that credence was usually only given to them when all other sources were unavailable. Visiting MPs had a double-edged effect on the Air Intelligence study. Those with previous military training were able to offer valid impressions of the fighting.[44] However, their visits sparked emotional debates in Westminster and some criticism of the British attitude to Spanish Civil War lessons.[45] Former officers included such luminaries as Major-General J. F. C. Fuller who made two visits to Nationalist Spain during 1937.[46]

There were to be no Secret Intelligence Service resources available to the Joint Intelligence Committee (S), although they considered they needed such assistance.[47] The final source of data came from actual combatants. Several British airmen served in the Spanish Civil War and the FO kept files on most of them.[48] Some were interviewed in Spain by air attaché Pearson and others debriefed in Britain. Some provided excellent material, but their true value seems to have gone unrecognised.[49]

### Summaries of Information

Contrary to Corum, Air Intelligence data on Spain was released to the RAF throughout 1936 – 1939.[50] A weekly summary of information was circulated to the Air Staff from July 1936 and Spain invariably featured in Air Intelligence monthly summaries until July 1939. These were not highly classified, covered political, military and aerial activity and released revealing detail on such activity as bombing and ground attack, for widespread use.[51] From April to October 1937, Joint Intelligence Committee (S) activities were aimed at the production of detailed reports. The results were considered to be 'interim', as more detailed data was arriving, and the Joint Intelligence Committee (S) sought future direction.[52] The three reports – 'Anti-Aircraft Artillery Defence', 'Air attack on Fuel Oil Storage' and 'Low Flying Attack on Ground Forces', were put to an extraordinary meeting of the COS in October 1937.[53]

### The Joint Intelligence Committee (S) Reports

Report No. 1 on Anti-Aircraft Artillery Defence evinced the difficulty of collecting data from Spain. This report was later to attract adverse criticism from the War

Office (WO). The Sub-Committee on Bombing and AA Gunfire Experiments reported that '...the practical value of the reports on air warfare in Spain was almost negligible as...records of the essential factors [speed, height of aircraft] were seldom ascertained…The essential factors were in fact...virtually unobtainable'.[54] However, despite noting that forces were '…badly-trained, poorly armed and deprived of essentials…' it ignored the fact that '[they still]…managed to achieve important results and forced bombers to fly high with consequent lack of accuracy.'[55] Comment was made on the excellence of the German AAA forces, the utility of their 88mm guns and the need for aerodrome defences. Yet by caveatting that the results '…fell short of first-class powers…' and not seizing upon the German performance as indicative of their potential in a wider war, the paper proffered mixed messages.[56]

Report No.2 on Air attack on Fuel Oil Storage stated that there was little to learn but for the apparently insignificant fact that fuel storage had been set alight by bombs, incendiary bombs and machine gun (MG) ammunition with equal facility. The RAF, unsure of its operational aims, did not realise that these results could help frame the future Bomber Command operational plans against Germany.[57]

The most important paper, No. 4 detailed the impact of 'Low Flying Attack upon Ground Forces' and covered the bulk of air activity in Spain. In theory, it should have indicated that ground attack was now a vital element in warfare. It contained a '…combination of vivid but fragmentary detail, specific lessons and a general negative caveat about the relevance of the Spanish Civil War.'[58] It made telling points about the vulnerability of undefended troops, lacking air-raid warning and camouflage, to air attack. It found that '…every report on mobile military ops stresses the positive effects of aircraft operating… with ground forces and…the demoralising effect of the absence of AAA and or aircraft.' but stressed that '…tactics until latterly have not shown close ground-air co-operation.' The scale of attack had been small and troops were poorly trained when compared to the 'first-class powers'. Yet despite the 'second-class' slant, the most telling paragraphs concluded that '…the moral effect of air action against ground troops when aircraft are employed resolutely in conditions of undisputed air supremacy at the right time and place *has been out of all proportion to the material results achieved*. Furthermore, 'Material results *have been considerable* [author's italics]…Low-flying attack with machine guns or bombs was undoubtedly more effective in battle than bombing, especially high level bombing, alone.'[59] Although obscured by the many caveats, the importance of ground-attack aircraft in Spain and to future conflict was clearly identified in Report No. 4. (CDS DQ – Report 3?)

### The COS and the Joint Intelligence Committee (S) reports

That the COS met specifically to consider the Joint Intelligence Committee (S) reports shows the value British forces placed on Spanish Civil War lessons. Unfortunately, the reports arrived during a period

of 'détente' between the RAF and the *Luftwaffe*. In January 1937, the DCAS, Air Vice-Marshal Courtney, visited Berlin with several officers including Goddard. The COS met on 19 October 1937 – *the very week that Luftwaffe Generals Milch and Udet were in London on the reciprocal visit.*[60] The RAF viewed Spain in 1937 as an irrelevant conflict, but they were also convinced that they knew the Luftwaffe shared their viewpoint.[61] In addition, Deverell, the CIGS, was engaged in a parochial battle with Hore-Belisha, the Secretary of State for War, on the role of the Field Force (FF) and the relevance of the continental commitment.[62] He was not inclined to release resources to the RAF, which could further weaken the FF. The Joint Intelligence Committee (S) reports were reviewed by Newall (CAS), Deverell and Chatfield, the Chief of Naval Staff (CNS), accompanied by the Secretaries of State for War and Air, chaired by Sir Thomas Inskip, the Minister for Co-ordination of Defence.

The minutes make it clear that the COS were disinclined to accept major lessons from Joint Intelligence Committee (S) reports. The CNS pointed out that '…it would be helpful to consider these reports…*even though…no lessons of importance could be learned from them*. It was possible that certain technical lessons could be learned from them.'[63] The report on AAA Defence received considerable attention and emphasised that aerodrome defence needed further consideration. Deverell, conscious that the FF needed AAA resources, was adamant, '…the Report had been drawn up on meagre evidence…It was necessary to exercise care in the conclusions which should be drawn…' Hankey ruled that the Air Ministry should review the defence arrangements for RAF aerodromes.[64] CNS found the report on oil storage to be too limited to draw conclusions; another report would be needed. The vital paper on low-flying attack attracted the CAS's only real intervention. When Hore-Belisha noted *the use of aircraft in protecting ground forces*, Newall interjected that '…this was a gross misuse of resources [apparently]…the Italians were so impressed with the results of low-flying attack that they had diverted 50 per cent of their aircraft to this role.'[65] He was not about to follow their example. The COS concluded that the Joint Intelligence Committee (S) should report further, the RAF should examine aerodrome defences and any existing air defence organisation weakness was to be discussed interdepartmentally and reported to Hankey.

Hinsley suggests that the reports had little influence because their lack of detail rendered them inconclusive.[66] This was not true of the ground attack report, which contained considerable detail, particularly from victims of low-flying attacks. Sadly, the COS were not susceptible to suggestions that they should look for revelations. A '…highly conservative British approach to the tactical innovations… of the small wars…was established as a reflex action.'[67]

### The Joint Intelligence Committee (A)

In April 1938, the Admiralty suggested, against opposition, that the Joint Intelligence Committee (S) should be expanded to consider

all air warfare. However, there was a strong counter-opinion that the Sino-Japanese conflict provided a fertile study ground and should be included alongside the completion of the Spanish Civil War work. Once again the Air Ministry seemed reluctant to work jointly. The Deputy Director of Intelligence stated that '…Goddard could not be further deflected from his normal work.'[68] The Joint Intelligence Committee (S) continued to work, publishing a final report on the Spanish Civil War threat to the Straits of Gibraltar.[69] Following adverse WO comment upon the value of the report on AAA Defence, the position of the Sub-Committee was reviewed, but the Joint Intelligence Committee finally decided to expand the Joint Intelligence Committee (S) to '… examine all available information on air war in Spain and the Far East…' as the Joint Intelligence Committee Air War – Joint Intelligence Committee (A).[70] Goddard, though replaced as Chairman, retained responsibility for gathering intelligence.

In July 1938, the Air Ministry was focused even more firmly on the growing German threat, but Spanish Civil War lessons could still be useful. Air Secretary of State Swinton wrote to Newall on the role of the RAF in national defence, stressing that '…the impression has been given, perhaps quite wrongly by events in Spain, that bombing is still an indiscriminate weapon which can cause considerable material damage but cannot as yet be directed with accuracy and effort…'.[71] Swinton apparently wanted 'to give a true and unbiased account not only of the tactics…but also the lessons which can be drawn…for a responsible people' not realising how closely Britain's bombing capability resembled that 'wrong impression'.[72] Dutifully, Goddard struggled to obtain corroborating Joint Intelligence Committee (A) data from the FO. He wrote 'I am sure that the British Minister and the military attaché [know we]…need information regarding the effects of bombing but in fact little authoritative information comes through.'[73]

By November 1938, difficulties with Joint Intelligence Committee (A) resources were becoming apparent. The Munich Crisis led to the extensive revision of British war plans for war with Germany. Available manpower was at a premium and the Joint Intelligence Committee (A) members were needed for other duties. Home Office Air Raid Precaution support to the Joint Intelligence Committee (A) became problematic and important work on passive air defence was abandoned and '…attributed solely to the shortage of staff.'[74] In February 1939, four of eight planned reports had been completed and a proposal to dissolve the sub-committee was tabled.[75] While awaiting Joint Intelligence Committee approval, it was decided to complete a fifth report and provide an air tactics paper, but by March, Germany had occupied Prague and 'The COS thought that if Germany were to attack Poland, the right course would be that we should declare war on Germany.[76] The COS were too preoccupied to consider the five completed Joint Intelligence Committee (A) reports, and they were passed to the DCOS.[77]

### The DCOS and the Joint Intelligence Committee (A) reports

On 10 July 1939, Goddard, now

Deputy Director of Intelligence, presented five Joint Intelligence Committee (A) reports to the DCOS:

1. DCOS 100 – Air Attack on Sea Communications.
2. DCOS 101 – Air Co-operation with Land Forces.
3. DCOS 102 – Air attack on Industry.
4. DCOS 103 – Effects of Air Warfare on Internal Communications.
5. DCOS 104 – Active and Passive Defence.

But the pattern of 1937 was set to be repeated. The DCOS vision of the forthcoming war could not be affected at this late stage. As Wark surmises, '…the Spanish Civil War could never have served as a substitute parable for war…[it was] too unusual a theatre of war for that with too marginal an employment of advanced technology.' The reports were too disjointed with their mix of 'Close intelligence observation, with its technical details of equipment and events, [vying] for attention with possible lessons…from tactical innovations in that war.'[78]

DCNS suggested that the reports should be widely circulated to ministers and commands, but inevitably it should be indicated '…where the circumstances differed materially from those likely to obtain in a first-class war.'[79] The report on air attack on sea communications reinforced the negative approach stating that '…neither side in Spain possesses equipment of the standard or on a scale that might be expected in a war between first-class powers.'[80] Although strictly true, Air Intelligence knew that very large-scale fighting was occurring. For the Battle of Brunete in July 1937, the Nationalists had assembled 200 aircraft and the Republicans 400 aircraft; air battles saw over 200 aircraft in action simultaneously.[81] The report identified 'considerable' Nationalist success against Republican shipping with a small force of aircraft from Majorca. Traffic had been immobilised and ports seriously damaged, yet the report merely commented that this could not be replicated on Britain without a significantly greater effort.[82]

The report on Air Co-operation with Land Forces posed a direct question about the validity of RAF air support policy, but it also ambivalently portrayed the use of low-flying attack as an expediency forced upon 'second-class powers' in Spain. In un-industrialised Spain, ground forces presented the only worthwhile target. Nothing matched the target array required for the Air Staff's vision of independent air action.[83] The report supported the British position on this 'exceptional' use of ground-attack aircraft by quoting the German CAS's opinion as '…aircraft should not be used in the bombardment of the front line but are better employed on attacking communications and targets in the forward areas.' In addition, the '…general [ground-attack] employment of Italian units was largely at variance with Italian ideas on the use of air power in a major war.[84] However, the report recognised that '…the provision of aircraft for this purpose is undoubtedly receiving serious consideration by foreign powers…Italy, Germany, Japan and certainly Russia [sic]'. It also stated that the *Luftwaffe* '…has a specially

developed type of aircraft for close support and that the German Army is introducing special AA defensive organisation against such aircraft.'[85] Wark correctly wonders why '…a first-class power…should learn such lessons and develop such weapons… without comment by the Joint Intelligence Committee (A).'[86] This did not occur to the DCOS. Tellingly, the report concluded that the case was proven '…if the full effectiveness of aircraft…in close support is to be obtained…there seems to be a prima facie case for a special design.'[87]

The last major report considered active and passive air defence of cities and deployed forces.[88] 'The special nature of [Spain]…encouraged an exceptional use of aircraft against ground troops' but it also created a need for fighter escorts.[89] Both sides escorted bombers attacking inland towns and although Spain was a 'short-range' war, the Italians were '…devoting considerable attention to long-distance fighters. The Fiat CR 25, with a range of 1550 miles was in production in 1938.'[90] Ground-attack aircraft were also escorted. 'The number of protective fighters was sometimes as many as twice the number of aircraft engaged in primary ground-attack.'[91] The closing comment pointed clearly to the new reality of battlefield air attack:

*'The power of the air weapon against troops in the field was impressive even when its influence was mitigated by moderate AA defences…The conclusion cannot be avoided that the threat of air attack, extending to great distances beyond the forward troops, makes necessary an ample provision for the active and passive defence of armies in the field.'*[92]

But the DCOS meeting closed without modifying the Committee's view that there was '…any weakness in the potentialities of bombing, for if this had been the conclusion, the estimate of German capability to deliver a 'knock-out' blow against England would have been revised'.[93] Instead, the accumulated intelligence of two years of study was:

*'…taken to indicate that the airforces in Spain…had been inadequate to exploit the situation…Where opportunity did present itself of vindicating the power of the bomber, it had been lost by bad management. Regarded in this light, the main lessons to be learnt were negative. They were taken to indicate lines of policy that should not be adopted…*[94]

## Lessons of the other great powers

Britain was not the only nation unable to clearly discern air power lessons from Spain; all interested nations struggled to do so. To Coox, the 'Experiences of Ethiopia, Spain and China seemed irrelevant and atypical. The victorious allies of the WWI tended to regard their conduct of operations in that war to have been vindicated by ultimate victory.'[95] Without direct combat experience, France and the USA both found it difficult to identify relevant air warfare lessons from Spain.

In France, the supremacy of defensive doctrine went relatively unchallenged by the Spanish Civil War. Failure in battle was thought a result of faulty defensive doctrine and poor weapon quality. The dominance of WWI tactics remained. France read the Spanish Civil War as negatively as Britain because her strategic orthodoxy was just as powerful.

The American Army Air Corps shared the vision of the primacy of the strategic bombing offensive with Britain and their study of the Spanish Civil War exhibited similar attitudes. Assistant Chief of the Air Corps, Brigadier-General 'Hap' Arnold:

*'…commented briefly, dismissing it as irrelevant to modern warfare…He noted that strategic bombing had not been carried out because it was civil war. Air power in Spain had been used extensively in interdiction campaigns in support of ground forces…He advised against drawing lessons from Spain.'*[96]

Greer writes 'It was argued that the light bomber had proved effective in Spain as a weapon of ground support [but the Air Corps]…tended to answer that attack planes should be designed for their *proper* purpose rather than for close support of ground units.'[97] As a result, by 1941 '… no suitable type existed. It was stated that the discarding of attack aviation had resulted from observations of the Spanish Civil War, in which such aviation had been unsuccessful.'[98]

*The Polikarpov I-16-10 "Rata" was the Soviet Union's most advanced fighter. It was flown by Soviet pilots as well as being license-built in Spain for the Republican Air Force.*

In the Soviet Union, Italy and Germany, the powerful advantage of detailed feedback on operations and tactics was available, yet drawing the correct lessons proved to be almost as problematic as for Britain, France and America. The combatants incorporated Spanish Civil War lessons to formulate their approach to WWII. This ensured that they took advantage of valid innovations, but meant that acceptance of flawed lessons left a flawed doctrine for the WWII battles.

The Soviet Union contributed 1,000 personnel and 909 aircraft to the Republican cause. Their Spanish experience led to fundamental decisions about the validity of strategic bombing and close support of ground troops. Soviet Air Force General Lapchinsky, a pre-Spanish War advocate of Douhet, wrote that 'Strategic bombing could only be effective after the enemy's military resistance had been broken [based on Madrid and Guernica] and…only possible after military resistance was broken because until then all available Airpower *would have to be directed against the front.*'[99] The revised field service regulations of 1939 '…defined the air mission as being to reinforce the ground forces 'in the direction of the main effort'[100] Consequently, the Soviets disbanded the only European heavy bomber fleet. More positively, the success of the Soviet R.5/R.Z attack biplanes spurred the development of the IL-2 Sturhmovik, which became an essential part of post-1941 air-ground operations.

Italian experience in Spain proved as confusing. Despite contributing its most modern aircraft in substantial

numbers, COS General Valle, considered that they learnt nothing from the Spanish Civil War.[101] Before the war the *Regia Aeronautica* had been essentially Douhetian in approach, but the ground support operations advocated by Mecozzi proved effective in Spain. According to Sullivan the:

*'Aviazione Legionara was left free to test both Douhet's and Mecozzi's concepts as Rome ordered. These experiments convinced Valle that ground support ops would defeat the Republic more quickly but Valle's opponents forced him to continue terror bombing and Regia Aeronautica operational doctrine remained confused afterwards.'*[102]

*Returning from Spain, the 19,000 German "volunteers" were cheered at large military parades. They brought valuable combat lessons as well as suntans and medals*

In, particular, the failure to develop new fighter tactics had far-reaching effects. The predominance of Spanish Civil War veterans in the Air Ministry stifled tactical innovation and doctrine remained Spanish Civil War-based until 1941. Furthermore, the confusion over the validity of ground-attack prevented the Italians ever developing an effective close support aircraft.[103]

Early commentators argued that the Condor Legion experience dictated German air doctrine and forced the *Luftwaffe* to become 'the handmaiden of the army'.[104] Corum insists that the *Luftwaffe* had a well-balanced air doctrine before the Spanish Civil War, which permitted both strategic bombing operations and army support. Spain allowed them to perfect ground-attack techniques to such an extent that COS Von Richtofen successfully advocated a specialised ground-attack force before WWII.[105] Spanish Civil War lessons heavily influenced fighter tactics and bombing doctrine, confirming that fighter escort was needed for bombers and that '…attacks on armies could lead to an earlier victory than the bombing of economic resources and armament factories.'[106] Improvements were necessary in night and bad weather navigation while dive-bombing proved capable of being an effective substitute for horizontal bombing. But no improvement was made in bomber armament; *Luftwaffe* aircraft remained without armour protection and defended by single, free-mounted machine guns. However, Proctor states that overall, 'Many of the Germans who survived both wars are of the opinion that in the long range the negative outweighed the positive.'[107] What the Spanish Civil War did provide was a core of 19,000 combat veteran *Luftwaffe* personnel who were to play key roles in the forthcoming WWII.[108]

## The Air Staff and the Lessons of Spain

That the COS/DCOS did not re-orient RAF doctrine as a result of the

Air War Spain and China Committees studies did not mean that their efforts were in vain. Perhaps the Spanish Civil War was too unusual a conflict to take as a model for future war; all the great powers experienced difficulties in identifying correct lessons from it. Yet, Air War Spain and China Committees reports contained extensive detail, which could have informed the RAF of the direction and pace of German technology and given an insight into emerging German doctrine and tactics. A study of Air Staff decision-making 1936 – 1939 reveals that influential officers *were well informed* about Spain and made key decisions in the light of Spanish Civil War lessons. Spain stimulated important debate on tactics and weapons and influenced such vital discussions as air support for the Army in France.

**Armour and Weapons Policy**

The writer who thought that the RAF '…blithely ignored the lessons of Spain about the vulnerability of bombers to modern fighters…' does not realise the efforts the RAF went to in 1936 – 1939.[109] Although an Air Staff officer wrote that:

*'…admittedly, there have been pressing developments in the techniques of interception and fighter operations, [but]…the advantages conferred on the bomber by the amazing developments in speed are beyond dispute…we cannot rely on our close defences to save us…'*[110]

Air Commodore Slessor, Director of Plans (DPlans), was unimpressed and wrote 'Experience in Spain by no means bears out that statement…we have so little knowledge of first-class warfare'[111] While such optimism was being expounded, crash programmes to armour RAF aircraft and up-gun bombers were in progress. Jones states that the RAF '…formed the most accurate assessment of the hazards of daylight operations… bombers [needed]…powerful defensive armaments…in power-operated turrets.'[112] In 1936, the RAF issued two bomber specifications. The pilot was to have armour protection and all aircraft were to be heavily-armed with powered machine gun turrets.[113] Air Chief Marshal (ACM) Dowding of Fighter Command was already concerned about the ability of his eight .303 machine gun-armed fighters to defeat armoured German bombers and cannon-armed fighters. Spain offered hope of establishing whether the RAF was lagging behind. The question was asked:

*'…is armour being applied to the latest types of aircraft engaged in the Spanish war and if so what thickness…our present policy is to ask for a measure of protection for pilots of single seater fighters...[but] we accept the engine as being armour in itself.'*[114]

Air Intelligence knew the Germans had experimented successfully in combat with armour in Spain.[115] Incendiary ammunition had been particularly successful and explosive ammunition had been used against International convention. Cannon had been reported on French and German aircraft as early as April 1936.[116] Faced with the prospect of cannon-armed enemy fighters, an Air Fighting Committee (AFC) meeting concluded that the "…single engined fighter is invulnerable to .303 [fire]."[117] ACM Ludlow-Hewitt wrote to the Air Ministry seeking action '…Bomber Command cannot accept a state of complete helplessness

against the single-seater fighter'.[118] The up-gunning of bombers, more ammunition and speedy provision of enhanced armour offered the only answer.

Dowding also revised his position stating '…I consider that armour and bullet proof windscreens are fundamental requisites for modern fighters in view of the tactics, which they have to adopt [stern attacks].'[119] Air Intelligence then confirmed the use of armour in Spanish Civil War by Nationalist attack aircraft. They thought it *likely* that the Germans were considering protecting other aircraft, but later reports confirmed that German aircraft were not generally fitted with armour plating.[120] By October 1939, panic action on bomber armour was underway and the RAF was gaining the advantage; Sholto Douglas, the Assistant CAS (ACAS), wrote that all Hurricanes and 50 per cent of Spitfires had received armour, with 20 Spitfires being fitted each week.[121] German aircraft remained unarmoured at the outbreak of war.

*Groundcrew work on Hurricane Mk 1*

The question of bomber armament vexed the Air Staff. One officer, fearing enemy fighters armed with 20mm or larger calibre guns '…could not visualise the possibility of bombers being armed with an equivalent number of these weapons... [and] the bombers defence would therefore become inadequate...'[122] The only option was larger guns further reducing speed and bomb load. An order for 20mm cannon turrets was placed in 1937, but crucially the bomber would have to be built around large gun turrets if it was to carry usable loads at speed. This was incorporated into the design of the B.1/39 bomber, but the .303 machine gun would have to remain the standard for at least five years.[123] Unfortunately, Beaverbrook, the Minister for Aircraft Production, stopped all cannon-turret work in 1940 and none reached British bombers in wartime.[124]

The Spanish Civil War should have been able to offer advice on bomb requirements. The Air War Spain and China Committees had often attempted to equate bombing effect with the size of weapons used. Some graphic results from raids on Madrid were reported, but there was little technical examination. [125] In mid-1937, the RAF's biggest bomb remained a 500lb weapon but:

*reports from Spain indicated that the favourite bomb used against buildings was the 225 kilo [650lb] pound…The 2,000lb bomb is twice the load capable of being carried on Battle and Blenheim aircraft…There would seem to be a need for the design and supply of a 1,000lb bomb for attacks against heavy machinery targets.*[126]

Production of a 1,000lb weapon was approved in 1938, but it was not available until June 1939. Ludlow-

Hewitt was anxious to use the weapon against transport targets.[127] Spain offered relevant examples, some of which could influence plans '…it would appear that in the majority of attacks on railway lines, repairs have been possible with considerable rapidity. This indicates the desirability of harassing repair gangs by further carefully timed attacks if possible'.[128] Further evidence showed the potential vulnerability of the oil system 'The lessons of the Spanish Civil War seem to show that undefended tanks can be destroyed by aircraft with the greatest of ease; passive defence measures… show no guarantee that installations may not be destroyed completely.'[129]

## Escorts

Escorts for bombers had come to be regarded as a 'hardy annual' by the Air Staff, but numerous Spanish Civil War reports stating that large numbers of escort fighters were being used, prompted a vigorous Air Fighting Committee discussion in June 1937.[130] However, the Air Fighting Committee shared the reservations of the Air War Spain and China Committees. DCAS, influenced by his *Luftwaffe* visit, stated 'I have no doubt…that the concept of fighter escorts is essentially defective.' The Germans had told him that '…the circumstances of [Spain] were quite peculiar and very unlike…a war between two air powers.'[131] Dowding, usually such a forward-thinker, dismissed the Spanish Civil War as irrelevant; the conditions would not obtain in a European war. Large-scale use of escorts resulted because fighters were cheap, available and useful in a short-range war. Bombers were rare and expensive.[132] Fighters

*The German "Condor Legion" tested the Messerschmitt Bf 109 E-3 in Spain in early 1939. The E-3 became the mainstay of the Luftwaffe fighter force in the Battle of Britain*

could be easily drawn off, leaving the bombers vulnerable. The Air Fighting Committee agreed that this ruled the single-seat fighter out as an escort but"...fighters with their firepower mainly aft could be used to accompany the bombers...If multi-seater fighters could be used in the formation...the aircraft in question would be virtually a converted bomber...'[133] [The British tactical innovation resulting in the Defiant being armed purely with four turret-mounted machine guns proved a singular failure.][134] The single-seater fighter could be discounted because it was thought Germany had no plans for long-range fighters.

The question would not go away. Further Air Intelligence reports on escort fighters in Spain surfaced in 1939. Sholto Douglas maintained '...It is true that the Germans sometimes escorted their bombers in Spain partly because their armament in German bombers is…weak and ineffective and they are therefore easy prey to enemy fighters.' Details of the long-range Messerschmidt 110 fighter were now known, but Douglas considered it an unsuitable

escort because it lacked enough *rearward-firing guns*.[135] What he wanted was '…a turret fighter with a fairly long endurance so that it could, if required, carry out *offensive* patrols over German territory.' Plans agreed '…our big bomber policy will enable us to operate in future with small formations, or even with single aircraft, in which case escorts would not only be extremely uneconomical but would also tend to rob our tactics of flexibility.'[136]

**Air Support**

The Spanish Civil War should, at least, have spurred a re-evaluation of RAF support for the Army. Instead, Slessor (DPlans), who was ideally placed to influence policy, and had published a respected work on army-air co-operation in 1936, [137] spent three years rebutting army demands for greater support. His view of the Spanish Civil War was not positive. Reviewing a proposed joint RAF-Army memorandum on FF AA defence, after the COS decision on the Joint Intelligence Committee (S) reports, he commented that '…these papers show an obsession on the part of the General Staff with the least probable form of land operations, namely a campaign in France'. He thought:

*...experiences in Spain…cannot be taken as…conditions which would obtain in modern warfare between two highly organised, fully equipped armies and air forces…Nevertheless, increased use of low flying aircraft against ground troops is undoubtedly a method of modern warfare, which the British organisation must take into account, [but] low flying attack is likely to be very costly...*[138]

The RAF viewed ground-attack as a third or fourth priority task. Terraine quotes Maurice Dean as saying '…between 1918-1939, the RAF forgot how to support the army.'[139] The FF in France was to be supported by a small Air Component of fighters and reconnaissance aircraft with a group of Battle bombers (the AASF) operating independently. The bombers were not for direct support (DS) of troops. The Army produced demands for extra aircraft in 1939 using supporting evidence from the Spanish Civil War.[140] Slessor refuted their demands:

*'…the results obtained were usually disappointing compared with the losses sustained except under certain, special and infrequent circumstances. On nearly all occasions, much more favourable and important objectives could have been selected. Nevertheless, events in Spain have tended to raise a doubt about the view that the aircraft is not" a battlefield weapon"…'*[141]

His view incorporated the experiences of 1914 – 18 and the Spanish Civil War and pointed inevitably to the same conclusions:

a. Aircraft were not a substitute for artillery.
b. Without artillery, the use of aircraft for attacking deployed troops in positions was limited; more effective targets could be found further back.
c. Special and infrequent conditions were needed; local air superiority; enemy lack of small AA; a high degree of training and morale; careful orders, organisation and control.

Not all RAF leaders agreed with him and some effort was made to identify a direct support bomber requirement

to appease army sensitivities. A two-seat, four machine gun turret-armed aircraft with a 1,000lb bombload was specified for direct support work but there would be no dive-bomber despite Army wishes.[142] Regrettably, the time had now come to learn the lessons 'face-to-face'. Disaster in France occurred before any suitable aircraft could be identified. Despite undoubted bravery, appalling losses resulted when obsolete AASF Battles were thrown into direct support regardless of the air superiority situation.

## Conclusion

Seventy years of hindsight leads many to suggest that the RAF should have been better prepared for war against the 'Ultimate Enemy' of Nazi Germany. Webster and Frankland certainly found it '…a strange result after twenty years of devoted work.'[143] Corum suggests that the RAF was actually '…the air force that was least capable of learning and adapting…an intellectually shallow service – a sort of gentlemen pilots club.'[144] This short paper has attempted to give the lie to such views.

The Interwar RAF did not continually and effectively assimilate the fast-changing pace of aerial technology. But it was not alone. Ferris writes 'One would think the RAF to be the only air force on earth to make mistakes, and the worst at procuring new equipment and in preparing for strategic bombing and air defence; and each of these thoughts would be wrong.'[145] All nations struggled to find their way in air warfare, the Spanish Civil War potentially offered to all an example of what modern aerial warfare *could* be.

This paper has sought to show that, although a little publicised fact, the RAF never ignored the Spanish Civil War. The British forces made an innovative and rare decision to *act jointly* to study Spain and air *warfare*. Two years of effort was expended by 20 per cent of available Air Intelligence resources. The results were widely promulgated and eight highly-detailed reports presented to the highest levels of the politico-military command structure. Senior RAF leaders discussed and debated Spanish Civil War lessons when making decisions on vital questions of fighter, bomber and close support policy. Regrettably, the effort failed to produce far-reaching results.

Wark accurately sums up this failure as the norm for intelligence services in peacetime and this paper has illustrated how even the Spanish Civil War combatant nations found it difficult to identify valid lessons. The intelligence services could not easily make allowances for the discontinuities between past, present and future when applied to a period of rapid technological change.[146] Military leaders could not reconcile the small, distant, civil war with its mix of highly modern technology and small forces with their WWI-based concept of a future massive clash between highly trained air forces. *St. Paul's 'glass' was simply too dark for them*. Goddard later wrote '…the English have a dangerous tendency to confuse beliefs with facts and where facts conflict with traditional thinking, to reject them. Thus we come to right action by a very hard route."[147] The route was hard indeed; almost six years on the 'Road to Damascus' and final victory.

**Notes**

[1] James S. Corum, 'The Spanish Civil War: Lessons Learned and Not Learned by the Great Powers', *Journal of Military History* 62 (April 1998), 315. Such attitudes are closely examined in my forthcoming doctoral thesis on 'The RAF and the Lessons of the Spanish Civil War'.
[2] Charles Messenger, *The Art of Blitzkrieg*, (London: Ian Allan, 1976), 105-114 and 134-156.
[3] MRAF Sir John Slessor, *The Central Blue* (London: Cassell, 1956), 204. Also Scot Robertson, *The Development of RAF Strategic Bombing Doctrine 1919-1939* (Westport Ct: Praeger, 1995). Introduction and 165.
[4] Corum – 'Lessons Learned', 331.
[5] Typically, Neville Jones, *The Beginnings of Strategic Air Power – A History of the British Bomber Force 1923-1939*, (London: Frank Cass, 1987).
[6] Slessor, *Central Blue*, 150 and 194-5. Also MRAF Bomber Harris, *Air Offensive* (London: Greenhill Books, 1990).
[7] John Terraine, *The Right of the Line – The RAF in the European War 1939-1945*, (London: Hodder & Stoughton, 1985), 46.
[8] Terraine, *Right of Line*, 64.
[9] F. H. Hinsley, *British Intelligence in the Second World War*, (London: HMSO, 1979), Vol. I, 37-39.
[10] Wesley K. Wark, *The Ultimate Enemy - British Intelligence and Nazi Germany 1933-1939*, (London: I. B. Taurus, 1985).
[11] Wesley K. Wark, 'British Intelligence and Small Wars in the 1930s', *Intelligence and National Security*, October 1987, 67-87.
[12] Wark, 'Small Wars', 77.
[13] Wark, 'Small Wars', 81.
[14] Williamson Murray, 'Appeasement and Intelligence', *Intelligence and National Security*, October 1987, 47-67.
[15] Murray, 'Appeasement and Intelligence', 48.
[16] Hinsley, *British Intelligence*, 8-10.
[17] The UK National Archive [TNA] –AIR/2/1688, DDI Branch Staff Requirements.
[18] The JPS consisted of the heads of the three service plans sections. See Hinsley, British Intelligence, 32.
[19] Wark, 'Small Wars', 71.
[20] Hinsley, *British Intelligence*, 78.
[21] Hinsley, *British Intelligence*, 37.
[22] Later Air Marshal Sir Victor Goddard – See *The Times*, Obituary, 23 January 1987.
[23] Air Marshal Sir Victor Goddard, *Epic Violet*, unpublished manuscript in Liddell Hart Military Archives, Kings College, London, 30-37.
[24] Wark, *Ultimate Enemy*, 236-240.
[25] The knock-out blow was the belief that the *Luftwaffe* would direct a potentially decisive bomber strike against London in the opening days of a war. See Uri Bialer, *The Shadow of the Bomber- the Fear of Air Attack and British Politics 1932-1939*, (London: Royal Historical Society, 1980).
[26] Hinsley, *British Intelligence*, 38. Goddard comments in *Epic Violet*, 'I will cite the belief, which I never held, that the war would begin with the devastation of London from the air. During 1938-39 I used to give a monthly lecture...at the CD College…I was required to lecture, not upon the probable employment of the GAF in war, but the…effects of a pre-supposed policy of employing the GAF exclusively upon the destruction of London…For I was debarred from giving any other option as more likely.'
[27] See TNA-AIR//40/221 – 15 August 1936 and 20-21 August 1936.
[28] TNA-AIR/40/219 – 1 August 1936.
[29] TNA-AIR/2/1688 – 23 February 1937.
[30] TNA-AIR/2/2022 – 17 March 1937.
[31] TNA-AIR/2/2022 – 22 March 1937.
[32] TNA-CAB/56/1- Minutes, 26 April 1937.
[33] Wark, 'Small Wars', 72.
[34] The Sub-Committee was to consist of Admiralty, War Office, Foreign Office and Air Raid Precautions (Home Office) members under Air Ministry Chairmanship.

[35] TNA-AIR/2/2022 - Joint Intelligence Committee (JIC) to AI3 20 May 1937 and TNA-CAB/56/5 – JIC Minutes, 3 March 1937.
[36] TNA-AIR/2/2022 - Minute 13, 27 May 1937.
[37] TNA-CAB/56/5 – JIC (S) Minutes 17 September 1937.
[38] TNA-CAB/56/5 – JIC (S) Minutes 17 September 1937.
[39] TNA-AIR/40/1487 – 8 November 1937
[40] See Jill Edwards *The British Government & The Spanish Civil War 1936-1939*, (London: Macmillan, 1979), 220-22 and AD Harvey, 'The Spanish Civil War as seen by British Officers', *Royal United Services Institute Journal*, Vol. 141, No.4, (1996), 65-67 and Wark, 'Small Wars', 73.
[41] TNA-AIR/40/1487 – 8 November 1937.
[42] TNA-AIR/40/1487-10 August 1938 and TNA-CAB 56/6 – 14 October 1938.
[43] See Wark, 'Small Wars', 67 and Bialer, *Fear of the Bomber*.
[44] TNA-WO/106/1587 - Notes on Nationalist Aragon Front by Wg Cdr A. James MP.
[45] TNA-CAB/53/8 COS 219th Meeting, 1.
[46] TNA-WO 106/1578 & 1579 detail Fuller's reports. Harvey, *Spanish Civil War by British Officers*, 65-67, covers many such visits.
[47] Wark, 'Small Wars', 72 and TNA-CAB 56/1 JIC(S) 8 July 1938.
[48] Brian Bridgeman, *The Flyers*, (Swindon: Brian Bridgeman, 1989).
[49] TNA-AIR/40/224 – 16 February 1937 – Report on service with Franco's air force by Mr W. D. Winterbotham. It contains highly accurate detail on Italian and German aircraft and weapons. The acting DDI comments, 'Any use to us? If not destroy'.
[50] Corum, 'Lessons Learned', 21. This suggests that little data on Spain was made available to the RAF.
[51] TNA-AIR/8/210, 219 and 252.
[52] TNA-CAB/56/1 JIC 15th Meeting Minutes – 25 April 1938.
[53] TNA-CAB/53/33 JIC 622 (1), JIC 623 (2) and JIC 624 (4).
[54] TNA-CAB/56/1 JIC 17th Meeting Minutes – 15 June 1938.
[55] TNA-CAB/56/1 JIC 11th Meeting Minutes– 6 October 1937.
[56] TNA-CAB/53/33 JIC 622.
[57] TNA-CAB/53/33 JIC 623.
[58] Wark, *Small Wars*, 75.
[59] TNA-CAB/53/33 JIC 624.
[60] TNA-AIR/40/218 – German Visit to RAF October 1937.
[61] TNA-AIR/2/2797 Goddard to DCAS – 15 April 1937. 'General Wenniger, the German Air Attaché, informed me that as a result of the air warfare in Spain which had largely been in co-operation with the Armies on both sides, German Army authorities have represented to the German Air Ministry (RLM), that air warfare in Spain has not developed along the lines they supposed it would in the next war. Although…there were obvious reasons for this, the RLM felt *compelled to keep the Army quiet* by allocating an increased number of reconnaissance squadrons to the Army.'
[62] Brian Bond, *British Military Policy between the Two World Wars* (Oxford: Oxford University Press, 1980), 255-258.
[63] TNA-CAB/53/8 COS Committee – Minutes of 219th Meeting of COS Sub-Committee of CID, 1.
[64] TNA-CAB/53/8 COS Committee, 6.
[65] TNA-CAB/53/8 COS Committee, 13. This is often misquoted. Newall was commenting upon the use of fighters to defend troops from ground-attack aircraft.
[66] Hinsley, *British Intelligence*, 37-38.
[67] Wark, 'Small Wars', 77.
[68] TNA-CAB/56/1 JIC 15th Meeting Minutes – 25 April 1938.
[69] TNA-CAB/JIC/66 – 3 June 1938.
[70] TNA-CAB/56/1 JIC 19th Meeting Minutes – 21 July 1938. The JIC(A) sat under Wg Cdr L. O. Brown.
[71] TNA-AIR/8/243 – 28 July 1938.

[72] TNA-AIR/8/243 – 28 July 1938.
[73] TNA-AIR/40/1487 – AI3 to FO – 10 October 1938.
[74] TNA-CAB/56/6 – JIC(A), 6th Meeting Minutes, 17 February 1939.
[75] Wark, *Ultimate Enemy*, 218-219.
[76] Wark, *Ultimate Enemy*, 220.
[77] Slessor, *Central Blue*, 210. '…the rather spasmodic incursions of the DCOS… tended to be a bit of a fifth wheel on the coach…it tended to produce insufficiently considered solutions…'.
[78] Wark, 'Small Wars', 82.
[79] TNA-CAB/54/2 DCOS 40th Meeting Minutes – 19 July 1939.
[80] TNA-CAB/54/6 DCOS 100, 4.
[81] Karl Ries and Hans Ring, *The Legion Condor* (West Chester, Pa.: Schiffer Publishing, 1992), 68. TNA-CAB 54/6 DCOS 104, Air Defence, 18, states that 'In the Aragon offensive of March-April 1938, at least 500 aircraft and probably more, were employed by the Nationalists in operations lasting five weeks.'
[82] TNA-CAB/54/6 DCOS 100, 21-23.
[83] Wark, 'Small Wars', 79.
[84] TNA-CAB/54/6 DCOS 101, 26.
[85] TNA-CAB/54/6 DCOS 101, 27.
[86] Wark, 'Small Wars', 80.
[87] TNA-CAB/54/6 DCOS 101,28.
[88] TNA-CAB/54/6 DCOS 104.
[89] TNA-CAB/54/6 DCOS 101, 28.
[90] TNA-CAB/54/6 DCOS 101, 10.
[91] TNA-CAB/54/6 DCOS 101, 21.
[92] TNA-CAB/54/6 DCOS 101, 31.
[93] TNA-AIR/41/39-AHB *Narrative on Bombing Offensive Versus Germany, Part 1: Preparation 1917-38*, 339-340.
[94] TNA-AIR/41/39, 340.
[95] Alvin D. Coox, 'Military Effectiveness of Armed Forces in the Interwar Period 1919-1941, in Allan R. Millett and Williamson Murray, *Military Effectiveness*, Vol. II: The Interwar Period (Winchester, Mass.: Allen and Unwin, 1988), 261-262.
[96] Corum, 'Lessons Learned', 318.
[97] Thomas H. Greer, *The Development of Air Doctrine in Army Air Arm*, (Maxwell AFB, Alabama: Air University, 1955), 87.
[98] Greer, *Air Doctrine*, 122.
[99] Earl F. Ziemke, 'The Soviet Armed Forces in the Interwar Period', in Allan R. Millett and Williamson Murray, *Military Effectiveness*, Vol. II: *The Interwar Period* (Winchester, Mass: Allen and Unwin, 1988), 16.
[100] Ziemke, 'Military Effectiveness', 17.
[101] John F. Coverdale, *Italian Intervention in the Spanish Civil War* (New Jersey: Princeton University Press, 1975), 410. Over 1,435 pilots and 764 aircraft served in Spain.
[102] Brian R. Sullivan, 'Fascist Italy's Military Involvement in the Spanish Civil War', Journal of Military History, Vol. 59, No. 4, Oct 1995, 724.
[103] Sullivan, 'Military Involvement', 720-721.
[104] James S. Corum, *The Luftwaffe: Creating the Operational Air War 1918-1940* (Kansas: University Press of Kansas, 1997), 219-223.
[105] Corum, 'Lessons Learned', 326-327.
[106] Manfred Messerschmidt, 'German Military Effectiveness 1918-1939', in Allan R. Millett and Williamson Murray, *Military Effectiveness*, Vol. II: *The Interwar Period* (Winchester, Mass.: Allen and Unwin, 1988), 247.
[107] Richard L. Proctor, *Hitler's Luftwaffe in the Spanish Civil War*, (Westport Ct.: Greenwood Press, 1983), 259.
[108] Proctor, *Hitler's Luftwaffe*, 261-263.
109 Corum, 'Lessons Learned', 331.
[110] TNA-AIR/8/243 – 11 August 1938.
[111] TNA-AIR/8/243 – 11 August 1938.
[112] Jones, *Beginnings*, 170.
[113] TNA-AIR/ 16/680 – The specifications created the Manchester, Lancaster, Stirling and Halifax.
[114] TNA-AIR/ 2/3233.
[115] TNA-AIR/8/243 - AI3-2 December 1937.
[116] TNA-AIR/16/832 – AI Report.
[117] TNA-AIR/2/3341 - AFC 13th Meeting – 2 January 1938.
[118] TNA-AIR/2/3341 – 25 January 1938.

[119] TNA-AIR/2/3345 – 14 October 1938.
[120] TNA-AIR/2/3233 – 2 January 1939. Me 109s received field-modified armour in August 1940.
[121] TNA-AIR/2/3345 – 9 October 1939.
[122] TNA-AIR/2/2073 – 9 June 1937.
[123] R. Wallace Clarke, *British Aircraft Armament*, Vol.1: RAF Gun Turrets from 1914 to the Present Day (London: Patrick Stephens, London), 61-62. See also TNA-AIR/14/380-9 August 1938.
[124] Clarke, *Aircraft Armament*, Vol.1, 61.
[125] TNA-AIR/8/210 – December 1936, 22-24.
[126] TNA-AIR/14/383 –22 April 1938.
[127] TNA-AIR/9/92 –22 July 1938.
[128] TNA-AIR/2/3043 – October 1939.
[129] TNA-AIR/9/79 – 20 March 1940.
[130] TNA-AIR/2/2073 – 9 June 1937.
[131] TNA-AIR/2/2613 – 1 February 1937.
[132] TNA-AIR/2/2073 – 9 June 1937.
[133] TNA-AIR/2/2073 – 9 June 1937, 3.
[134] Peter Lewis, The British Fighter since 1914 (London: Putnam, 1979), 62.
[135] TNA-AIR/2/2613 – 13 April 1939 and 25 June 1938. Only Dowding was sceptical about turret fighters.
[136] TNA-AIR/9/97–21 December 1938.
[137] Wing Commander J. C. Slessor, *Air Power and Armies* (Oxford: Oxford University Press, 1936).
[138] TNA-AIR/2/2190 – 8 February 1938.
[139] Terraine, *Right of Line*, 383.
[140] General Staff (Research) – Report for DCIGS No. 7, 'Considerations from the Wars in Spain and China with Regard to Certain Aspects of Army Policy' (Minley Manor: 31 March 1939).
[141] TNA-AIR/2/4130 – 6 June 1939.
[142] TNA-AIR/2/4229 – 2 December 1939.
[143] Sir Charles Webster and Noble Frankland, *The Strategic Air Offensive against Germany: Preparation* (London: HMSO, 1976), Vol. I, 125.
[144] Corum, 'Lessons Learned', 331.
[145] John R. Ferris, 'The Air Force Brat's View of History', *International History Review*, Vol. XX, No. 1: March 1998, 126.
[146] Wark, 'Small Wars', 85.
[147] Goddard, *Epic Violet*, 36.

# British Thinking on Air Power - The Evolution of AP3000

By Gp Capt Christopher Finn

This article traces the contemporary development of British air power doctrine from 1977 to the present day. By the late 1970s the published doctrine of WWII and the early Cold War had become stultified. The RAF had become focused upon the tactical aspect of the Central Region in particular and had developed further its anti-intellectual tendencies. The creation of the post of Director Defence Studies (RAF) allowed a series of individuals to challenge the orthodoxies of their times and, in their own ways,to stimulate a broader debate on the value of air power. The article suggests that while the context and personalities changed with time, there was a coherent line of thought about the reasons for articulating air power doctrine. And, more importantly, the principles stated were remarkably consistent and enduring ones.

*"They [the USAF Doctrine Center] are the guys who build the box we are all exhorted to think outside."*

**USAF officer to author,Maxwell Air Force Base, 2002**

The opening quotation highlights the perennial problem of the doctrine writer; the delivery of a product that is not only relevant, but is perceived to be relevant and will therefore be used by those at whom it is aimed. In exploring the development of contemporary British air power thinking, it is perhaps useful to briefly examine the RAF's earlier doctrine. The July 1928 edition of *AP1300*[1] stated that 'the aim of a nation at war is to compel the enemy as quickly and economically as possible to conform to its purpose or will, thus the ultimate aim of all armed forces is identical although the means to achieve that aim may differ.' Later, in the chapter on air bombardment,[2] it said 'the bombardment of the most vital and vulnerable of these centres may be more effective and decisive than the direct attack on naval and military forces.' The former quotation chimes well with both the manoeuvrist approach and current effects-based thinking, and the latter both reflects and anticipates the work of the strategic bombing theorists. The second edition of *AP1300*[3], published in 1940, dealt with the context of war at the strategic level in terms of the main roles of air warfare: the strategic air offensive; the strategic air defensive; and operations in support of the Navy and Army. It also addressed the protection of air forces on the ground, the role of intelligence and operations in austere and undeveloped areas. It is of interest that this edition of *AP1300* devoted 33 pages to *appreciations*, the military planning process that is now termed the Estimate.

The formal RAF air power doctrine of the early Cold War period was codified in the fourth edition of *AP1300*[4]. The introductory note by the Chief of the Air Staff, Air Chief Marshal Sir Dermott Boyle, stated that:

*'Providing the great deterrent is the primary function of air power today[5]. The responsibility for providing the United Kingdom's contribution to the deterrent rests with the Royal Air Force. This is our major task. And it must not be overlooked that the air defence of this country is inextricably part of the deterrent since it not only defends the bases from which our V-Bombers operate but also raises doubt in the mind of the enemy as to the degree of success he is likely to achieve in knocking out our bombers and consequently the degree of punishment which he must expect in return.'*

The Manual's approach to the other facets of air power was virtually unchanged from the wartime version. *AP1300* did not explain doctrine per se, but it is implicit throughout, particularly in the application of the principles of war. Yet the role of the manual was clear from the final paragraph of the introductory note:[6]

*'Success in the military field, whether in the preliminary planning or in the actual conduct of operations, is largely a matter of judgement. Judgement, though partly intuitive, is mainly based on knowledge. All officers should therefore strive continually to increase their professional knowledge so that their*

*judgement may be soundly based.*[7]

The target audience for the manual was primarily junior officers and particularly aircrew; while the fourth edition was printed in March 1957, reprinted in September 1964, and amended in 1968, despite its withdrawal in the early 1970s, it was still used as a 'C' promotion exam (from flight lieutenant to squadron leader) primer as late as 1977. With this doctrinal background as a starting point, this paper will consider how and why current Royal Air Force air power doctrine has developed, in the form of the *AP3000* series, from 1988 to the present day, identifying whether the changes have been conceptual or contextual. In this story, successive Directors of Defence Studies (RAF) (DDS) have played a key role.

The post of DDS was created in 1977 by the CAS, Air Chief Marshal Sir Neil Cameron, to 'be responsible for reviving and maintaining an interest in the study of present and future uses of air power in its various military applications'.[8] The DDS had direct right of access to CAS and his work was not to be constrained by current MOD thinking. Consequently, the first incumbent had no hesitation in drawing CAS's attention to the fact that 'no authoritative publication on air power concepts has been issued since the now defunct *AP1300* of March 1957, last revised in 1968'.[9] Subsequent DDS' expressed concern that the RAF's 'sense of unity and common purpose was being weakened as each specialist force pursued its own route to professional excellence'[10] and proposed the formation of a single directorate of air power doctrine at the RAF Staff College, Bracknell. In 1988, steps were taken on an unofficial basis to produce a new RAF doctrine manual.[11] This faced two major hurdles. The first was the inherent scepticism and suspicion within the RAF towards a written doctrine, although this was perhaps borne of ignorance about its purpose. The second was the view expressed by several very senior officers that this would somehow conflict with NATO doctrine and thus detract from Alliance solidarity. However, NATO air power doctrine was described in Allied Tactical Publication 33B, and this was definitively 'tactical' rather than elaborating the fundamental principles or philosophy that would guide a broader thinking about the uses of air power within the RAF. Furthermore, numerous bureaucratic obstacles, not least the lack of a budget for producing the document, were all exploited by the project's opponents. While the aspiration was to produce a comprehensive strategic manual, comprising a summary document, essays which elaborated on the key principles and references to permit further research, it was more than the market could bear at the time. Fortunately, there were also some key supporters, including the ACAS, Air Vice-Marshal John Thompson. With his approval, *AP3000* – purposefully renumbered to draw a clear distinction between it and its predecessor, *AP1300* – was produced on a trial basis, with a limited print run. It was intended that the trial would provoke wider and more mature comment, to help the Air Force Board assess whether the new air publication was necessary. A second edition would then be produced if required, incorporating

comment and with a far wider distribution.

*AP3000 Edition 1* was, by design, short and pithy and, in that sense, was similar to *AP1300*. However, in addition to presentational differences, such as the use of pictures and diagrams, it differed primarily in treating air power holistically, rather than separating it into individual roles. The purpose of doctrine as a statement of the fundamental principles for the employment of air power was clearly explained and it described three air campaigns – counter-air, anti-surface force and the strategic air offensive – plus two essential supporting activities, combat support air operations and ground combat support. The CAS, Air Chief Marshal Sir Peter Harding, made the target audience for *AP3000* clear in his foreword.[12]. In terms of air power education, the first category was the RAF itself. The second category was the UK's allies, through the contribution to Alliance doctrine, and the last category comprised the RAF's sister services, the Civil Service, Parliament and the general public, to increase the understanding of air power more widely. Within the RAF, *AP3000* was aimed squarely at the officer cadre.

*AP3000 Edition 1* was initiated in the year that the CGS, General Sir Nigel Bagnell, directed the publication of the *Design for Military Operations*, a recognition that the Army had also been in a doctrinal lacuna for many years. The Heads of Defence Studies from the Army and the Royal Navy were involved in the drafting process for *AP3000 Edition 1* and considerable effort went into achieving as much commonality as possible between the different environmental approaches and, subsequently, the first edition of *BR1806 British Maritime Doctrine* was published in 1995. In 1991, a first draft of a new, second edition was completed, following consultation and comment on the first edition. Apart from a very short annex on the allocation of resources for the armed services and the incorporation of more detailed examples and lessons from the 1991 Gulf War, few changes were considered necessary and the stated target audiences remained the same, with the exception that all ranks were encouraged to read the book rather than just officers.

The development of RAF air power doctrine was not limited to *AP3000*. It was felt that the MOD had deliberately played down the role of air power in the Gulf War because of the impact it would have had on procurement processes and future inter-service relations.[13] So, to explain what air power could offer over other forms of warfare, an Air Power Working Group (APWG) was formed by DDS (RAF), initially comprising senior civilian academics, but later expanded to include not only academe, but the other services, the USAF and the Department of Air Warfare.[14] The intention was not only to gather a group of thinkers to address Air Power's role in the post-Gulf War world, but also for the members to act as advocates of the British view of air power within the UK and with the USAF and RAAF as well. The Dean of SAAS was invited to participate, as was the Director of the RAAF's Air Power Study Centre. The inaugural meeting in 1994 brought together a group of Air Power sceptics; the challenge was to turn them into apostles.

The result was the publication of *The Dynamics of Air Power*[15]. This consisted of two parts. The first, 'Evolving Theory', looked at the distinctive characteristics of air power, the counter-air context, synergy in operations, air power force and coercion and air power and the role of the media. The second part looked at air power in peace support operations with the common thread being the primacy of the supporting elements of air power in those operations. While the overt target audience for the book was not particularly clear, as it was commended 'to theorists and practitioners alike,[16] the intention was 'to get the decision makers to think'[17] and to further understanding of the issues, rather than just providing a simple explanation through an oblique look at the fundamentals. This was to be the first of a series of analyses of the efficacy of modern air power and, together with subsequent books, would provide the intellectual springboard for air operations and future versions of *AP3000*. However, the debate was not to be confined solely to the deliberations of the APWG and it was important to set military force in a post-Cold War and post-Gulf War context. In the first instance, a Tri-Service Conference established the strategic direction, and this was followed by a joint RAF/USAF Air Power Conference, held in 1996. Apart from making sister services think how each would contribute to the air battle of the future, it provided an opportunity for members of the APWG to expose their thoughts to scrutiny. The audience was drawn not only from the defence establishment, but included the Vice Chief of the USAF and senior members of other NATO forces, as well as politicians of all three main parties. An unstated aim was to influence any defence review following the 1997 election.

In parallel, the APWG re-examined the validity of the concepts and doctrines of the Cold War era to ensure that the RAF was not being seduced by its expectations of technology and the resulting book, *Perspectives on Air Power*[18], examined the political, technological and military context of air power in the post-Cold War era.

Concurrently, the publication of the first edition of *British Defence Doctrine*[19] and the *UK Doctrine for Joint and Multinational Operations* (JWP 0-10)[20] marked a move towards joint, as opposed to single, service doctrine, embodying concepts such as the manoeuvrist approach and the three components – conceptual, moral and physical – of fighting power.

In 1996, it was determined that a new version of *AP3000* was needed, although this was to be 'evolutionary, not revolutionary'.[21] Air Chief Marshal Sir Richard Johns was to remain CAS until April 2000, a month after the eventual publication of the new, *AP3000 Edition 3*,[22] and although he was initially sceptical of the need for it, his view changed[23] as he became convinced that the RAF's doctrine must take full account of the changes in the strategic environment following the end of the Cold War, including the move towards 'jointery,' a perspective reinforced by the emphasis on joint structures in the 1998 Strategic Defence Review.[24] He also felt very strongly that the final document needed to be endorsed by the other services, to recognise their contribution to

the generation of national air power. Consequently, *Edition 3* was the first to carry a joint imprimatur and was launched publicly at the RUSI by CAS and senior representatives of the RN and the Army.

CAS's views were borne of his own experience as Director of Operations during the Gulf War of 1990/91, when it became clear to him that the RAF's operational focus on Central Europe had constrained its thinking and left it tactically inflexible. As an ex-Senior Air Staff Officer in RAF Germany and at HQ Strike Command, he felt that he had to bear his own share of the responsibility for the RAF's fixation with the Central Region[25]. He was determined that doctrine should not become dogma, so his aim was to educate his people so that they could develop a sound and deep understanding of both the strengths and weaknesses of air power, to inform the application of military judgement. Unsurprisingly, Air Chief Marshal Johns took a keen personal interest in the drafting process.

The themes of *Edition 3* were initially aired in the leading article of the first *Air Power Review*, published in the summer of 1998. The three air campaigns were replaced by the core capabilities of air power: control of the air, strategic effect, joint force employment, combat support air operations and force protection. A slightly revised version of this paper was later presented, adding 'information exploitation' to the core capabilities. However, these ideas were not universally well-received, with attempts being made by some factions within the Air War Centre and the dying embers of the RAF Staff College to kill off *AP3000* through the drafting of an 'Air Operations' chapter for the *UK Operations Document*. This was seen off by an alliance of CAS, ACAS, the Air Staff and the staff of the new Joint Services Command and Staff College, along with the three heads of defence studies.[26]


*AP3000 Edition 3* was very different from its predecessors. Its contents could now be summarised as: principles of war; air power doctrine, comprising the core capabilities; a command and control philosophy of centralised command, decentralised execution and mission command; and, an operational philosophy comprising the manoeuvrist approach and an initial look at effects-based warfare. Together, these elements linked ends, ways and means. Finally, there was an overall statement of air strategy comprising emerging ideas of effects-based warfare, the more conventional campaign planning

methodologies and the new effects-based methodology of strategy-to-task. The core capabilities were now: information exploitation; control of the air; strategic effect of air power; Joint Force Employment 1 – indirect and direct air operations; Joint Force Employment 2 – combat support air operations; Joint Force Employment 3 – force protection; and sustainability.

Edition 3 was longer than its predecessors and was also more explanatory, using historical examples set in text boxes. The concept of air component command was implicit in *Editions 1* and *2*, but explicitly covered in *Edition 3*. In line with CAS's direction, the primary purpose of Edition 3 was to explain the use of air power in the post-Cold War world from the perspective of a single environment in an era of increasing jointery. It reflected the SDR and lessons from the Bosnia campaign of 1995, but not Kosovo in 1999. It also reflected the procedural and doctrinal aspects of the first edition of *British Defence Doctrine*. The inclusion of the language of the manoeuvrist approach made it more acceptable to the Army and it was now entitled *British Air Power Doctrine* to reflect its joint endorsement. The underlying thrust of the document was that airmen needed to be able to properly understand and articulate air power doctrine and concepts. *Edition 3* aimed at a higher intellectual plane than previous editions, with the aim of enhancing understanding rather than providing simple explanations, and it increased the use of references and included an extensive bibliography.

It was to be ten years before a new edition of *AP3000 Edition* was drafted. In the interim, CAS's Air Power Workshop produced *Air Power 21*,[27] which considered the dichotomy between governments taking the peace dividend while operational tempo, particularly in intervention operations, increased, addressing issues such as expeditionary warfare, the revolution in military affairs, command and control and, interestingly, in view of what was to happen in Operation IRAQI FREEDOM, an article on the land-air interface, which at this time was a neglected area. CAS's Air Power Workshop also produced *British Air Power*[28] which, *inter alia*, addressed evolving views on effects-based warfare, particularly with regards to the strategic effect of air power and the challenges of the age of transformation. However, it was becoming increasingly clear that *AP3000* would again require revision, as *Edition 3* had been finalised before the Kosovo campaign, and subsequent events, such as 9/11 and the consequent SDR New Chapter and Operation ENDURING FREEDOM in Afghanistan, required consideration. Furthermore, effects-based operations and net centric warfare had become significant conceptual topics.

However, at an early stage of drafting in 2003, Operation IRAQI FREEDOM intervened and the process was put on hold, both to enable the doctrinal lessons of the conflict to be identified and because many of the key players in the process were personally involved in the conflict. Subsequently, to inform initial thinking on the development of *AP3000 Edition 4*,[29] a joint conference, organised by the three Heads of Defence Studies, was held to examine effects-based

warfare with the aim of exploring what was becoming a common doctrinal language, despite having no basis in explanation or common understanding. Additionally, a conference was held to capture the air power lessons of Operation IRAQI FREEDOM in May 2004, including the CAS (Air Chief Marshal Sir Jock Stirrup), General 'Buzz' Moseley USAF (JFACC), Air Chief Marshal Sir Brian Burridge (UK National Contingent Commander) and Air Marshal Glen Torpy (UK Air Component Commander). This established the facts of the air war and also addressed themes such as technology, legality and ethics and their doctrinal implications.

Despite this groundwork, the gestation of *Edition 4* proved to be far more protracted than was originally foreseen. *Edition 3* predated much of the plethora of contemporary UK joint doctrine that now exists and, consequently, included material that was generic across defence rather than being peculiar to the air environment; concepts such as the principles of war and the components of fighting power, for example, are now covered entirely adequately in *British Defence Doctrine*. This prompted a debate about the purpose of *AP3000* as distinct single-service doctrine, and its position, within the hierarchy of extant joint doctrine. This was finally resolved at a workshop convened by DDS in September 2008, and a new draft was submitted for approval by the Air Staff in January 2009, with the aim of publishing and distributing it in time to inform preparation for the next Advanced Command and Staff Course, which sits at the Joint Services Command and Staff College in September 2009.

The purpose of *AP3000 Edition 4* is to distil the essence of air and space power into a concise and easily digestible format that complements joint doctrine, rather than replicates it, so it will be shorter and generic, and non-air power specific concepts have been removed. *British Defence Doctrine Edition 3* provides the cue, when it refers to the discrete doctrine publications of the maritime, land and air environments 'that guide the single services and provide the necessary familiarity and broad basis of understanding for joint and component commanders, formations and units to operate effectively across environmental boundaries'.[30] Accordingly, Edition 4 has two aims: first, to provide authoritative conceptual direction on the employment of air and space power to airmen; and second, to explain as clearly as possible its utility to soldiers, sailors and all of the other actors who, as part of a Comprehensive Approach to ordering crises, are influenced by, or influence air and space power. Just as *British Defence Doctrine* 'provides the broad philosophy and principles underpinning the employment of the British armed forces'[31], so *AP3000 Edition 4* aims to do the same for the air component, by describing what air and space power does in broad terms; thedetail of how it is delivered is provided elsewhere in the *AP3000* series. The content is conceptual, rather than providing a practioners' guide, and the target audience is predominantly at the staff training establishments; in particular, at squadron leader or wing commander level, or other service or civilian equivalent, at the Joint Services Command and Staff

College, and at squadron leaderlevel for the new Intermediate Command and Staff Course and at the Higher Air Warfare Course. However, *AP3000* will also act as the capstone document to guide and inform the lower level, single service, doctrine publications that will provide the core syllabi for the training schools and new junior officer and airmen through-life training courses. It can be regarded as strategic doctrine, explaining the what and why of air power, while tactical doctrine will be provided in the form of *AP3001, Air Power Essentials*, giving more detail on the fundamentals of air power, and *AP3002, Air Operations*, which will explain the how of air power application.

*Edition 4* is sub-titled *British Air and Space Doctrine* to reflect the increasing importance of space to all military operations. It explains how British air and space power can be applied in a complex world, where expeditionary warfare is as likely to be enduring as interventionist, but where success in contemporary counter-insurgency operations, conducted within a framework of joint action, must be balanced against the retention of a contingent, full spectrum capability, able to deliver national security objectives whatever the crisis situation. The doctrinal heart of the publication is the distillation of air power into four core roles: control of the air, mobility and lift, intelligence and situational awareness and attack, both kinetic and non-kinetic. A new definition of air and space power is proposed, to reflect its importance in influencing events and changing behaviours, and its application is considered in terms of coercion theory. *AP3000 Edition 4* is set in the context of the Comprehensive Approach, adopted by the UK in the realisation that the best method of achieving militarily and politically favourable outcomes in complex crisis situations is to use all of the available levers of power, in a cross-governmental and inter-agency approach. Although some of the enthusiasm for an effects-based approach to operations has abated in the decade since *Edition 3* was published, the UK's military contribution to the Comprehensive Approach will still be expressed through the campaigning process, where the achievement of desired outcomes is produced by synchronised activities delivering required effects.[32] It also reflects the renewed emphasis on air-land integration, and the development of Networked Enabled Capability.

It has been suggested that the development of *AP3000* from 1988 to the present follows a route from doctrinal famine to feast. Perhaps the RAF has observed Michael Howard's dictum that doctrine should be subject to 'constant and critical interrogation,' although it could equally be accused of falling into the trap outlined by Richard Overy, where doctrine becomes an end in itself and will 'solidify like a slowly moving lava flow.' Be that as it may, analysis of the development of British air power doctrine over the last 20 years reveals four enduring themes.

The first theme is the importance of the contextual environment, and there are two key events. The first is the end of the Cold War, which exposed the lack of any publicly articulated understanding of how air power could be employed beyond

the constraints of the Central Region and its flanks. Subsequent pressure on government to take the 'peace dividend' while fighting the UK's first major expeditionary war since Suez was the manifestation of the end of the Cold War and clearly influenced the development of doctrine. The second key event was the Strategic Defence Review and the subsequent 'New Chapter.'[33] These dictated increasing 'jointery' in the employment of UK Armed Forces and in their structures, training and doctrine.

The second theme is the importance of personalities. The role of successive DDS' (RAF) has been key in 'leading the development of air power thinking and doctrine within the military and academic communities'[34] while the intervention of particular Chiefs of the Air Staff and other senior officers has often been critical in the direction of the development of air power doctrine.

The next theme is the reasons that emerge as drivers for the development or amendment of doctrine, often linked again to personalities responding to events as they transpire. For example, one DDS was prompted to 'raise RAF official doctrinal development from a near-death hibernation'[35] as a result of his perception of the corporate approach of the contemporaneous RAF hierarchy, while ever-increasing jointery has forced *AP3000* to articulate a coherent environmental air power doctrine.

The last theme is that of the doctrine itself, but before examining this, it is necessary to define doctrine and its purposes in this context. While *AP3000* has been described as strategic air power doctrine, the description of its contents through successive iterations in this paper demonstrates that it is primarily aimed at the operational level. Indeed, the core capabilities of air power can be seen as the operational level effects which air power can achieve; tactical level missions are the statements of the available mechanisms with which those effects may be achieved.

On the other hand, the work of CAS's Air Power Workshops does address the impact of the strategic level of war upon air power, and vice versa. It would therefore appear that there are two manifestations of doctrine present – implicit doctrine, described in the publications of Air Power Workshop and indeed in the proceedings of conferences, and explicit doctrine, codified in formal doctrinal publications. It is also clear from the content of *AP3000* that at this level, doctrine is concerned with what air power can achieve and why, rather than how it is procedurally and technically employed; in short, what the Army describe as philosophy and principles. In this light, the various editions of *AP3000* are remarkably consistent in their approach. Each describes the overarching philosophy of the British application of armed force; the principles of war extended latterly by the manoeuvrist approach. They all describe the operational effects of air power, initially expressed as the three air campaigns and more latterly as the core components, or the four fundamental roles in the draft *Edition 4*. They all describe the enabling capabilities that are required to achieve those operational effects, and the command and control philosophy,

starting with the Cold War construct of centralised command and decentralised execution, through to network enabled capability and its impact upon the earlier philosophies. Finally, all discuss how these operational effects are crafted into air elements of the joint campaign, the joint campaign itself and the achievement of the desired strategic end state. This was firstly expressed in terms of an air strategy, but it is now encapsulated within the effects-based approach and the concept of strategy-to-task or 'joint action' within *Edition 4*. Indeed, as a way of explaining this level of doctrine, clear parallels can be drawn with the interwar, wartime and post-war editions of *AP1300*.

The development of British air power doctrine from 1988 to the present day can be characterised in terms of consistency and change. The consistencies are apparent in the overall framework and approach, the philosophy and principles of the application of air power. Change is visible in the context, in terms of political changes such as the withdrawal of the airborne nuclear deterrent, or geopolitical in terms of the move to expeditionary air warfare, and also in technological developments. The first technological change has been the advent of relatively cheap and highly accurate precision-guided weapons. The effect of this, even over so short a time-span as the last 18 years, has been to vastly increase the ability of air power to deliver the offensive-based operational effects such as control of the air and strategic effect to support the other environmental commanders. But perhaps the more important development has been that of information technology in its broadest sense which, when coupled with stealth technology and precision weapons, enable increasingly more flexible and focused operational effects. So it would appear that while air power has developed hugely in the means for its employment, the principles for its application, which were well known at the time of the formation of the RAF on 1 April 1918, have not really changed at all: indeed, if they were to change regularly, they would not be the fundamental principles that British air power doctrine has constantly sought to identify and explain, from the publication of *AP1300* through to the *AP3000* series.

**Notes**

[1] *AP1300 – Royal Air Force Manual - Operations*, Ministry of Defence, July 1928, Chapter I, para 3.
[2] Ibid, Chapter VIII, para 4.
[3] *AP3000 – Royal Air Force Manual - Operations*, Second Edition, Ministry of Defence, February 1940.
[4] *AP1300 – Royal Air Force Manual - Operations*, Fourth Edition, Ministry of Defence, March 1957 (reprinted September 1964).
[5] Ibid, p viii.
[6] Ibid, p viii.
[7] Ibid, p 4, para 20.
[8] Annex A to CAS/91111 dated 2 Nov 76.
[9] Annex A to CST/40/DDS dated 13 Sep 78.
[10] 'Air Power Doctrine', *Air Clues*, Vol 42, No 5, May 1988.
[11] A detailed exposé of the aims and problems inherent in the *AP3000* project are contained in a letter from AVM A. G. B. Vallance to the author dated 5 March 2004, summarised in the subsequent paragraphs.
[12] AP3000 – British Air Power Doctrine, Ministry of Defence, 1991, p v.
[13] Letter from Neil Taylor to author, 10

October 2002.
[14] Correspondence between Air Cdre A. Lambert and author.
[15] *The Dynamics of Air Power*, Group Captain Andrew Lambert and Arthur C. Williamson (Eds), RAF Staff College Bracknell, 1996.
[16] Ibid, p iv.
[17] Interview Air Commodore Lambert and author, October 2002.
[18] Perspectives on Air Power – Air Power in its Widest Context, Stuart Peach (Ed), Joint Services Command and Staff College, Bracknell, 1998.
[19] *British Defence Doctrine*. JWP 0-01, MOD London, 1996.
[20] *UK Doctrine for Joint and Multi-national Operations*, JWP 0-10, PJHQ Northwood, circa 1996.
[21] Correspondence Group Captain Steve Abbott to author, 12 November 2002.
[22] *AP3000, British Air Power Doctrine Edition 3*, HMSO 1999, p 1.2.12 – p 1.2.17.
[23] Letter Air Chief Marshal Sir Richard Johns to author, 7 May 2004.
[24] *The Strategic Defence Review*, CM399, London, July 1998.
[25] Letter Air Chief Marshal Sir Richard Johns to author, 7 May 2004.
[26] Correspondence between Stuart Peach and author.
[27] *Air Power 21 – Challenges for the New Century*, Peter W. Gray (Ed), Ministry of Defence, London, 2000.
[28] *British Air Power*, Defence Studies (Royal Air Force), Shrivenham, 2003.
[29] *Effects-Based Warfare*, Christopher Finn (Ed), Defence Studies (Royal Air Force), Shrivenham, 2003, Chapters 5 and 6.
[30] *British Defence Doctrine*, 3rd Edition, p. 4-4.
[31] Ibid, p. 5.
[32] Ibid, p. 5.
[33] *The Strategic Defence Review: A New Chapter*, CM 5566 Volume 1, Ministry of Defence, July 2002.
[34] D Def S (RAF) TORs, 21 Aug 02.
[35] Correspondence between A. G. B. Vallance and author.

# The Quest for Relevant Air Power - Continental Europe

By Dr Christian Anrig

Due to limited resources, no single European air force has been able to acquire the full spectrum of air power. Against the backdrop of American air power dominance, this situation led to a transatlantic air power capability gap. While much has been said about this capability gap and continental European reluctance to make meaningful contributions to allied military operations, the actual achievements and distinct features of continental European air forces have been neglected. This article attempts to address this neglect by scrutinising continental European contributions to deployed operations, by examining European alliance frameworks, and by analysing air power deficiencies and remedies. In its conclusion, the article highlights four potential guidelines for the development of relevant and flexible European air power.

In the course of operation Desert Storm, the dominance of American air power manifested itself in a way that could not have been anticipated. Against this backdrop, a prominent British air power scholar and practitioner coined the term 'differential air power', referring to a transatlantic air power capability gap.[1] In addition to this gap, American airmen began to consider continental Europe, particularly France, as obstacles to the 'proper' application of American air power. In a hearing of the Senate Committee on Armed Services in October 1999, the American Air Component Commander of Allied Force, Lieutenant General Michael Short, argued that France should not have been allowed to restrict American aviators, who had borne 70 per cent of the air campaign over Serbia and Kosovo.[2] The Iraq crisis in early 2003 reinforced this negative image of 'Old Europe'.

While much has been said about a transatlantic air power capability gap and continental European reluctance to make meaningful contributions to allied military operations, the actual achievements and distinct features of continental European air forces have been neglected. Seeking to address this neglect, this article will scrutinise the contributions of continental European air powers to deployed operations. It will continue to examine European alliance frameworks and their repercussions for air power. Thereafter, the need to develop European air power, deficiencies in air power capabilities, and remedies will be examined. The article will conclude by highlighting four potential guidelines for developing relevant and flexible European air power.

## Deployed operations

The title *The Quest for Relevant Air Power* implies that the purpose of European air power first has to be established. Air power, like all forms of military power, in essence is subservient to politics. The relationship between the military and politics is best expressed by Carl von Clausewitz's famous dictum: 'War is merely the continuation of policy by other means.'[3] Hence, despite the fact that air power came to the fore almost a century after Clausewitz's statement, the relevance of modern air power still has to be assessed in Clausewitzian terms. Since the demise of the bipolar ideological and nuclear confrontation between the West and the East, and since operation Desert Storm, the successful liberation of Kuwait in early 1991, continental European air power has generally served two purposes in deployed operations – humanitarian relief and combating terrorism. Operations conducted for humanitarian purposes and air operations against the backdrop of the 'War on Terror' form the basis for critically examining European air power.

### *Balkan air campaigns*

In the first half of the 1990s, the United States and Europe were confronted with internal, ethnically motivated conflicts in the Balkans and elsewhere. The most predominant of these was the Bosnian Civil War, lasting from 1992 to 1995. As a response to this conflict, the West launched a UN operation on the ground, and in the air, NATO conducted its first air campaign,

operation Deny Flight.

Deny Flight started on 12 April 1993. It was first supposed to enforce a declared no-fly zone over Bosnia by means of round-the-clock combat air patrols.[4] In the months that immediately followed, the mission spectrum was extended to include air-to-ground strikes.[5] Due to the narrow rules of engagement, the civil war parties could execute air space violations with near impunity,[6] and a total of only four CAS (close air support) missions were authorised in the course of two years.[7]

Only in the second half of 1995 did consensus for a more vigorous air campaign began to build. The massacre of Srebrenica in July 1995 certainly contributed to sucha change in attitude. Yet the immediate event that triggered a more robust air campaign, operation Deliberate Force, was the shelling of a marketplace in Sarajevo on 28 August 1995. Early on 30 August 1995, NATO aircraft took off to strike targets in Bosnia.[8] The campaign itself was halted twice for negotiations. After these faltered, the bombing was resumed.[9] On 14 September, the Serbs agreed upon UN terms, which caused offensive operations to be suspended.[10] The avoidance of collateral damage was considered to be of strategic importance by the American air component commander, Lieutenant General Ryan. The target set was restricted to purely military targets, such as ammunition depots and artillery sites.[11]

The Alliance air forces,[12] flew 3,515 sorties, including 750 strike sorties, and slightly more than 1,000 air-to-ground munitions were released.[13]

A total of up to 300 aircraft were assigned for operation Deliberate Force, among these approximately 20 air-to-air refuelling aircraft.[14] In terms of sorties, the US services accomplished by far the most (66 per cent), followed by the UK (ten per cent) and France (eight per cent), with Dutch, German, Italian, Spanish, and Turkish aircraft flying the remainder.[15]

*Puma of 33 Sqn based at RAF Benson on operations in Kosovo*

The air campaign was part of a larger package, finally producing the November 1995 Dayton Accords – bringing peace to Bosnia and Herzegovina. The international sanctions started to have an effect, and the Bosnian-Muslims and Croats launched a ground offensive alongside the air campaign.[16] Moreover, Deliberate Force included a heavy ground component. A French, British, and Dutch multinational brigade was deployed to Bosnia in mid-1995. According to the French general commanding the brigade, artillery fire paralysed Serb military movements around Sarajevo and produced synergies with air power.[17]

Between 24 March and 9 June 1999, NATO embarked upon the largest air campaign over the Balkans, the goal being to stop the suppression of the Albanian majority in Kosovo.[18] Why Milosevic gave in is still a controversial issue. A bundle of factors was identified, with air power underpinning all the other factors – declining support from Russia, NATO's cohesion as an alliance, diplomatic interventions, and the increasing threat of a NATO ground intervention.[19]

In its destructive effect, Allied Force was much larger than its predecessors. Approximately 23,000 bombs and missiles were used, of which 35 per cent were precision-guided, including 329 cruise missiles.[20] Unlike operation Deliberate Force, these munitions were not exclusively aimed at purely military target sets. Allied Force went beyond the immediate battlefield and laid waste to large parts of the Serbian infrastructure, including oil refineries along the Danube.[21]

***Characteristics of the Balkan air campaigns***

The Balkan air campaigns had typical characteristics, which are largely related to the highly sensitive political environment in which the operations were conducted. Throughout the 1990s, continental European constituencies in general were not at ease with the use of military power for achieving foreign political goals. Force could only be applied for an evident humanitarian purpose. Consequently, the Balkan air campaigns were only gradually escalated. Unlike Desert Storm, where several target sets were attacked simultaneously – in a so-called parallel warfare mode, operations Deny Flight, Deliberate Force and Allied Force were gradualist, taking account of the brittle political environment. European politicians and militaries were reluctant to get dragged into an all-out war. The situation in Germany, and to a lesser degree in the Netherlands, aptly highlights the reality of this politically fragile environment. On the first night of operation Allied Force, a Dutch F-16 downed one of three Serb MiG-29s destroyed by the Alliance. Indicating the sensitivity of this incident, the Dutch Chief of Defence, Admiral Lukas Kroon, expressed concerns about too much publicity to General Wesley Clark.[22]

On 30 June 1995, the German parliament voted in favour of a more robust military commitment in the context of the Bosnian civil war – so far, the Federal Republic has only provided AWACS personnel. The core of the German contribution encompassed eight Tornado ECR, specifically dedicated for SEAD (suppression of enemy air defences) missions, and six reconnaissance Tornado aircraft.[23] Yet nationally imposed rules of engagement provided a very narrow margin for German aircraft to operate. Their employment was restricted to supporting defensive actions of the multinational brigade. As a consequence, German Tornado aircraft were not entitled to directly participate in the UN mandated air campaign Deliberate Force.[24] While the Alliance could not directly draw upon German SEAD aircraft for operation Deliberate Force, the mere presence of German Tornado ECR

aircraft inhibited hostile SAM activity.

Given Europe's fragile political environment for the use of military force, a genuine European air power doctrine would have to embrace the realities of European politics. Accordingly, European air power doctrine also has to conceptualise the gradualist approach, even if this runs contrary to the widely accepted US view on air power doctrine, which places an emphasis on striking hard and swift.

Yet gradualism and political restraints are not negative things *per se*. Deliberate Force is an example of how a gradualist joint campaign effectively achieved its goals, through concentration on the battlefield – the target set consisted exclusively of military targets – and in conjunction with the other tools of grand strategy. Secondly, against the backdrop of operation Allied Force, it is generally agreed upon that Russian diplomacy played a role in convincing Milosevic to agree to a G8 plan, in order to stop NATO's air campaign against Serbia. It is doubtful whether the Russians would have been willing to exert pressure on the Serbs, if NATO would have embarked upon an all-out air campaign from the very beginning. In essence, the object in war is to attain a better peace. Accordingly, the British strategist Liddell Hart argued: '…it is essential to conduct war with constant regard to the peace you desire.'[25] This dictum pertinently applies to campaigns conducted for humanitarian purposes. From such a vantage point, Deliberate Force – with its emphasis upon avoiding collateral damage and upon gradualism, can be regarded as a very successful military operation. In general, Europeans feel more at ease with operations, which clearly focus upon the battlefield in the narrow and traditional sense.

***Continental European air powers and the 'War on Terror'***

Despite alliance frictions in the course of Allied Force in 1999, the French Air Force was the first European air force to engage targets in Afghanistan by means of fighter-bombers. This kinetic phase was preceded by a reconnaissance phase, in order to provide French decision-makers with autonomous intelligence. Regarding the deployment of attack aircraft, the French approach was two-pronged.

*French Air Force Mirage 2000D*

On the one hand, French Super Etendards from the aircraft carrier *Charles de Gaulle* had been flying missions over Afghanistan since December 2001. Together with Italian Navy Harriers operating off the carrier *Garibaldi*, these aircraft supported US Navy fighter-bombers orbiting over Kandahar and Tora Bora. On the other hand, six Mirage 2000D together with two tanker aircraft were deployed over 6,000 kilometers from France to Manas,

Kyrgyzstan, on 27 February 2002. On 2 March, these aircraft, alongside 16 French Navy Super Etendards, took part in operation Anaconda.[26] The American Air Component Commander, General Moseley, argued that, given the ferocity of the fighting on the ground, he immediately had to engage the French Mirage aircraft, without giving them time to acclimatize. The French detachment, consisting of fighter-bombers and tanker aircraft, was the first to be based at Manas, and General Moseley acknowledged France's role in establishing a new front for operations over Afghanistan. He considered it particularly important to complement air power projected from aircraft carriers by a land-based approach. In June 2002, the French Mirage aircraft in Manas were joined by USMC F/A-18D Hornets. Both in the air and on the ground, co-operation between the two contingents was very tight. Up to autumn 2002, the American and French air forces were the only ones among the 12 coalition countries that patrolled over Afghanistan day and night. Missions lasted between four to seven hours.[27] Within seven months, French Mirages logged 4,500 flying hours and 900 sorties, destroying or neutralizing 32 targets.[28] Over a protracted period of time, French aircrews covered vast distances in each sortie.

In the first half of 2007, the French Air Force deployed its Rafales for the first time to Central Asia. Their missions encompassed tactical reconnaissance, low-level passes to deter and disperse enemy forces or to provide close air support. On 1 April 2007, for instance, French Air Force fighter-bombers responded to a call by US troops for air strikes against insurgents 200 kilometers east of Kabul. The request was picked up and executed by a Rafale and a Mirage 2000D. French Navy Rafales operating from the *Charles de Gaulle* also contributed to the fighting on the ground.[29]

The successful rapid integration of French air assets in the initial stages of operations Enduring Freedom was partly the result of significant defence restructuring. Shortfalls, as experienced during operation Desert Storm, triggered a far-reaching defence reform under President Jacques Chirac in the mid-1990s, putting an emphasis upon modernising the conventional component of France's defence architecture.[30]

*French Air Force Rafale*

European co-operation is highlighted by the fact that, on 1 October 2002, the French Mirage 2000D aircraft based in Manas were replaced by a European F-16 detachment.[31] This combined detachment consisted of eighteen F-16s from Denmark, the Netherlands, and Norway supported by a Dutch KDC-10 tanker aircraft. It is interesting to point out that during this transition period,

European transport and air-to-air refuelling aircraft were co-ordinated by a common European Airlift Co-ordination Cell (EACC) based in the Netherlands.[32] EACC was part of an evolutionary process that has been leading to a common European air transport command, as will be elaborated further below.

Within one year of operations, the Dutch fighter-bombers alone logged 804 sorties and 4,640 flying hours, regularly providing close air support to ground troops.[33] The combined European F-16 detachment finally led to the establishment of a European F-16 expeditionary air wing, known under the acronym EPAF EAW (European Participating Air Forces' Expeditionary Air Wing).

The multinational F-16 deployment to Manas was effective despite some legal and procedural obstacles. In order to further improve co-operation between the European F-16 users, General Berlijn, then Commander-in-Chief Royal Netherlands Air Force, took the initiative to approach his Belgian, Danish, Norwegian and Polish Air Force counterparts to ask for their view upon establishing a European expeditionary F-16 wing. The EPAF EAW memorandum of understanding was finally signed by the defence ministers of Belgium, Denmark, the Netherlands, Norway, and Portugal during the NATO summit in Istanbul on 28 June 2004.[34] The participating air forces intend to make optimum use of available and complementary assets in out-of-area operations, in order to increase efficiency. EPAF EAW allows for deployments involving two or more air forces, depending on the particular circumstances. Through this approach, national sovereignty is respected, with each participating nation defining its level of commitment.[35] The essential benefit of the EPAF EAW concept is synergy. Through their combined commitment, EPAF nations as a group can deliver more robust and sustainable force packages than autonomous national efforts would allow for. Currently, European F-16s under the EPAF EAW banner continue to support ISAF operations in Afghanistan.

***Rapid reaction interventions in Africa***

Military operations that have increasingly taken place in the post-Cold War era, but have attracted scant attention, are so-called rapid reaction interventions. The British and French armed forces have accumulated most experience in these operations, and it is basically their experience, which served as an example for the EU Battle Group concept. These are highly integrated operations, with air power playing an important force enabling role. Operation Palliser was the most prominent British rapid reaction operation in Africa of the post-Cold War era. In 2000, the operation decisively helped to stabilise civil war-torn Sierra Leone with minimal, but rapid, use of force. This article turns to an examination of the French experience.

When rapidly deploying forces to Central Asia in early 2002, against the backdrop of operation Enduring Freedom, the French Air Force could draw upon a vast experience in small-scale deployments to Africa since the late 1960s.[36] These operations provided the French Air Force with the necessary expertise to

open a new front for air operations over Afghanistan.

French operations in Africa have traditionally been autonomous national operations. After the Cold War, French forces have on many occasions intervened in order to temporarily stabilize hotspots or to evacuate Western citizens. As these operations have required quick reaction, power projection by air has proved indispensable for mission-success. Besides airlift, the French Air Force has often provided combat aircraft, giving the lean, French, ground force deployments a decisive edge in firepower. For instance, operation *Turquoise*, lasting from 22 June until 22 August 1994, was aimed at stopping genocide in Rwanda and establishing a safe haven. Since Rwanda is a land-locked country and more than 8,000 kilometers away from France, rapid deployment could only be executed by airlift. The air-bridge was considerably augmented by chartered Russian wide-body transport aircraft. A total of 3,000 personnel and 700 vehicles and additional cargo were moved during the operation. Firepower was delivered by 1,200 French frontline troops supported by 12 combat aircraft.[37] Further major joint interventions were conducted in Central Africa (1996), in the Congo (1997), and in Ivory Coast, beginning in late 2002. Forward deployed bases and troops proved to be an essential key to success.

Developments in creating a common European security and defence policy have also had corollaries for French overseas interventions, implying a shift from autonomous national towards multi-lateral operations. One of the most prominent operations took place in the southern provinces of the Democratic Republic of Congo in mid-2003. The operation was a response to the killing of approximately 400 civilians in the city of Bunia by civil war factions. There had already been 700 lightly armed UN peacekeepers in place – yet they had not been capable of providing adequate security. The French President's positive response to the UN Secretary General's call for assistance in order to stabilise the crisis in the Ituri district paved the way for the EU's first autonomous military operation outside Europe, lasting from 6 June to 1 September 2003. Out of 1,860 troops, France provided 1,660 for operation Artemis.[38] The main combat element consisted of 150 French and approximately 75 Swedish special operation forces. The deployment of these Swedish forces is an interesting aspect, particularly against the backdrop of the country's legacy of neutrality. During the operation, French Mirage aircraft provided close air support and reconnaissance.[39] Again, inter- and intra-airlift, as well as forward deployed French bases, proved indispensable for the timely management of this humanitarian crisis.

British and French experience in rapidly deploying joint contingents to hotspots led to the EU Battle Group concept; basically a joint force with a core of approximately 1,500 infantry troops. At the Franco-British summit in *Le Touquet* on 4 February 2003, the concept was raised for the first time.[40] After the experience of prolonged interventions in Bosnia and elsewhere, the EU Battle Group concept represents a thrust towards

more robust, but timely limited, operations, primarily based on Chapter VII of the UN Charter, which does not require the consent of the warring parties.

For smaller European countries, the EU Battle Group concept represents a major challenge and accelerates their force transformation process. At the Council of Defence Ministers in Brussels on 22 November 2004, it was declared that Sweden, Finland, Norway, and Estonia intended to establish a multinational battle group, with Sweden being the lead nation. Out of 1,500 troops, Sweden contributes approximately 1,100. The Nordic Battle Group's first standby period lasted from 1 January to 30 June 2008.[41] Though being a land-centric concept, the Nordic Battle Group had a significant impact upon the Swedish Air Force's thrust towards deployed operations. During the standby period, eight NATO interoperable JAS-39 C Gripen combat aircraft provided part of an air component.[42] This rapid reaction Gripen unit is a preliminary point of culmination in a considerable shift from an air force that was almost exclusively geared towards autonomous territorial defence to an air force that is getting ready to take on its share on the international stage.

**Division of labour - NATO and the EU**

In this section, the alliance frameworks, which have provided the political framework for various military operations, are examined. The American-led Balkan air campaigns, under a NATO banner and partly on behalf of the UN, were in many ways a formative experience, as they represented for a majority of European air forces the first real combat operations since World War II. These days, European nations engage primarily in two types of operations, NATO or EU operations. Accordingly, a division of labour is gradually becoming apparent between the two co-operative security bodies. While NATO's ISAF operation in Afghanistan constitutes a support operation against the backdrop of the 'War on Terror', the EU focuses, besides stabilisation operations in the developing world and in the Balkans, on small-scale rapid-reaction interventions.

Whereas deterrence and collective defence had provided the fulcrum during the Cold War era and have continued to be a central NATO Alliance issue, the emphasis *de facto* shifted towards peace support and crisis management operations after the Cold War.[43] Despite this shift, NATO remains the sole instrument for collective defence. It is also important to point out that in the post-Cold War era, there have been several initiatives to strengthen the European pillar in the alliance in order to achieve a more balanced transatlantic burden sharing, such as the ESDI (European Security and Defence Identity) of the early 1990s.[44]

In parallel to NATO's re-orientation, EU members agreed on the development of a Common Foreign and Security Policy (CFSP) in 1992. Implicitly, the prospect of a future common defence was held out. With the ratification of the Amsterdam Treaty in June 1997, the European Council incorporated the Western European Union's *Petersberg* tasks

into the EU's CFSP.[45] These include humanitarian and rescue tasks, peace-keeping tasks, and peace-enforcement.[46]

Yet despite the declaration of broad political intentions, no concrete action plan for common defence matters was decided upon. Moreover, Europe's difficulties in dealing with the crisis in the Balkans seriously put into question the effectiveness of the CFSP. It was essential to improve European military capabilities if the EU wanted to take on strategic responsibilities. This realisation led the UK and France, the two critical European military actors, to take action, resulting in the bilateral Franco-British *Saint-Malo* declaration of late 1998.[47] France and the UK jointly declared that 'the Union must have the capacity for autonomous action, backed up by credible military forces, the means to decide to use them, and a readiness to do so, in order to respond to international crises.'[48]

In the ensuing years, a rapid Europeanisation of the *Saint-Malo* declaration took place. Particularly, the EU summit in Cologne, in June 1999, was an important milestone towards a European Security and Defence Policy (ESDP) as an integral part of the EU's CFSP. In particular, the apparent European shortfalls during the Kosovo air campaign were a catalyst for making swift progress in common European defence matters.[49]

NATO and the ESDP complement each other. The former guarantees a strong transatlantic link and provides for collective defence, a particularly important aspect for the Eastern European members. The latter is particularly suited to respond to active requests by the UN Secretary General against the backdrop of crises in the developing world. In many cases, the ESDP is the natural choice for the conduct of non-Article 5 crisis management scenarios. ESDP-led operations are, in certain theatres, seen as more benign than potential NATO operations. This specific reality was underlined by a French Air Force officer with ample experience in the African theatre at a recent NATO conference.[50] Yet while the ESDP provides a suitable framework for peace support operations, it is less likely to provide an adequate framework for conventional high-intensity warfare in deployed operations.

Critics might argue that in the field of defence, the EU is producing irrelevant redundancies in relation to NATO. These supposed redundancies, however, are of almost exclusively conceptual and not physical nature. There are no separate EU troops. Both NATO and the EU largely draw on the same troops – hence, there is a single set of forces for both institutions. There are some redundancies regarding command and control, such as a Civil Military Planning Cell within the European Union Military Staff. Yet these redundancies come at a minimal cost and are necessary. In order to secure political freedom of action, particularly in the light of Europe's fragile political environment for military interventions, a host of potential options needs to be generated. The current environment is characterised by the formula 'the mission defines the coalition', as expressed by the former Secretary of

Defense, Donald Rumsfeld.

**The need to develop European air power**

Co-operation in the field of air power was already, during the days of the Cold War era, of pivotal importance – particularly given the short warning times in case of a Soviet surprise attack. Hence, NATO's integrated air defence played a vital role. Yet in the post-Cold War era, the necessity to generate common approaches has become even more urgent. Four reasons for this can be identified:

- Shift from a threat-based to a capability-based paradigm for defence planning.
- Shift from 'fighting in place' to deployed operations.
- Shift from deterrence postures to real operations.
- Costs for advanced air power technology combined with European reluctance to keep defence spending on a Cold War level.

The Cold War, with its clearly defined threats, provided governments and militaries alike with a more or less reliable framework for planning, force structuring, and procurement. This certainty ceased to exist. Instead, Western armed forces had to shift from a threat-based to a capability-based approach. The threat-based approach basically meant that forces were tailored according to a relatively clear Warsaw Pact threat. With the end of the Cold War, these clearly defined threats ceased to exist. As a consequence, it has been attempted to structure armed forces along a number of defined capabilities, in order to be able to respond to a number of scenarios, ranging from alliance defence to peace support and humanitarian operations.

In the post-Cold War era, the challenge of a sensible force mix concerns both larger and smaller European actors. For the smaller nations, the particular question is what particular capabilities they should provide, in order to contribute to a sensible force mix on a supra-national level. *These capabilities include offensive aspects such as precision-strike, defensive aspects such as theatre ballistic missile defence, or force enabling aspects such as air-to-air refuelling. They underpin the four core air power roles – control of the air, mobility and lift, intelligence and situational awareness, and attack, both kinetic and non-kinetic. In the current environment of deployed operations, a fully autonomous force must be able to meet all these roles. Yet achieving full effectiveness in all areas is, and will almost certainly remain, beyond the affordable reach of a single European nation.*

The second reason identified to generate common approaches to air power is the shift from 'fighting in place' to deployed operations. Deployed operations actually require more roles to be covered than traditional territorial alliance defence. This particularly concerns the areas of mobility, sustainability and force protection.

Thirdly, the shift from deterrence postures to real operations revealed significant shortfalls in European force structures. Unlike the Cold War deterrence postures, real operations are unforgiving in exposing shortfalls.

Capabilities not only have to exist on paper, but they must be robust, deployable and usable at short notice. Moreover, real operations are challenging and demanding in terms of interoperability issues.

Finally, costs for advanced air power technology, combined with European reluctance to keep defence spending on a Cold War level, are major challenges in generating modern air power. In sum, political, financial and technological constraints and trends have prevented most European nations from acquiring air power capabilities comparable to those of the United States.[51] As a consequence, the transatlantic air power capability gap continued to widen in the 1990s, as operation Allied Force clearly demonstrated.

## Deficiencies in European air power

Allied Force is referred to as a benchmark for highlighting deficiencies in European air power and for examining developments that have taken place since 1999. In the course of Allied Force, the United States was shouldering by far the largest burden. While some European allies were able to make valuable SEAD contributions or to deliver precision-guided munitions, many European allies lacked the capabilities to operate effectively with the US services,[52] which contributed 59 per cent of all allied aircraft involved in the air campaign and released over 80 per cent of the expended munitions.[53] Approximately 23,000 bombs and missiles were used, of which 35 per cent were precision-guided, including 329 cruise missiles.[54]

Examining NATO's air campaign as a model for possible future European military operations, a British defence expert argued in 2000 that the approximately 500 all-weather bombers that the UK, France, Germany and Italy could field at the time needed to be increased by about 50 per cent.[55] Furthermore,the transatlantic capability gap became visible in the fields of AAR (air-to-air refuelling) and airborne stand-off jamming. As regards the latter, NATO's air campaign hinged entirely upon US capabilities. In the domain of AAR, approximately 90 per cent of the sorties were flown by American aircraft.[56]

### *Air mobility*

The post-Cold War era revealed significant gaps in European strategic airlift. This problem is related to the fact that during the Cold War, Western European armed forces were supposed to fight 'in place'.

*Royal Air Force C-17A Globemaster III*

As a consequence, with a significant increase in out-of-area operations, European air forces have suffered from a shortage in strategic airlift capacities. Even at the end of the

1990s, Western Europe did not own a single military wide-body transport aircraft capable of lifting a main battle tank.[57] In 2001, the RAF was the first European air force to bridge this gap by leasing four C-17s from Boeing with the option to buy at the end of the lease period. The aircraft were finally procured and the fleet was extended to six aircraft by early July 2008.[58]

Yet it would be wrong to conclude that strategic mobility just depends on transport aircraft. Deployable ground infrastructure represents a major shortcoming in European air power, too. Against the backdrop of the NATO Response Force air component, the Royal Air Force and the French Air Force have so far been the only air forces to provide deployable air bases on a national basis.[59]

AAR – a specific element of air mobility – is one of the foremost European shortcomings in deployed operations. Whereas the USAF, the USN and the USMC together operated more than 650 tanker aircraft of various types in 2006, the air forces of France, Germany, Italy, the Netherlands, Spain, Sweden, and the United Kingdom could muster approximately seventy aircraft, with the UK and France providing the bulk of the European tanker fleet.[60] This gap is likely to remain so. The UK and France, operating the largest European tanker fleets, plan to replace their aging fleets by 14 Airbus multi-role tanker transport aircraft each.[61] As a consequence, there is likely to remain a significant imbalance between the shaft and the spear, between force enablers and offensive air power.

***Precision strike***

The shortfalls in kinetic air power have been addressed more vigorously than the issue of force enablers. Accordingly, European air forces went to great lengths in the wake of Allied Force at improving their precision strike capabilities. During operation Allied Force, when American forces and the Royal Navy released a total of 329 cruise missiles, the continental Europeans were not in a position to contribute to the cruise missile campaign. Since then, the Germans and French have been acquiring over one thousand missiles combined,[62] and France has been pursuing an innovative approach through the AASM (*armament air sol modulaire*), basically a rocket boosted precision-guided bomb which can function as a cheap substitute for cruise missiles or which can be used to engage targets of opportunities, depending on the homing device.[63]

Technological advancements since Allied Force have also significantly enhanced firepower per aircraft. The Rafale or Eurofighter Typhoon for instance are capable of releasing a standard air-to-ground weapons load of four to six precision-guided munitions, whereas in Allied Force, strike aircraft, such as the Tornado, the Mirage 2000D or the F-16, carried a standard weapon load of only two laser-guided bombs. Such an increase in firepower puts the above argument by a British commentator, that Europe would have to increase its 500 all-weather bombers by 50 per cent, into a different perspective. While the lack in precision firepower has been addressed quite effectively, the imbalance between the shaft and the

spear still remains problematic.

**Remedies**

Improvements in European defence are often presented as inextricably linked to limited defence budgets and to a lack of investment in research and development. Yet co-operative approaches to European air power might offer more value for money, as has already been highlighted by the development of the European F-16 wing against the backdrop of operations in Afghanistan. Further alternatives include role specialisation as well as doctrinal and operational responses. Moreover, command and control gained a new emphasis in the post-Cold War era, in order to effectively employ air power assets.

***European airlift co-operation***

In the wake of the Kosovo air campaign, Lord Garden argued that the support area, especially airlift, offered opportunities for pooling

*A400M Roll-out*

and rationalisation without too many issues of national sovereignty.[64] In the meantime, European air forces have indeed been active in this field, and a number of complementary initiatives can be identified.

Since 2001, European Air Group air forces[65] have commonly co-ordinated their airlift assets first through the European Airlift Coordination Cell (EACC) based in Eindhoven, which was further evolved into the European Airlift Centre (EAC) in mid-2004.[66] The rotation of the French Mirage detachment in Manas with the European F-16 component was facilitated by EACC. Moreover, Europeans have started both to commonly charter and to commonly procure wide-body/long-range transport aircraft. These days, there are basically two complementary initiatives. The first initiative is the so-called Strategic Airlift Interim Solution (SALIS), under which a multinational consortium of 16 countries, led by Germany, is chartering Antonov An-124-100 transport aircraft. SALIS has been operational since March 2006. The SALIS initiative contributes to bridging the European capability gap in strategic airlift until the commissioning of the European A400M military transport aircraft. SALIS is equally available to both NATO and EU operations, underlining the strategic partnership between the two alliance frameworks.[67]

NATO's Strategic Airlift Capability initiative for its part is an example of shared ownership. Ten NATO countries plus two Partnership for Peace (PfP) nations, Finland and Sweden, signed a memorandum of understanding confirming their participation in commonly acquiring and sustaining three C-17 strategic transport aircraft. Based at Papa

airbase in Hungary, the aircraft, scheduled for 2009, will be flown and maintained by multinational crews.[68] The most far-reaching project is the European Air Transport Command (EATC) initiative. At the Franco-German summit in November 1999, France and Germany declared their intention to transform their co-operation in the field of military airlift into a common transport command.[69] In May 2007, finally, an agreement between Germany, France, Belgium, and the Netherlands was signed for establishing EATC, which is supposed to reach initial operational capability in early 2009.[70] This multi-lateral approach will provide each of these countries with an unprecedented surge capability, as EATC will pool more than 100 Airbus A400Ms from Germany, France, and Belgium.[71] Against the backdrop of sustained out-of-area operations or rapid reaction operations, co-operation in the field of military airlift will enhance European power projection capabilities significantly.

***Role specialisation***

Unlike the pooling of assets, role specialisation has been politically more sensitive. As a consequence, role specialisation has been taking place by default – due to lack of resources – rather than by a deliberate policy. Role specialisation is perceived to supposedly limit national freedom of action. In particular, nations are reluctant to become reliant on other allies for particular capabilities.

Yet small nations in any case have to limit themselves to a very narrow band-with of roles. Very often these are primarily relegated to quick reaction alert, air policing, a tactical precision-strike and reconnaissance capability, tactical mobility and a very limited inter-theatre airlift capability to re-supply up to battalion-sized contingents in deployed operations. It would be beneficial for small nations to explore the potential of role specialisation more systematically and to acquire subject matter expertise in certain key areas, which would allow them to gain leverage within an alliance or a coalition.

Reluctance to go down the path of role specialisation also contributes to the European imbalance between the shaft and the spear. Particularly small countries, which have to make hard choices due to constrained defence resources, emphasise so-called kinetic air power capabilities over force enabling capabilities. Kinetic assets are still seen as providing for a country's defence, whereas an overemphasis on force enablers is seen as excessive role specialisation. This attitude exacerbates the teeth-to-tail ratio on a supra-national level. Despite the fact that the potential procurement of a limited number of C-17s in the late 1990s by a medium-sized European state would have generated an international leverage out of proportion to the costs involved, this option has not been pursued. Instead, the emphasis has been placed on the acquisition of offensive assets, such as combat helicopters.

A particular example that shows the benefits of role specialisation is electronic warfare. Airborne stand-off jamming represents a significant European shortfall. In the meantime, there are projects in Germany and France to remedy this gap.[72] Yet

it seems to be unnoticed that the Swedish Air Force has retained an expertise in airborne stand-off jamming for most of the post-Cold War era. In the late 1990s for instance, ten two-seat Viggens were modified into dedicated electronic warfare platforms. These so-called SK-37E Viggens were phased out in mid-2007. As a next step, the JAS-39 D Gripen might be further developed into an electronic warfare platform. Yet the project does not have the highest priority within the Swedish Air Force.[73] The Swedish Air Force ought to place a particular emphasis on retaining and improving this capability, as it would give Sweden a sought-after niche capability and hence leverage in composite air operations. This capability could be put at the disposal of the EU, and Sweden is also seeking active co-operation with NATO and involvement in NATO's Response Force.

***Doctrinal and operational responses***

Doctrinal and operational responses can function as force multipliers, as they allow European air forces to rely more on human-centric approaches than on hardware and software. Examples are stand-off jamming and SEAD. They are considered capabilities that have become indispensable for composite air operations. Yet, real operations have proven that there are ways to operate effectively without these specific capabilities under certain circumstances. In the course of operation Deny Flight, the American Air Component Commander announced that all missions had to be escorted by SEAD aircraft. Some European allies, however, expressed their doubts about this far from flexible way of operating.[74] Instead of over-reliance on SEAD and stand-off jamming assets, Dutch pilots preferred to make their flight patterns as unpredictable as possible.[75] It was basically an argument on whether to rely on rigid force packages with stand-off jammers and dedicated SEAD assets or to draw upon air power's flexibility.

*F-16 of the Danish Air Force*

The Royal Netherlands Air Force (RNLAF) displayed distinct national approaches to air power in the air campaigns over Bosnia. Since the mid-1980s, the RNLAF had been pioneering the so-called swing-role concept. In contrast, other European F-16 users were employing the aircraft in fixed roles only.[76] All Dutch F-16 pilots are trained in both the air-to-air and air-to-ground role.[77] Due to this concept and its inherent flexibility, Dutch F-16s could be re-tasked from an air defence to an attack mission while in the air. This gave the combined air operations centre at Vicenza some extra leeway.[78] Since swing-role not only requires multi-role capable combat aircraft, but also versatile aircrews,

the RNLAF is willing to meet the demands of a very intensive and costly training programme.[79]

***Not primarily a matter of size***

To draw the conclusion that proficiency in the application of air power is primarily a matter of size or that size is proportional to effectiveness is wrong. In fact, size has not so much mattered in generating European air power.

For operation Allied Force, the German contingent contained ten dedicated SEAD Tornados and four reconnaissance Tornados.[80] They accounted for approximately 1.4 per cent of the allied aircraft fleet, which in the course of the campaign was increased to slightly more than 1,000 assets.[81] Yet the small German Tornado contingent released a significant number of high-speed, anti-radiation missiles, 236 out of a total of 743 expended throughout the entire campaign,[82] which corresponded to approximately a third.

Likewise, the Dutch detachment consisting of a total of 20 F-16s and two KDC-10 tanker aircraft proved very efficient. Throughout operation Allied Force, Dutch F-16s flew 700 air-to-air, approximately 450 air-to-ground and 50 reconnaissance sorties over Yugoslavia. The RNLAF delivered more than 850 air-to-ground weapons, including 246 laser-guided bombs and 32 Maverick missiles. Given these figures, the RNLAF played a substantial role in operation Allied Force and provided, according to Dutch sources, approximately 7.5 per cent of the offensive NATO sorties.[83] To put the number of expended precision-guided munitions into context, the RNLAF accounted for approximately 3.5 per cent of the total number employed during the campaign and released slightly more than the RAF, which employed 244 laser-guided bombs and six ALARM anti-radiation missiles.[84] Accordingly, the RNLAF lived up to its motto *Parvus Numero Magnus Merito*.

***Command and control***

In general, a shift from a particular emphasis upon airframes to a balanced approach, giving more consideration to air power software, has taken place. In fact, air power software gained unprecedented importance at the outset of the post-Cold War era. In the wake of operation Desert Storm, Martin van Creveld argued: 'No other country possesses the hardware, much less the 'software', needed for mounting an air campaign that will even remotely compare with US capabilities in this field.'[85] Yet in the meantime, the RAF, the French Air Force, and the German Air Force have been building up computerised command and control systems, essential for the conduct of autonomous European air operations.

The SCCOA system (*système de commandement et de conduite des opérations aériennes*) has become of pivotal importance in France's thrust towards enhanced and interoperable conventional forces. The deployable component of SCCOA can support a combined Joint Force Air Component Command (JFACC) Headquarters in deployed operations.[86] Enhanced interoperability on a technical level has enabled the French Air Force to take on a lead role on the international scene. As such, the

French Air Force was in charge of the NATO Response Force (NRF) JFACC during the second half of 2005. Despite France's non-integration into NATO's integrated military command structure, the French Air Force was the first European air force to provide such a capability on a national basis to the NRF.[87]

The German Air Force has also made significant steps in improving its command and control capabilities. During the Cold War era, the German Air Force had no means at its disposal to conduct air combat operations above the wing level and fully hinged upon NATO command and control structures. In the post-Cold War era, with an increasing German commitment to out-of-area operations, a national capacity for the planning, conduct, and command of air combat operations became necessary. In late 2001, the German Air Force established its Air Operations Command – *Kommando Operative Führung Luftstreitkräfte*. For the first time in its history, the German Air Force received an autonomous capacity for tactical and operational planning of air operations. The Air Operations Command was primarily designed as a national nucleus for a multinational Air Component Command Headquarters against the backdrop of NATO or EU operations.[88] As such, the Air Operations Command will enable Germany to act as the lead nation AIR in multinational operations.[89]

**EU operations**

European countries do not have to be capable of autonomously dealing with major contingencies, such as a future conflict involving China. In these circumstances, it is 'inconceivable that European governments would act independently of the US.'[90] However, the EU needs to be capable of autonomously undertaking peace support operations across the spectrum of military force, with a particular focus upon battle group sized early-entry operations in failed states. After severe disagreements over Iraq in early 2003, it is, for instance, difficult to imagine that the EU could have drawn easily upon NATO resources – meaning American assets – for operation Artemis in mid-2003.

Rapid intervention operations in failed states require solid strategic airlift, ISTAR (intelligence, surveillance, target-acquisition, and reconnaissance), and close air support capabilities, the latter providing escalation dominance. While a NATO C-17 airlift fleet might prove very useful in these scenarios, it will finally always require US consent – a right the Americans have put a premium upon in order to secure their influence upon European security.[91] In contrast, co-operative arrangements that can be made equally available to NATO and EU operations, such as the European Air Transport Command, offer assured availability for European operations. In the field of satellite reconnaissance and surveillance, both France and Germany have taken significant steps in recent years. Next to the French-led Helios II project, Germany launched the first of five SAR-Lupe (Synthetic Aperture Radar) satellites in late 2006. It is planned to secure satellite data exchange between Germany and France.[92] Once a robust

number of A400M aircraft has been delivered to European air forces, combined with various European satellite programmes and other ISTAR assets, rapid intervention operations on behalf of the UN should no longer represent a major challenge for Europe in terms of military capabilities.

**Concluding thoughts**

The rapid deployment and the sustained presence of European air power detachments in Afghanistan and elsewhere show that Europe can make relevant contributions to current operations. In this process, European co-operation is key to creating relevant air power. By overcoming fragmented approaches to air power, it draws upon the synergies of the various air forces. In accordance with this, the article concludes by highlighting four potential guiding principles for the future development of European air power.

According to the principle 'primacy of politics', co-operative ventures and supra-national pooling of assets have to take into account the political dimension. Today's operations are primarily conducted by NATO, the EU, or *ad hoc* coalitions. As established above, NATO and the EU's Security and Defence Policy (ESDP) complement each other. While NATO guarantees a strong transatlantic link and provides for collective defence, the ESDP is particularly suited for rapid interventions in the framework of humanitarian operations. Accordingly, a natural division of labour between the two organisations is shaping up. Hence, in order to guarantee political freedom of action, co-operative ventures should be equally available to both NATO and the ESDP. This flexibility is important in a politically fragile environment, when it comes to the projection of military power.

Secondly, if we mean serious European co-operation, we have to go beyond the pooling of assets to role specialisation – not only a challenge, but also an opportunity for the smaller European air forces. Role specialisation would help to address the imbalance between offensive air power and force enablers. While there are disadvantages regarding national discretion, role specialisation could offer small nations significant leverage within a coalition or alliance, by providing a sought after-niche capability. European air power suffers from significant shortages in the force enabling areas, including deployable air base infrastructure or air-to-air refuelling assets.

Co-operation among the larger European air forces, which maintain balanced force structures, is also gaining in importance. The Royal Air Force, the French Air Force, and the German Air Force together – or any of these two combined – are likely to cover a significant range of aerospace power capabilities in the medium-term. These include airborne early warning, wide area air-to-ground surveillance, stand-off jamming, suppression of enemy air defences, theatre ballistic missile defence, high-altitude long-endurance unmanned aerial vehicles, deployable air operations centres, combat search and rescue, air-to-air refuelling, strategic airlift, and deployable air bases. This core of

capabilities will be coherent and will allow smaller European air forces to plug in and play. By providing niche capabilities, they can reinforce existing capabilities of these larger air forces and thereby contribute to more robust and sustainable force packages. While it makes sense for larger European nations to retain balanced force structures, smaller nations should give thought to partial role specialisation. Role specialisation should not happen by default, as is currently the case owing to limited resources, but as a result of a deliberate and focused policy.

While it cannot be expected that all alliance partners, be it in the framework of NATO or the ESDP, will contribute to a particular operation, it is realistic to assume that any two of the larger European air forces combined with a number of smaller air forces will commit themselves. If defence resources are appropriately spent, such a combination of air forces is likely to cover a balanced range of capabilities in order to conduct effective and sustained air operations.

Thirdly, effective European air power is not primarily a matter of size and resources – it is rather a question of balanced, interoperable, and usable capabilities. Moreover, it is a question of political will. Are countries willing to make a meaningful contribution? Likewise, it is a question of an air force's qualities regarding professionalism, training, education, and attitude.

Finally, are we conceptually embracing certain distinct European characteristics? European air power is likely to operate in very fragile political environments. Popular support for air campaigns that might seem too offensive is likely to remain brittle. Hence, gradualist approaches might often be the only options. Do European doctrines reflect those political realities, in order to meet genuine European interests? 'No major proposal required for war', Clausewitz accurately proclaimed, 'can be worked out in ignorance of political factors; and when people talk, as they often do, about harmful political influence on the management of war, they are not really saying what they mean.'[93] Air power is and will remain a tool of politics.

**Notes**

[1] Tony Mason, *Air Power: A Centennial Appraisal*, rev. ed. (London, Brassey's, 2002), 236-238.
[2] Hearing of the Senate Committee on Armed Services, 'Lessons Learned from Military Operations and Relief Efforts in Kosovo' (Washington D.C., 21 October 1999).
[3] Carl von Clausewitz, *On War*, Book I, Chapter 1, Paragraph 24.
[4] Benjamin S. Lambeth, T*he Transformation of American Air Power* (Ithaca/London, Cornell University Press, 2000), 178.
[5] Robert C. Owen, 'Summary' in Robert C. Owen (Ed.), *Deliberate Force – A Case Study in Effective Air Campaigning: Final Report of the Air University Balkans Air Campaign Study* (Maxwell, Air University Press, January 2000), 461.
[6] Mason, *Air Power*, 173.
[7] Lambeth, *American Air Power*, 178.
[8] Owen, 'Summary', 483-484.
[9] John A. Tirpak, 'Deliberate Force', *Air Force – Journal of the Air Force Association*, Vol. 80, No. 10 (October 1997) in online copy at **http://www.afa.org**, accessed 27 October 2004.
[10] Owen, 'Summary', pp. 493-494.

[11] Ibid., 491, 502.
[12] Lambeth, *American Air Power*, 176.
[13] Richard L. Sargent, 'Aircraft used in Deliberate Force' in Robert C. Owen (Ed.), *Deliberate Force – A Case Study in Effective Air Campaigning: Final Report of the Air University Balkans Air Campaign Study* (Maxwell, Air University Press, January 2000), 199.
[14] Ibid., 204, 220-222.
[15] Richard L. Sargent, '*Deliberate Force Combat Air Assessments' in Robert C. Owen (Ed.), Deliberate Force – A Case Study in Effective Air Campaigning: Final Report of the Air University Balkans Air Campaign Study* (Maxwell, Air University Press, January 2000), 332.
[16] John Stone, 'Air-Power, Land-Power and the Challenge of Ethnic Conflict', *Civil Wars*, Vol. 2., No. 3 (Autumn 1999), 29-30.
[17] André Soubirou, 'The Account of Lieutenant General (Ret) André Soubirou, Former Commanding General of the RRF Multinational Brigade in Bosnia from July to October 1995', *Doctrine Special Issue* (February 2007), 24-28, in online copy at **http://www.cdef.terre.defense.gouv.fr**, accessed 22 November 2007.
[18] Benjamin S. Lambeth, *NATO's Air War for Kosovo: A Strategic and Operational Assessment* (Santa Monica, RAND, 2001), xiii.
[19] Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly: NATO's War to save Kosovo* (Washington D.C., Brookings Institution Press, 2000), 5, 184, 199-200; Lambeth, *NATO's Air War*, 67-86; Benjamin S. Lambeth, 'Operation Allied Force: A Strategic Appraisal', in John Andreas Olsen (Ed.), *A Second Aerospace Century: Choices for the Smaller Nations* (Trondheim, The Royal Norwegian Air Force Academy, 2001), 103-109.
[20] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile War in Kosovo*, rev. ed. (Washington D.C., Center for Strategic and International Studies CSIS, 20 July 1999), 4-5.
[21] See: Tony Mason, 'Rethinking the Conceptual Framework', in Peter W. Gray (Ed.), *Air Power 21: Challenges for the New Century* (London, The Stationery Office, 2000), 217.
[22] Wesley K. Clark, *Waging Modern War* (Oxford, PublicAffairs, 2001), 197-198.
[23] Walter Jertz, 'Einsätze der Luftwaffe über Bosnien', in Peter Goebel (Ed.), *Von Kambodscha bis Kosovo: Auslandeinsätze der Bundeswehr* (Frankfurt am Main/Bonn, Report Verlag, 2000), 140.
[24] Franz-Josef Meiers, Zu neuen Ufern? Die deutsche Sicherheits- und Verteidigungspolitik in einer Welt des Wandels 1990-2000 (Paderborn, Ferdinand Schöningh, 2006), 283-284.
[25] B. H. Liddell Hart, *Strategy, 2nd* rev. ed. (First Meridian Printing, 1991 – Copyright: London, Faber & Faber, 1954, 1967) 353.
[26] Gen. Patrice Klein, 'Bilan et enseignements des opérations Héraclès et Ammonite' in Pierre Pascallon (Ed.), *L'Armée de l'Air: Les armées françaises à l'aube du XXIe siècle* (Paris, L'Harmattan, 2003), 203-204; Benjamin S. Lambeth, *American Carrier Air Power at the Dawn of a New Century* (Santa Monica, RAND, 2005), 17, 19.
[27] Frédéric Castel, 'Sept mois de coopération exemplaire entre la France et les États-Unis', *Air Actualités*, No. 556 (November 2002), 30-32.
[28] Eugénie Baldes, 'Les Mirages français passent le relais', *Air Actualités*, No. 556 (November 2002), 34-35; Ministère de la *Défense, Defence against Terrorism: a Top-Priority of the Ministry of Defence* (Paris, DICoD, April 2006), 24.
[29] Pierre Tran, 'Rafale F2 makes its Combat Debut over Afghanistan', *Defense News* (2007), in online copy at **http://www.defensenews.com**, accessed 14 August 2007.
[30] *Une Défense Nouvelle 1997-2015, Armées*

*d'aujourd'hui*, No. 208 *hors série* (Paris, Service d'informations et de relations publiques des armées, March 1996).
[31] Castel, 'Sept mois de coopération', 30.
[32] Latest News of the Ministry of Defence, News Summaries July-September 2002, 26 September 2002, **http://www.defensie.nl**, accessed 14 June 2004; Baldes, 'Les Mirages français passent le relais', 34-36.
[33] Latest News of the Ministry of Defence, Current News Summaries, 6 October 2003, **http://www.defensie.nl**, accessed 14 June 2004.
[34] Interview, Headquarters Royal Netherlands Air Force, The Hague, 23 June 2004.
[35] Memorandum of Understanding concerning the Establishment of the European Participating Air Forces' Expeditionary Air Wing (Istanbul, 28 June 2004).
[36] Mark A. Lorell, 'Lessons from the French Experience in Low Intensity Conflicts' in Andrew Vallance (Ed.), *Air Power: Collected Essays on Doctrine* (London, HMSO, 1990), 75-76.
[37] Admiral Jacques Lanxade, 'L'opération Turqoise', *Défense nationale* (February 1995), 9-11.
[38] United Nations, Peacekeeping Best Practices Unit, Military Division, *Operation Artemis: The Lessons of the Interim Emergency Multinational Force* (UN, October 2004), 3-4, in online copy at **http://pbpu.unlb.org**, accessed 26 November 2005; Marc Joulaud, *Avis présenté au nom de la commission de la défense nationale et des forces armées, sur le projet de loi de finances rectificative pour 2003,* No. 1267 (Paris, Assemblée Nationale, 2003), 20, in online copy at **http://www.assemblee-nationale.fr**, 21 July 2006.
[39] United Nations, *Operation Artemis*, 12.
[40] Gerrard Quille, 'Battle Groups to strengthen EU Military Crisis Management?', *European Security Review*, No. 22 (ISIS Europe, April 2003), in online copy at **http://www.forum-europe.com**, accessed 24 July 2006.
[41] Annual Exchange of Information on Defence Planning, Vienna Document 1999 (Stockholm, The Kingdom of Sweden, March 2005), 9; Jan Joel Andersson, *Armed and Ready? The EU Battlegroup Concept and the Nordic Battlegroup*, Report, No. 2 (Stockholm, Swedish Institute for European Policy Studies, March 2006), 39.
[42] Jan Jorgensen, 'Battle Group Gripens', *Air Forces Monthly* (August 2007), 42-46.
[43] *NATO Handbook* (Brussels, NATO Office of Information and Press, 2001), 47-48.
[44] NATO, *Declaration of the Heads of State and Government, Press Communiqué M-1(94)3 Meeting of the North Atlantic Council* (Brussels, NATO Headquarters, 11 January 1994), § 4-6, in online copy at **http://www.nato.int**, accessed 25 February 2007.
[45] Meiers, *Die deutsche Sicherheits- und Verteidigungspolitik*, 143.
[46] *Europa Glossary*, **http://europa.eu**, accessed 26 February 2007.
[47] Jean-Yves Haine, *ESDP: An Overview* (Paris, European Union Institute for Security Studies ISS), in online copy at **http://www.iss-eu.org**, accessed 14 May 2005.
[48] Saint-Malo Declaration (December 1998), paragraph 2.
[49] Meiers, *Die deutsche Sicherheits- und Verteidigungspolitik*, 161.
[50] Chirstophe Taesch at the conference Europe, NATO and Air Power (Ramstein Air Base, 7 October 2008).
[51] David Gates, 'Air Power: The Instrument of Choice?', in Peter W. Gray (Ed.), *Air Power 21: Challenges for the New Century* (London, The Stationery Office, 2000), 26.
[52] John E. Peters, Stuart E. Johnson, Nora Bensahel, Timothy Liston, and Traci Williams, *European Contributions to Operation Allied Force: Implications for*

*Transatlantic Cooperation* (Santa Monica, RAND, 2001), 52.
[53] Lambeth, *NATO's Air War for Kosovo*, 33, 66.
[54] Cordesman, *The Lessons and Non-Lessons*, 4-5.
[55] Timothy Garden, 'European Air Power', in Peter W. Gray (Ed.), *Air Power 21: Challenges for the New Century* (London, The Stationery Office, 2000), 144.
[56] Peters et al., *European Contributions*, 20-24.
[57] Hans-Christian Hagman, *European Crisis Management and Defence: The Search for Capabilities*, Adelphi Paper, No. 353 (Oxford, Oxford University Press for IISS, 2002), 22.
[58] 'Sixth C-17 swoops into Britain', *Defence News* (3 July 2008), online copy at **http://www.mod.uk**, accessed 24 September 2008.
[59] 'NRF: The French Air Force in Control', *Air Actualités*, No. 583 (July/August 2005), 43.
[60] Michael J. Gething and Bill Sweetman, 'Air-to-air refuelling provides a force multiplier for expeditionary warfare', *Jane's International Defence Review*, Vol./No. 39 (February 2006), 45.
[61] *Défense Nationale* (Paris, La Documentation française, June 2008) 228; 'A330-200 Future Strategic Tanker Aircraft (FSTA) – Multi-Role Tanker Transporter (MRTT), Europe', *Airforce Technology*, online copy at **www.airforce-technology.com**, accessed 2 January 2009.
[62] *Loi de programmation militaire 2003-2008 – la politique de défense* (Paris, Journaux officiels, May 2003), 28; Lt. Gen. Walter Jertz, 'Unser Schwerpunkt ist der Einsatz: Das Luftwaffenführungskommando auf dem Weg in die Zukunft', *Strategie & Technik* (March 2006), 22.
[63] 'Armament Air-Sol Modulaire', *Defense Update* (updated 19/12/2006), online copy at **http://www.defense-update.com**, accessed 7 March 2007.
[64] Garden, 'European Air Power', 119.
[65] The following air forces are members of the European Air Group: RAF, French AF, Italian AF, Belgian AF, German AF, Netherlands AF, Spanish AF.
[66] EAG, *European Airlift Centre* (EAC), **http://www.euroairgroup.org**, accessed 2 March 2007.
[67] Bundesministerium der Verteidigung, *Verlässlicher Zugriff auf "fliegende Güterzüge"* (Leipzig, 23 March 2006), **http://www.bmvg.de**, accessed 9 August 2006; EU Council Secretariat, *Development of European Military Capabilities: The Force Catalogue 2006* (Brussels, November 2006), 3, online copy at **http://www.consilium.europe.eu**, accessed 6 February 2007.
[68] NATO, *Strategic Airlift Capability: A Key Capability for the Alliance* (last updated 27 November 2008), **www.nato.int**, accessed 2 January 2009.
[69] Interview, Ministry of Defence, Bonn, 26 April 2006.
[70] 'European Air Transport Command Agreement Signed', *Defense Industry Daily* (25 May 2007), online copy at **http://www.defenseindustrydaily.com**, accessed 2 August 2007.
[71] Airbus Military, **www.airbusmilitary.com**, accessed 17 August 2007.
[72] *Loi de programmation militaire 2003-2008*, 28, 40; Interview, Ministry of Defence, Bonn, 27 April 2006.
73 Lars-Ake Siggelin, 'Electric Saabs', *Air Forces Monthly* (October 2007), 40-41.
[74] Wim H. Lutgert and Rolf de Winter, *Check the Horizon: De Koninklijke Luchtmacht en het conflict in voormalig Joegoslavië 1991-1995* (The Hague, Sectie Luchtmachthistorie van de Staf van de Bevelhebber der Luchtstrijdkrachten, 2001), 511.
[75] Interview, Headquarters Royal Netherlands Air Force, The Hague, 22 June 2004.
[76] Lt. Gen. Dirk Starink, Commander-in-Chief Royal Netherlands Air Force, briefing at the Shephard Air Power

Conference 2005 (London, 25-27 January 2005).
[77] Lt. Gen. B. A. C. Droste, Commander-in-Chief Royal Netherlands Air Force, 'Decisive Air Power Private: The Role of the Royal Netherlands Air Force in the Kosovo Conflict', *NATO's Nations and Partners for Peace*, Issue 2 (1999), 129.
[78] Lutgert and de Winter, *Check the Horizon*, 508-510.
[79] Droste, 'Decisive Air Power Private', 128-129.
[80] Hans-Werner Jarosch, *Immer im Einsatz: 50 Jahre Luftwaffe* (Hamburg/Berlin/Bonn, E.S. Mittler & Sohn, 2005), 141.
[81] Meiers, *Die deutsche Sicherheits- und Verteidigungspolitik*, 301.
[82] Jarosch, *50 Jahre Luftwaffe*, 145; Lambeth, *NATO's Air War*, 110.
[83] Droste, 'Decisive Air Power Private', 127-128; interview, Air Historical Branch Royal Netherlands Air Force, The Hague, 24 June 2004.
[84] *Kosovo: Lessons from the Crisis* (London, The Stationery Office, 2000), annex f; calculation of percentage is based upon figures from: Cordesman, *The Lessons and Non-Lessons*, 4.
[85] Martin van Creveld, Steven L. Canby, and Kenneth S. Brower, *Air Power and Maneuver Warfare* (Honolulu, University Press of the Pacific, 2002, reprinted from the 1994 ed.), xiv.
[86] Gen. François Bourdilleau, 'Evolution de l'Armée de l'Air vers le modèle Air 2015' in Pierre Pascallon (Ed.), *L'Armée de l'Air: Les Armées françaises à l'aube du XXIe siècle* – Tome II (Paris, L'Harmattan, 2003), 248.
[87] 'NRF: The French Air Force in Control', 43.
[88] 'Das Kommando Operative Führung Luftstreitkräfte', *CPM Forum - Luftwaffe 2004* (Sankt Augustin, CPM, 2004), 56-57.
[89] Bundeswehr Luftwaffe, *DasKommando Operative Führung Luftstreitkräfte*, **http://www.luftwaffe.de**, accessed 15 March 2007.
[90] Lawrence Freedman, 'Can the EU develop an Effective Military Doctrine?' in Steven Everts, Lawrence Freedman, Charles Grant, François Heisbourg, Daniel Keohane, and Michael O'Hanlon (Eds.), *A European Way of War* (London, Centre for European Reform, 2004), 23.
[91] Nicole Gnesotto (Chair), Jean-Yves Haine (Rapporteur), André Dumoulin, Jan Foghelin, François Heisbourg, William Hopkinson, Marc Otte, Tomas Ries, Lothar Rühl, Stefano Silvestri; Hans-Bernhard Weisserth, and Rob de Wijk, *European Defence – a Proposal for a White Paper: Report of an Independent Task Force* (Paris, European Union Institute for Security Studies ISS, May 2004), 49.
[92] Interview, Ministry of Defence, Bonn, 27 April 2006.
[93] Carl von Clausewitz, *On War*, Book VIII, Chapter 6B.

# Air Power and the Russian-Georgian conflict of 2008: lessons learned and Russian military reforms

By Stéphane Lefebvre and Roger McDermott

Russia's short war with Georgia, in August 2008, resulted in a rapid military victory, which surprised many observers and experts. Russia's use of airpower proved a significant factor in achieving its operational goals in what the Russian government described as its 'peace enforcement operation,' including driving Georgia's armed forces from South Ossetia and simultaneously securing Abkhazia. Nevertheless, within only two months Russia had elaborated a far reaching and ambitious military reform and modernization agenda partly reflecting its 'lessons learned' from the campaign in the South Caucasus. The authors examine Russian airpower in the Georgia war in the context of reform plans that also have implications for Russia's future use of airpower in conflict. It highlights some of the operational failings of Russian airpower, what air force commanders identified as the most pressing priorities in enhancing air capabilities, and questions some of the underlying assumptions in this reform process.

The August 2008 military conflict between Russia and Georgia over Georgia's breakaway republics of South Ossetia and Abkhazia marked Russia's first large-scale military operation outside its boundaries since the dissolution of the Soviet Union in December 1991.

*Russian IL-76 Medium-Range Transport Aircraft used to carry troops to Sukhumi and Abkhazia*

The operation involved the deployment and effective use of naval, land and air assets, each playing an important role in Russia's resounding defeat of the Georgian military. Air power, by crushing Georgian air assets and installations and other key targets, assured Russia control of the land battle. This article discusses the use of air power by Russia, the lessons it has learned from its conflict with Georgia, and the way ahead for Russian military reform as it impacts on the air force.

**The use of air power prior to August 2008**

Russia's alleged first use of air power against Georgia dates back to 1992, when the conflict between Georgia and its breakaway republic of Abkhazia erupted. While the use of air power was negligible and indecisive throughout the 13-month conflict, the few Su-25 and Su-27 combat aircraft which flew caused a stir because they were believed, by Georgia, to belong to the Russian Air Force (*Voyenno-Vozdushnyye Sily – VVS*) or at least to be piloted by Russian pilots. Abkhazia's Gudauta air base was then assumed to be under the control of Russia, just as it was assumed in August 2008 despite a Conventional Treaty in Europe (CFE) commitment to have it closed by 2001.[1] On 19 August 1993, a Georgian SA-2 surface-to-air missile brought down a Russian Su-27 fighter aircraft near Gudauta.[2]

After the cease-fires in South Ossetia and Abkhazia of the early 1990s, and the deployment of Commonwealth of Independent States (CIS) Collective Peacekeeping Forces (mainly Russian) in the Georgian-Abkhaz conflict zone, and Russian, Georgian and Ossetian Joint Peacekeeping Forces in South Ossetia, sporadic skirmishes and incidents continued, but few of them involved the use of air power. Between 1999 and 2004, however, the Organization for Security and Cooperation in Europe (OSCE) observed and corroborated a number of Russian aerial incursions over Georgia's territory. In September 2002, Russia even took the step of reinforcing its fleet of fighter aircraft and bombers in the North Caucasus Military District base of Mozdok as a brief show of force and a threat of intervention against Chechens in Georgia's then uncontrolled Pankisi Gorge region.[3] Equally controversial and alarming, in August 2007 a Russian aircraft was believed to have dropped an air-to-surface anti-radar missile from an Su-24 ground-attack

aircraft, which the United States believed was targeted at a Georgian radar station. Russia disagreed with this interpretation, noting a lack of evidence.[4]

*MiG-29 Fulcrum*

2008 proved to be a turning point in the use of air power. Russia, certainly dissatisfied with the prospects of Georgia one day joining NATO, independence being granted to Kosovo, and an increased level of Georgian bellicosity toward Russia, used air power in a manner that led to a build up of tension between Georgia and Russia. Georgia, intent on regaining its full and complete sovereignty and control over its two breakaway republics, also increased its military pressure on Abkhaz and South Ossetian military and paramilitary forces through the use of air power. Aerial incursions, for example, were reported by both sides. On 5 April, two Georgian Su-25 ground-attack aircraft, observed by the United Nations Observer Mission in Georgia (UNIMOG), flew over the Abkhaz-controlled zone. Local Abkhaz observers reported other aircraft sightings to UNIMOG on 13, 16 and 20 April, and 17 May. On 8 July, four Russian fighter aircraft briefly overflew South Ossetia in an effort, the Russian Foreign Affairs Ministry stated, to "cool heads in Tbilisi and to prevent a military scenario from unfolding." Prior to the overflight, Georgian President Mikheil Saakashvili had issued an ultimatum to Russia asking for its release of four Georgian soldiers of the Joint Peacekeeping Forces, to which Russia acquiesced. Georgia interpreted the overflight, which coincided with a visit to Tbilisi by U.S. Secretary of State Condoleezza Rice, as a violation of its territorial integrity, and recalled its ambassador to Russia for consultations.[5] The United States agreed with Georgia, calling Russia's action a threat "to stability throughout the entire region."[6]

Georgian unmanned aerial vehicles (UAVs) conducting reconnaissance missions over the conflict zones, Abkhazia or South Ossetia were also a serious point of contention between Georgia, Russia and local separatist authorities. Between August 2007 and June 2008, the local Abkhaz authorities reported several instances of UAVs flying over the territory under their effective control, and claimed to have shot down up to seven Georgian UAVs. UNIMOG confirmed that, in 2008, Georgia flew UAVs on 18 March, 20 April, 4, 8 and 12 May, and that three of the UAVs – Israeli-made Hermes 450, were shot down, the second one either by a Russian MiG-29 or an Su-27 aircraft using a Vympel R-73 air-to-air missile on 20 April. The Georgian reconnaissance missions and the Abkhaz and Russian air defence actions were both considered by the United Nations to be violations of the

ceasefire regime in place.[7]

Adding to the tension build up, in July Russia carried out exercise *Caucasus 2008*, which featured Russian land, sea and air forces counterattacking unnamed forces that had attacked Abkhazia and South Ossetia, a very useful rehearsal for what was to follow if there ever was one. As a matter of course, Georgia thought the scenario provocative and threatening.[8] On 6 August, six of Georgia's military aircraft (Su-25s and perhaps a couple of L-39 Albatros jet trainers) flew a reconnaissance mission over South Ossetia, which was seen by the *de facto* South Ossetian leadership as a prelude to a Georgian military offensive against the breakaway region.[9]


*Map of Georgia*

### The use of air power during the five-day conflict

From 8 to 12 August, the Russian air force carried out a few hundred offensive sorties over Georgia (including both breakaway republics) using mainly three types of aircraft: Su-24M frontal bombers, Su-25 ground-attack aircraft, and Tu-22M3 long-range bombers. Targets were carefully selected to avoid unnecessary damage to Georgia's critical infrastructure, transport, communications and civilian industry;[10] however, collateral damage and civilian casualties were caused by aerial bombing. Georgia, which was first to use air power, was severely limited in what it could do due to the small size of its air force and the overwhelming superiority, in comparative terms, of the Russian air force.

Georgia's Su-25s (not much more than a handful) bombed the South Ossetian capital of Tskhinvali at the very beginning of hostilities. At 0800 on 8 August, they bombed the Russian peacekeeping force building in Yuzni, close to Tbilisi, where they reportedly killed up to 15 Russian servicemen. At around 1230, they hit Dzhava, a small South Ossetian village where notable South Ossetian officials were believed to be. The following day, at around 1330, they attempted to bomb the strategically important Roki tunnel, which links Georgia (South Ossetia) to Russia (North Ossetia), but failed and lost a second Su-25 since the conflict started. They tried to hit the Roki tunnel again on the 11th, but without any success and this resulted in the loss of an additional Su-25. These, incidentally, were the major aerial engagements of the Georgian air force throughout the five-day conflict.[11] As Mark Geleotti later observed, "Russia's rapid assertion of complete air superiority prevented

manned reconnaissance flights and also constrained [Georgia's] use of drones."[12] Russia, however, did not achieve air dominance, as its losses (it officially admitted to the loss of four military aircraft, whereas Georgia claims to have shot down ten or more) adequately attest.[13]

In the absence of any interceptor aircraft, Georgia was heavily dependent on its air defence forces to prevent the Russian air force from achieving air dominance. Thus, air defence had been Georgia's major preoccupation since 1999, when Russian aerial incursions really picked up.[14] In 2003, it started acquiring new air defence systems and modernizing its current capabilities. Ukraine was the key provider on both fronts, providing Georgia with at least one Kolchuga-M passive electronic monitoring radar system, new mobile 3-D air surveillance 36D6-M radars (which Georgia deployed in Tbilisi and Savshevebi, near Gori), upgraded four P-18 Spoon Rest air surveillance radars to the 2-D P-180U version (which Georgia deployed in Alekseyevka, near Tbilisi, Marneuli, Poti, and Batumi), and SA-8 mobile surface-to-air missile (SAM) systems to supplement its ageing Soviet-era systems. Ukraine also modernized Georgia's SA-3 surface-to-air missiles that were deployed in Tbilisi, Poti and elsewhere, and later sold Georgia sufficient Buk-M1 (SA-11) low- to high-altitude self-propelled SAM systems – along with 48 9M38M1 missiles – to equip a battalion of three batteries, each with two self-propelled launcher mounts and one self-propelled loader-launcher. The SA-11s, along with Osa-AK (SA-8B) low-altitude SAM systems and associated launchers (two batteries' worth) also acquired from Ukraine, were positioned by the Georgian air force in Gori, Senaki, and Kutaisi. Georgia's 2006 setting up in Tbilisi of an Air Sovereignty Operations Centre linking its Kolchuga-M and four civilian air-traffic-control radar networks into a single early warning and command and control tactical system was greatly facilitated by Ukraine's Aerotekhnika company.

*Russian Mi-8 helicopter taking off*

At the start of the conflict, Georgia also had in its inventory a variety of short-range systems in the forms of shoulder-fired missiles (e.g., SA-16) and anti-aircraft guns (e.g., ZU-23-2M and ZSU-23-4 23mm guns), and a few systems believed by Russia to have been provided by Israel (the Spyder-SR short-range self-propelled SAM system) and Turkey (Skywatcher army air-defence early-warning and command and control tactical system). Taken together, Georgia's effort at developing an effective air defence system were taken seriously by Russia and Georgia's air defence assets were targeted accordingly throughout the conflict. During the conflict itself, in the absence of full

spectrum air defences Georgian personnel may have been switching off radars, to avoid detection by Russian aircraft, replicating a tactic first seen in the Balkans in the 1990s. As Said Aminov aptly noted, however, in *Moscow Defense Brief* after the conflict, 'the air-defence system of Georgian attack groups was about the equivalent of a best frontline Soviet divisions during the late 1980s - early 1990s.'[15]

Russian air missions started on the morning of 8 August, and involved units of the 4th Army of Air Forces and Air Defence, including the 559th Bomber Aviation (Su-24-equipped), 959th Bomber Aviation (Su-24), 368th Assault Aviation (Su-25), 461st Assault Aviation (Su-25), 960th Assault Aviation (Su-25), as well as 3rd Fighter Aviation (Su-27), 19th Fighter Aviation (MiG-29) and 31st Fighter Aviation (MiG-29) regiments. The 55th (Mi-8, Mi-24) and 487th (Mi-8, Mi-24) Helicopter Regiments also took part in operations.[16] At 0945, Russian aircraft dropped five guided bombs on a Georgian military radar near Shavshebi, north west of Gori (which it attacked again on the 10th at 1145, and the 11th at 0030), and at 1057 three more guided bombs on Georgian military-related facilities, again not far from Gori. At around 1030, Su-24M tactical bombers struck at Georgian ground troops to prevent them from reaching and blocking the Roki tunnel linking Russia to Georgia's South Ossetia breakaway region.[17] Russian aircraft also targeted airfields used by the Georgian air force. On the 8th, they hit Vaziana at 1515, 1700 and yet again at 1730, and Marneuli and Bolnisi, near Tbilisi, at 1630, resulting in the destruction of three Georgian An-2 light transport aircraft and two L-39 Albatros jet trainers. On the 9th at 1022, they hit Gori, where several helicopters were destroyed, five individuals killed and 26 injured, and, between 1630 and 1730, Marneuli and Bolsini again. Military-related installations in Gori were hit on the 10th at 1000, and so was Vaziani at 0500, where nine individuals lost their lives, and military installations at Gardabani. That day at 0545, and again at 1910, the JSC Tbilaviamsherni aircraft final assembly plant (for the Su-25) in Tbilisi was hit by three aerial bombs.[18]

On the 9th at 0012 and 0100, aerial bombings were reported in Poti on the Black Sea coast, causing damage to several naval platforms. The Vaziani (at 0020) and Senaki (at 0017) bases were hit too, causing the death of six individuals and injuries to 30 others in the attack against the latter. Gatchiani, located near the Baku-Tbilisi-Ceyhan pipeline, was hit as well by Russian aircraft. The following day, the Russian air force revisited Gori, Poti and Senaki with more aerial bombings.[19] Early on the morning of the 11th, Russian aircraft hit several targets, including several deep inside Georgian territory. At 0305 and 0430, they hit several targets in Batumi, on the Black Sea coast, including Georgia's air command centre, and at 0312 the Georgian military base at Khelvachauri, near the Turkish border. Air attacks were also conducted against a civilian radar near Leninisi at 0437, the Shiraki base at 0500, Georgian tanks in Gori at 0610, the Senaki base at 0715, and the radar at Tbilisi airport and military targets in Gori, the Kodori Gorge and Poti from 0955 on. On 12 August, the last day of open engagements, only Ruisi, a village

to the north west of Gori where Georgian troops were located, was being targeted by Russian aircraft.[20]

In the final phase of combat operations in South Ossetia, the Russian air force supported ground forces who made effective use of the Uragan MLRS and the Tochka-U missiles and also, possibly, the Smerch MLRS for attacks on Georgian positions in South Ossetia. This operational synergy inflicted sufficient losses on the Georgian troops to bring about their rapid "demoralization and retreat."[21] Russia's General Staff commended the 76th Pskov airborne personnel operating in South Ossetia, and are consequently promoting the further strengthening of air assault battalions and considering giving the airborne troops their own aviation.[22] In fact, to fully equip, transport, and co-ordinate the deployment and integration of these troops into combat operations alongside the 58th Army units represented a demonstration of not only long-range airlift capability involving over 100 airlift sorties, it also revealed improved command and staff arrangements, which had often challenged Russia's armed forces during the conflicts of the 1990s.[23]

In Abkhazia, where Russia unexpectedly opened a second front, air power played a much smaller role, specifically in the capture of the Georgian-controlled Kodori Gorge by Abkhazian and Russian forces. On the early afternoon of 9 August, Russian aircraft provided support to the Abkhaz forces making their way to the Kodori Gorge; they bombed Georgian positions in two villages, Sakeni and Bas-Kvaptchana, in the Upper Kodori Valley.[24] On the 10th, at 0740 and 0845, the Russian Air Force reportedly hit a Georgian signals unit in the village of Urta, and several targets in the Zugdidi district.[25] The Kodori Gorge itself was bombed on the 10th and 11th as well.[26]

In the judgment of the International Crisis Group, Russia's bombing activities, which caused the collateral deaths of innocent civilians, 'went well beyond the necessary minimum.'[27] One obvious problem was Russia's use of cluster munitions.[28] A non-signatory of the recently adopted Convention on Cluster Munitions, Russia did not refrain from using such munitions against Georgia; so did Georgia, also a non-signatory. While Georgia acknowledged using Israeli bomblets, Russia denied using cluster munitions of any kind. Human Rights Watch investigators, however, found several Russian air-launched AO-2.5 RTM bomblets in Georgian villages.[29] To add further credibility to Human Rights Watch's findings, the Netherlands Ministry of Foreign Affairs officially reported that Gori had been targeted by at least two SS-26 Iskander tactical ballistic missiles, each armed with a cluster warhead containing ten sub-munitions.[30]

Damage caused by the conflict in Georgia is estimated to exceed US$1 billion. Georgia lost control over the Upper Kodori Valley and suffered severe military losses, including about a quarter of its main battle tanks, up to 15 naval vessels, a significant portion of its air force assets (Russia claimed to have shot down three of Georgia's Su-25s) including the bulk of its military and civilian radars, and

186 military personnel, although it is not clear which assets and lives were specifically lost to air attacks and bombardment.[31] According to most accounts, the major oil (the Baku-Tbilisi-Ceyhan and the Baku-Tbilisi-Supsa) and gas (the Baku-Tbilisi-Erzurum) pipelines transiting Georgia were not hit during the conflict, although there were voluntary and precautionary shutdowns. Georgia, however, reported direct air attacks against the Baku-Tbilisi-Ceyhan pipeline, which could not be proven. The vulnerability of the pipelines transiting Georgia, and Russia's opposition, is likely to affect plans to add new pipelines.[32]

Damage to Russia was limited to the military forces engaged in the conflict. Georgia's acquisition of new air defence systems and the modernization of older ones proved its worth – and were perhaps underestimated by Russia – even though Georgian systems could not adequately and entirely cover the country's airspace.[33] Georgian military changes since 2003, however, proved sufficient to deny Russia full air dominance over Georgia. Officially, Russia admitted to the loss of four military aircraft, three Su-25s and one Tu-22M3R, most likely to surface-to-air missiles.[34] Details are sketchy:

- On 9 August, an Su-25 piloted by Colonel Sergey Kobylash, a regiment commander, was shot down by a Georgian air defence missile. Kobylash ejected safely.
- The same day a Georgian SA-11 radar-guided surface-to-air missile brought down a Tu-22M3R Backfire bomber that was being used for reconnaissance purposes near Gori.[35] The navigator was killed, but the pilot, Colonel Igor Zinov, survived and was shown in his hospital bed by the Georgian media. Reportedly, all crew members were instructors from the Valery Chkalov main flight-test center at Akhtubinsk, recruited due to a shortage of ready and qualified pilots.[36] Zinov and other Russian servicemen were eventually exchanged for 15 Georgian soldiers.
- The last two Su-25s were shot down on 11 August, probably by surface-to-air missiles.

The overall number of aircraft Russia lost has been challenged by Georgia, which claimed to have shot down between a dozen to over a hundred, depending on the source consulted. Mikhail Barabanov, writing in *Moscow Defense Brief*, and perhaps a more credible source than Georgian officials, argues that Russia effectively lost seven aircraft: one Tu-22M3 long-range bomber, one Su-24M Fencer frontal bomber, one Su-24MR Fencer E reconnaissance aircraft, and four Su-25 attack planes.[37] Part of Georgia's success at eliminating Russian aircraft from the sky, according to Barabanov, can be attributed to its effective use of its Kolchuga-M passive radar systems and sound tactical use of its Buk-M1 and Osa-AK SAM systems (this is certainly in contrast to the poor performance of its land forces). Buk-M1 SAMs may indeed have succeeded in taking out no less than three Su-25s and the Tu-22M3, and

the Osa-AK the two Su-24s (Russian officials think that the Buk-M1 was responsible for the acknowledged loss of its four aircraft) – while the fourth Su-25s could have been hit by a Russian shoulder-fired missile by mistake.[38]

That Georgian air defence systems played such a significant role in the conflict before, for all intent and purposes, being taken out of commission can be explained by the fact that it was Russia's first experience in fighting against new generations, modern, CDS DQ – Is this correct? If it relates to the SAM systems it may be better to say '…fighting against so many new generation, modern SAM systems at once.' and so many SAM systems at once.[39] Even if Russia had had very experienced and accomplished combat pilots at hand, and the most modern and technologically advanced aircraft, aerial losses would still be expected. It remains, though, that poorly skilled pilots, bad tactics and old aircraft may have helped Georgian air defence scoring the successes it had.[40]

**Lessons learned and Russian military reforms**

Russia's President, Dmitry Medvedev, despite the country's success in its military conflict with Georgia, met with senior Russian officers at the Dongus test ground, Orenburg Region, on 26 September 2008 and requested a "precise plan of action for the immediate future" by December 2008. He then set out five key areas for improvement:

1. All combat formations and troop units must be brought to permanent readiness status.
2. The effectiveness of command and control systems must be 'raised'.
3. The system of officer training and education and military science must be improved.
4. The armed forces must be equipped with 'the most modern weapons' with special attention focused on precision munitions.
5. Pay, housing and the social amenities for military personnel must be improved.[41]

Thus, on 14 October 2008, Russia's Minister of Defence, Anatoliy Serdyukov, announced the beginning of a 'new stage' in military reform. These reforms are so systemic, far reaching and ambitious that they arguably constitute the most radical reform of the Russian armed forces since 1945. Serdyukov's military reform will impact on the whole functional basis of the Russian military, ranging from the command and control bodies to the officers training system and personnel numbers. In short, Russia aims to create a professional, permanent combat-ready army, designed for intervention in local conflicts rather than large-scale conventional operations. In doing this, it will move away from its traditional divisional-regimental structure to a brigade-based organization. This will be most apparent in abandoning its four-link command and control system (military district, army, division, regiment) to a new three-link structure (military district, operational command, brigade). These proposed changes, to take effect by 2012, are intended to enhance efficiency by streamlining

the multi-tiered system. Moreover, these reforms also envisage drastic officer cuts. By 2012, Russia's armed forces will be cut to one million servicemen, with around 150,000 serving officers.[42]

Serdyukov's military reform plan foresees abolishing non-fully manned (cadre) units and switching instead to permanent-readiness units. Thus, the Russian armed forces will ceaseto be a mobilization-based organization. A key factor in these initiatives will be the streamlining of the officer caste and the strengthening of Russia's conventional military capabilities on the basis of rapid reaction forces within each of its six military districts. Although these plans were clearly under consideration before August 2008, the war in Georgia has had an impact on the precise nature of these military reform priorities. Russian combat operations in South Ossetia witnessed the use of five regimental tactical groups (that is, reinforced motorized-rifle regiments) from the 19th (North Ossetia) and 42nd (Chechnya) Motorized-Rifle Divisions. The command and control of this grouping was not carried out by divisional staffs or even by the staff of the 58th Army (Vladikavkaz), but directly by the staff of the North Caucasus MD using a specially formed group. Therefore, the three-link command and control structure announced as part of Serdyukov's military reforms appears to be a formalization of the scheme used in Georgia.[43]

Many of these changes will have implications for future Russian air power, as well as revealing some of the weaknesses identified by the Russian planning staffs in the performance of the VVS during the war in Georgia. Although rapid reaction forces continue to be a vital part of the future structure of the Russian armed forces, Serdyukov decided against forming independent rapid reaction forces, preferring instead to transform existing units. These units are the Airborne Troops (*Vozdushno Desantnye Voiska* – VDV), which 'acquitted themselves sufficiently effectively during the repelling of Georgian aggression in South Ossetia. It is another thing to strengthen such units: a VDV brigade will appear in every military district to carry out urgent missions and action in unpredictable circumstances,' Serdyukov confirmed. Thus, all four existing air-assault divisions in the VDV will survive the reforms, but will be redistributed among all six military districts.[44]

Despite Russia's military leadership assessing the combat performance of its airborne forces highly during the war in Georgia, in August 2008, the MoD pressed for pushing through structural reforms that will see an airborne brigade placed in all six military districts; this will constitute Russia's future rapid reaction forces. Implementation of this reform involves disbanding one of the airborne divisions, the 106$^{th}$ in Tula, and distributing its regiments and subunits among the military districts, thus forming the nucleus of future airborne brigades. Therefore, although the 106$^{th}$ will be dissolved in 2009, this will not affect the manning levels of Russia's airborne troops, at around 25,000. Their unreformed structure in 2008 consisted of two airborne divisions (the 106th and 98th), the 76th Air Assault Division, the 31st Separate Air Assault Brigade,

and the 7th Mountain Division in the Airborne Troops' composition. The Tula Airborne Division consists of three regiments (including an artillery regiment), an air defence missile battery, and support units and subunits, with a total personnel strength of over 5,000 servicemen. Army General Nikolay Makarov, Chief of the General Staff (CGS), addressing foreign defence attachés at the Military Academy of the General Staff in Moscow on 10 December 2008, suggested the VDV may be 'cushioned' from this reform, allowing their traditional battalions and regiments to be preserved. Makarov said Army Aviation units will continue in their subordination to the Air Force, though this could change as a result of further alterations to reform plans, though he expressed his personal view that VDV should be transferred to the ground forces.[45] However, it is not clear where these newly formed brigades will be based, what their operational axis will cover, nor have the potential future sources of threat been clarified to merit this change in structuring. Until 2008, prior to initiating these changes, Russia's rapid reaction forces were based in European Russia, though in future they will be present even in the Siberian and Far East MDs to protect against unspecified threats. The MoD justify such plans in terms of 'optimizing' and forming a 'new look' Russian military.[46]

***Manning changes***

Consistent with President Medvedev's reform agenda, in November 2008, the VVS announced its plans to eliminate all its divisions and regiments, replacing these with airbases on the basis of squadrons and reducing its officer staff by 50,000 over a three-year period. By 2012, the VVS will eliminate the rank of ensign, while converting other management posts to civilian status. These changes came into effect on 1 December 2008, indicating the seriousness with which Russia's Defence Minister, Anatoliy Serdyukov, intends to push through such reforms. If implemented successfully, by 2012 the VVS will consist of a strategic-tactical command, strategic air command armed with nuclear weapons, military-transport air command and four air defence and antimissile commands. The existing 340 VVS units and formations will be cut to 180.[47] Corps and divisions of the Air Defence Forces (*Voiska Protivo-vosdushnoy Oborony* – PVO) will be reorganized into air-and-space defence brigades and the anti-aircraft missile brigades will also be reorganized into anti-aircraft missile regiments. These reforms will be augmented by reforming the supporting structures used to transport supplies to the forces, replacing the existing nine vehicular brigades with 20 battalions serving on constant alert. Although the overall nature of Medvedev's military reform programme is radical and far reaching, the VVS and VDV will arguably be the least affected. However, there are elements of the officer cuts and structural reorganization that will present problems if the reforms are to enhance the future combat readiness of Russia's Air Force. These range from the elimination of key officer and middle ranking posts, whether the MoD can adequately manage the transition to more efficient force structures and the State can afford

to invest in new procurement plans coupled with the social policies and career development that will support professionalising the various structures involved in Russia's air power capabilities.[48]

Plans to eliminate warrant officers (*praporshchik*) from the Russian armed forces, in an attempt to streamline and reduce what Defence Minister Serdyukov describes as a management system resembling an egg with too many Lieutenant Colonels and Colonels in the middle layer, has provoked ongoing controversy within Russia, from both serving and retired officers alike. This is a particularly crucial reform affecting the VVS, since practically all aircraft technicians, for fighters, ground attack aircraft, and bombers, including strategic platforms, hold the rank of warrant officers. They have also comprised the main personnel of aviation's TECh (aircraft maintenance units). According to the military reform programme more than 100,000 warrant officer posts will be abolished, gradually introducing 'professional' sergeants to fulfil their duties. Opponents of the reform question whether the Russian state has either the funds, specialists or the even a well developed programme in place to achieve this transition successfully. In October 2008, when these radical changes were publicly announced, there was no Federal programme yet in place to facilitate the conversion of all sergeants and petty officers to a contract manning system.[49]

***Education***

Russia's military reform programme will also have an impact on the extensive and sprawling educational and training establishments used by the VVS. In an effort to streamline these establishments, Colonel-General Aleksandr Zelin, VVS Commander in Chief has said that in future all training and research for the VVS will be carried out by a single centre. On 4 November 2008, during a visit to the Krasnodar-based Air Force School, Colonel-General Zelin envisaged that in several years time it will be the only academy in Russia to train air force pilots. Zelin said: "A single research centre will be created to comprise all other educational establishments and research institutes, which will advance research and train personnel for the Air Force."[50] Education and training reform will therefore, concentrate on eliminating duplication, designed to serve a new and 'optimized' air force, but it will face challenges in managing and designing adequate training programmes for the new generation of 'professional sergeants' planned to replace the existing warrant officers.

While the reform of the officer caste throughout the armed forces will present organizational challenges, little thought or planning currently exists on how to recalibrate the development of a new mindset and military culture among the junior ranks; the manning systems used within NATO professional armed forces encourage problem solving and initiative further down the chain of command. In short, duties and responsibilities carried out by lower ranks within western models were being fulfilled by officers in the Russian model of personnel management. These changes will present operational difficulties

during the transition period, while Russian Ministry of Defence (MoD) officials may have underestimated the potential impact these reforms may have on the combat capabilities of the Russian military in the short-medium term, as such radical manning transformations usually demand a gradual introduction over a longer period of time.

Such plans to drastically reduce and streamline the VVS educational and training establishments are in stark contrast to the fortunes of the VDV, who appear to have gained more leniencies from the MoD as a result of the war in Georgia. The Ryazan Higher Airborne Troops Command School, celebrating its 90th anniversary in 2008, also admits cadets from throughout the former Soviet Union, China and Africa. Colonel Vladimir Lugovoy, head of the military school, confirmed in November 2008 that the rumoured relocation of the command school from Ryazan to Novosibirsk has been abandoned. This appears linked to the performance of the VDV in the Georgia war, when these troops were again so heavily relied upon by Moscow.[51] Airborne Troops Commander, Lieutenant General Valeriy Yevtukhovich, reported to an extended meeting the VDV military council in Moscow on 18 November 2008, stating that formations and units of Airborne Troops have performed over 160,000 parachute drops in 2008. Colonel Aleksandr Cherednik, head of the VDV information and public relations service, singled out the 76th Airborne Assault Division headquartered in Pskov (commander – Major-General Aleksandr Kolpachenko) as the best formation of Airborne Troops (professionalized manning), and in particular the division's 104th Airborne Assault Regiment (commander – Hero of Russia, Colonel Gennadiy Anashkin) as the best unit. According to him, the commander's report highlighted combat tasks performed by soldiers from formations and units of the VDV during the operation to 'repel Georgia's aggression in South Ossetia'. As Cherednik stressed:

*'The Airborne Troops Commander particularly noted the courage and heroism of airborne troopers who were among the first to arrive in Tskhinvali to help Russian peacekeepers, their humane treatment of the Georgian population as well as of Georgian prisoners of war.'*[52]

***Russia's VVS on the eve of conflict with Georgia***

Russian military authorities, perhaps in support of such ambitious reform programmes, have been much more openly critical of deep social problems existing within the VVS. As many as one in four conscripts who reported for service in the Air Force in autumn 2008 were raised in a single-parent family, while one in 10 had used drugs before service, according to Lieutenant Colonel Vladimir Drik, aide to the Air Force commander-in-chief. These issues were used to explain the alarmingly high proportion of suicidal conscripts serving in the Rostov Force and Air Defence Large Strategic Formation. "According to a survey conducted in the Rostov Air Force and Air Defence Large Strategic Formation, around 25 per cent of the conscripts are liable to commit suicide, or, as psychiatrists say, are at high risk of suicide," said Drik.[53] He said about a quarter of these conscripts grew up

without a father or a mother, while 10 per cent had used drugs and abused alcohol before service and an undisclosed number had criminal convictions. While only serving as one illustration of such problems that could be limited to the locality, Drik underscored that this is being witnessed within the wider force structures. He said that, "problems concerning the conscripts in the Rostov Large Strategic Formation, as seen by psychiatrists, *exist in other Air Force combined units as well.*"[54] As troubling as these statistics are for the Russian armed forces, they accurately reflect wider social problems that are well documented in Russia, which are inadvertently subsumed into the military by conscription: the longer term solution lies in professionalizing the VVS and VDV.


*Su-25 Frogfoot ground attack aircraft*

The Russian Air Force faces a continued shortage of funds for conducting repairs and purchasing spare parts, consequently the technical condition of the Air Force aircraft fleet remains low, also affected by the significant age of the aircraft. Reportedly, the quantity of combat-ready aircraft in an aviation regiment varies from 40 up to 60, though it may be lower in some cases. In fact, the central problem facing the Russian Air Force is the technical condition of its aircraft fleet. Pilots having insufficient flight hours results from a lack of spare parts and the declining length of service life of its aircraft.[55] General Makarov described the low levels of combat readiness within the VVS, during a speech delivered to the Russian Academy of Military Sciences in Moscow on 16 December 2008, he explained: "Of those 150 regiments in our air forces, there are only five ones (sic) permanently combat-ready and capable of fulfilling all tasks set, albeit with limited numbers – operating just 24 aircraft instead of 36."[56]

Frontal aviation (tactical combat aircraft, frontal bombers, ground attack aircraft, fighters and reconnaissance aircraft) accounts for around 1,400 aircraft, of which 900 are reportedly in storage. Modernization programmes for frontal aviation aircraft are being conducted slowly owing to a shortage of resources. The state armaments programme for 2007-2015, foresees a total of 408 frontal aviation aircraft undergoing modernization, as well as introducing 116 new aircraft. This will mainly involve purchasing some new Su-35 fighters and Su-54 frontal bombers, though manufacturing delays have been encountered in both cases.[57] Should a complete fulfilment of the state armaments programme be achieved by 2015, only four of the 39 currently available frontal aviation regiments will be armed with the newest aircraft, and only a maximum of 18 with modernized aircraft. Moreover, Russia's frontal aviation lags behind the air forces of western

countries in being equipped with modern precision weaponry. The VVS has only recently completed trials using guided munitions with satellite correction, while Russian fighters are not armed with 'over-the-horizon' air-to-air missiles with active radar homing heads. It is expected that a new generation of armaments will reach the VVS no earlier than 2010.[58]

Colonel General Vladimir Popovkin, Russia's Armed Forces chief of armament and deputy minister of defence, outlined the priorities for the VVS following the war in Georgia, confirming that enhancing the future night-fighting capabilities of Russian air power will be a key part of Moscow's military reform agenda:

*'The priorities here are as follows: developing and producing the PAK FA [future frontline aviation system], modernizing the Su-24, Su-25, and Su-27 aircraft, and purchasing new aircraft – the oft-mentioned Su-34. It is very important that we will be buying all aircraft equipment as a package – that is, aircraft together with the ordnance for them. When talking about the modernization of relatively old machines, we mean primarily replacing their avionics. This is so that they can all "see" at night, so the crew can operate on a "fire and forget" basis, and so forth.'*[59]

Russia's armed forces are also behind in global developments and use of UAVs. The VVS currently has at its disposal outdated reconnaissance UAVs like the Tu-141, Tu-143 and Tu-243, though it is reportedly working on modernizing the Tu-143.[60] In an effort to address this deficiency in the longer term, work is underway in several Russian design bureaus simultaneously on the development of a broad spectrum of various UAVs (mainly for reconnaissance), with assistance from Israeli companies. In this regard, Russia has reportedly ordered the Ryabinsk-based Lutch Design Bureau's Tipchak UAV system for deployment in conflict zones. The Tipchak system consists of six 50kg drones, transport and launch vehicles, and a guidance and control centre, and the delivery of the first system was expected by the end of 2008.[61] RSK MiG, under a contract with the VVS, is currently working on the creation of the Skat stealth unmanned combat aerial vehicle (UCAV), which was demonstrated in 2007, and flight testing is expected to begin in 2009.[62] This may partly explain the apparently odd decision to deploy a Tu-22M3 bomber on a reconnaissance mission over South Ossetia, which was lost early on in the air campaign.

### *Fighting 'blind'*

Russia's experiences with Georgia's air defence systems will force the Russian air force to devote a lot more attention to 'the suppression of enemy air defences (SEAD), including the renewal of tactics, electronic weapons and increased military training in this area.'[63] The shooting down of the Tu-22M3, which had entered service in 1983, has highlighted several needs for improvement, including 'new navigation equipment, cockpit upgrades, new electronic warfare equipment, self-defensive aids, [and] GPS-guided weapons,' if the aircraft is to remain a viable asset to the Russian Air Force for the foreseeable future.[64]

Night vision capability was also critically lacking as the following story pointedly illustrates.

Lieutenant-General Anatoliy Khrulev, Commander of the 58th Army, was rescued by a helicopter piloted with the aid of third-generation night vision glasses. It was only possible to evacuate the army commander safely by helicopter and only at night. This operation, a standard occurrence in a NATO force, was successful thanks to a fortunate confluence of circumstances and the flight skills of the pilot of a Mi-8MTKO, Lieutenant Colonel Ivan Gnetetskiy. Prior to his tour of duty in the North Caucasus, he was given GEO-ONV1-01 night vision glasses to test, allowing him to take off from a helicopter pad near Dzhava in night conditions despite Georgian rockets being fired, flying in mountainous terrain, avoiding high-tension electric lines, and delivering the wounded commander to Beslan, North Ossetia. Yet, despite the positive publicity generated by this rescue mission, the use of night vision equipment by the VVS and VDV was woefully inadequate.[65]

In 1998, several experimental type-Mi-8 and type Mi-24 'night' helicopters were introduced for a number of Russia's security departments. The VVS conducted testing of army aircraft, which confirmed their unique characteristics. And the Federal Security Service (FSB) Interior Ministry (MVD) later sent their 'night hawks' into battle in Chechnya. The VDV only allotted one purely reconnaissance helicopter for large-scale counter-terrorist operations. During the second Chechen campaign, which began in 1999, there were helicopter sorties conducted using night-fighting capabilities, during which rebel bases, 'bandit groups' passing through the mountains, fire points, weapons caches, and many other targets were discovered. As much as two-thirds of the targets discovered were destroyed by FSB flown 'night helicopters'. Neither the VVS nor VDV were able to use night fighting Mi-24VK's and Mi-24PK's adapted to night-time battle while conducting the anti-terrorist operation. Consequently, they were put almost directly into reserve, and now they are getting ready to decommission them altogether. A squadron of Mi-24's were modernized according to the PN configuration, night cannon, using tank infra-red sights installed on the helicopters, failing to utilize the experience of working with the Mi-24VK and Mi-24PK. Naturally, the Mi-24PN was simply unable to fight at night. These were not deployed in South Ossetia. However, the State Arms Programme plans the procurement of thousands of various night vision systems based on third-generation technology.[66]

These deficiencies in Russia's night-fighting capabilities are being addressed in military reform plans, which seem invigorated by Russia's operational experience in Georgia. VVS Commander-in-Chief, Colonel-General Aleksandr Zelin, confirmed in December 2008 that the VVS had received its first deliveries of the Mi-28N (Night Hunter) helicopter. The Military helicopter factory, Vertolety Rossii, also reported that its tests of the Mi-28N were to be completed in December 2008, and that it had supplied around 15 of these platforms to the VVS, with more to follow. The Mi-28N Night Hunter is designed for destroying tanks, armoured hardware and low-speed air targets. It has a 30-mm-calibre gun, the Ataka-B

anti-tank missile system, air-to-air missiles and other armaments.[67]

Colonel-General Vladimir Popovkin, chief of armament and deputy minister of defence, noted the problems of introducing GPS devices into Russia's military inventory:

*'I would first note that the GPS system has never been part of our armoury, although a certain number of such navigation devices were purchased during the first Chechnya campaign. On the whole the development of the devices that will utilize the global navigation system is complete. It is now a matter of augmenting the satellite grouping and a matter for industry, whose potential determines the timeline within which these devices will be produced in the requisite quantity. And the third component is the ability of commanding officers to organize the instruction of service personnel in working with these devices. Like with mobile telephones, people need to be made familiar with them so they become a routine weapon, just like a submachine gun, and so they use them naturally, not when they are forced to. We are buying more than 3,000 such devices a year, and today – at the least on the southern borders users have no navigation equipment problems.'*[68]

## Conclusion

In the months and years to come, Georgia intends to enlarge its air force and improve its air defence system to cover the whole country, hopefully with the assistance it expects to receive from friendly countries.[69] This is important to Georgia as the strategic vulnerability of its energy infrastructures became obviously apparent during the August conflict.[70] Georgia's challenge, given its losses, is enormous and will cost a lot to remedy. Russia's challenges, in contrast, are much more manageable and have a reasonable chance to be met. Should they be fully carried out as described in this article, they would result in a much improved and capable armed forces. The VVS still has much to learn from its recent experience facing modern air defence systems, but any improvement in its performance will depend on more than technological fixes. Education, training, the retention of its best, most experienced pilots, and the development and validation of new techniques, tactics and procedures in SEAD activities will continue to play an important role in the ability of the VVS to perform its mission.

## Notes

[1] Dodge Billingsley, 'Georgian-Abkhazian Security Issues', *Jane's Intelligence Review*, Vol. 8, No. 2, February 1996, pp. 65-68; Pavel Felgenhauer, 'Russia Offers Georgia a Stick and a Carrot', *Eurasia Daily Monitor*, Vol. 5, Issue 78, 24 April 2008; Vladimir Socor, 'The West Can Respond More Effectively To Russia's Assault on Georgia: Part III', *Eurasia Daily Monitor*, Vol. 5, Issue 89, 9 May 2008; Vladimir Socor, 'UN Mission Confirms Georgian, Rejects Russian Version of Air Clash', *Eurasia Daily Monitor*, Vol. 5, Issue 100, 27 May 2008.

[2] Said Aminov, "Georgia's Air Defence in the War with South Ossetia," *Moscow Defense Brief*, No. 3(13) 2008, accessed at http://mdb.cast.ru/mdb/3-2008/item3/article3/.

[3] Dmitry Zaks, 'Russia Sends Jets to Georgia Border, War of Words Heats Up', *Agence France Presse*, 19 September 2002; Pavel Felgenhauer, 'Georgia Calls Putin's Bluff', *The Moscow Times*, 19 September 2002.

[4] 'Georgia: Sliding Towards Authoritarianism?' *Europe Report*, No. 189 (Brussels: International Crisis Group, 19 December 2007), p. 9; Daniel Fried, U.S. Assistant Secretary of State for European and Eurasian Affairs, 'The Current Situation in Georgia and Implications for U.S. Policy', Testimony before the Senate Committee on Armed Forces (Washington, D.C., 9 September 2008); C. J. Chivers, 'Georgia Seeks U.N. Security Council Session About Missile', *The New York Times*, 9 August 2007.
[5] 'Russia vs. Georgia: The Fallout', *Europe Report*, No. 195 (Brussels: International Crisis Group, 22 August 2008), p. 1; Jim Nichol, 'Russia-Georgia Conflict in South Ossetia: Context and Implications for U.S. Interests', *CRS Report for Congress*, Order Code RL34618 (Washington, D.C.: Library of Congress, Congressional Research Service, 29 August 2008), p. 4; Fried, 'The Current Situation in Georgia and Implications for U.S. Policy'.
[6] 'Georgia: Escalation of Violence in South Ossetia and Abkhazia', Press Statement 2008/575 (Washington, D.C.: U.S. Department of State, 14 July 2008).
[7] *Report of the Secretary-General on the Situation in Abkhazia, Georgia*, document S/2008/480 (New York: United Nations, Security Council, 23 July 2008), pp. 3-4; *Report of the Secretary-General on the Situation in Abkhazia, Georgia*, document S/2008/219 (New York: United Nations, Security Council, 2 April 2008), pp. 5-6; Felgenhauer, 'Russia Offers Georgia a Stick and a Carrot'; Vladimir Socor, 'UN Mission Confirms Georgian, Rejects Russian Version of Air Clash'.
[8] Nichol, 'Russia-Georgia Conflict in South Ossetia', p. 3.
[9] 'La guerre en Géorgie...une nouvelle fable de La Fontaine', *Navires & Histoire*, No. 50, October/November 2008, p. 8.
[10] Mikhail Barabanov, 'The August War between Russia and Georgia', *Moscow Defense Brief*, No. 3(13), 2008, accessed at http://mdb.cast.ru/mdb/3-2008/item3/article1/.
[11] 'La guerre en Géorgie...', pp. 11-13, 15; 'Russia vs. Georgia: The Fallout', p. 2; C. J. Chivers and Thom Shanker, 'Georgia Eager to Rebuild Its Defeated Armed Forces', *The New York Times*, 3 September 2008.
[12] Mark Galeotti, 'The Intelligence War over South Ossetia', author's blog entry dated 29 August 2008 accessed at http://inmoscowsshadows.wordpress.com.
[13] Jon Lake, 'Air War Over Georgia', *Combat Aircraft*, Vol. 9, No. 5, October/November 2008, p. 19.
[14] 'Georgia-Air Force', *Jane's World Air Forces*, updated 14 August 2008.
[15] Aminov, 'Georgia's Air Defence in the War with South Ossetia'.
[16] Spiegel Staff, 'The West Begins to Doubt Georgian Leader', *Der Spiegel*, 15 September 2008, accessed at http://www.spiegel.de/international/world/0,1518,578273,00.html; Peter Finn, 'Russian Air, Ground Forces Strike Georgia', *The Washington Post*, 9 August 2008; 'La guerre en Géorgie...', p. 13; Lake, 'Air War Over Georgia', p. 19. According to Mikhail Barabanov, 'Russian helicopters had a hard time flying over the Caucasus passes, and thus extensive use of helicopters by Russia began only after August 10-11, once a temporary landing/take-off strip was set up in South Ossetia.' Barabanov, 'The August War between Russia and Georgia.' A detailed organization chart of the 4 Army of Air Forces and Air Defence is available at http://en.wikipedia.org/wiki/File:4th_Air_ Army_(Russia).png.
[17] 'La guerre en Géorgie...', p. 11.
[18] 'Russia vs. Georgia: The Fallout', p. 3; 'A Chronology of the Crisis', *IISS Strategic Comments*, Vol. 14, Issue 7, September 2008; Finn, 'Russian Air, Ground Forces Strike Georgia.' The aerial bombings in Gori reportedly caused 'heavy civilian casualties.' Oksana Antonenko, 'A War with No Winners', *Survival*, Vol. 50, No. 5, October-November 2008, p. 25; 'La guerre

en Géorgie...', pp. 13-14.
[19] 'La guerre en Géorgie...', pp. 13-14.
[20] 'La guerre en Géorgie...', pp. 15-16.
[21] Colonel-General Anatoliy Nogovitsyn, Deputy Chief of the Russian General Staff, *Interfax,* 12 August 2008.
[22] See: *Politkom.ru*, 19 September 2008.
[23] 'Russia's Troops to Liberate Tskhinvali', *Kommersant*, August 8, 2008; 'Russian Paratroopers in Abkhazia', InfoRos, 11 August 2008; 'Paratroopers from Pskov, Ivanovo Brought in to Tskhinvali', *Kommersant*, 9 August 2008.
[24] Nichol, 'Russia-Georgia Conflict in South Ossetia', p. 6; 'Seeking Peace in the South Caucasus', *IISS Strategic Comments*, Vol. 14, Issue 9, November 2008; 'Russia vs. Georgia: The Fallout', p. 3; *Report of the Secretary-General on the Situation in Abkhazia, Georgia*, document S/2008/631 (New York: United Nations, Security Council, 3 October 2008), p. 2; 'La guerre en Géorgie...', p. 13.
[25] Report of the Secretary-General on the Situation in Abkhazia, Georgia, S/2008/631, p. 6; 'La guerre en Géorgie...', p. 14.
[26] 'La guerre en Géorgie...', pp. 14-15.
[27] 'Russia vs. Georgia: The Fallout', p. 29. The U.S. Congressional Research Service noted that Russia's military campaign had been seemingly disproportionate. Nichol, 'Russia-Georgia Conflict in South Ossetia', p. 10. In his statement to the Organisation for Security and Co-operation in Europe on 1 October 2008, U.S. Under Secretary of Defence for Policy Eric Edelman qualified Russia's response as 'significantly disproportionate.' See OSCE document FSC.JOUR/564, Annex 6 Attachment, 1 October 2008.
[28] For descriptions of the harm caused by cluster munitions, visit the webpage of the Cluster Munition Coalition at http://www.stopclustermunitions.org/the-problem/history-harm/.
[29] Michael Schwirtz, 'Georgia Fired More Cluster Bombs Than Thought, Killing Civilians, Report Finds', *The New York Times*, 6 November 2008; 'Georgia/Russia: Use of Rocket Systems Can Harm Civilians', Human Rights Watch, 12 August 2008, accessed at http://www.hrw.org; Andrew E. Kramer and Clifford J. Levy, 'Rice, in Georgia, Calls on Russia to Pull Out Now', *The New York Times*, 16 August 2008.
[30] Hans de Vreij, 'Russia Used 'Iskander' Missiles in Georgia Conflict, Report Says', *Jane's Defence Weekly*, Vol. 45, No. 44, 29 October 2008, p. 5.
[31] 'Georgia: The Risks of Winter', *Europe Briefing*, No. 51 (Brussels: International Crisis Group, 26 November 2008), p. 9. The US$1 billion figure is from Antonenko, 'A War with No Winners', p. 25; Felix K. Chang, 'Russia Resurgent: An Initial Look at Russian Military Performance in Georgia', *FPRI E-Notes*, 13 August 2008.
[32] 'Europe's Energy Dependence', IISS Strategic Comments, Vol. 14, Issue 7, September 2008; Ed Blanche, 'Oil's Troubled Waters', The Middle East, November 2008, pp. 42-44. Alleged attempts to bomb the Baku-Tbilisi-Ceyhan pipeline were also noted by the U.S. Congressional Research Service. Nichol, 'Russia-Georgia Conflict in South Ossetia', p. 16.
[33] Between 2004 and 2006, Ukraine provided Georgia with two 36-D6-M radars capable to detect, identify and track aerial targets. 'Statement by the Delegation of the Russian Federation' at the 558th Penary Meeting of the Forum for Security Cooperation, Organization for Security and Cooperation in Europe, FSC.JOUR/564, Annex 1, 1 October 2008.
[34] Craig Hoyle, 'Air Power in Demand', *Flight International*, Vol. 174, No. 5164, 11-17 November 2008, p. 48; Nichol, 'Russia-Georgia Conflict in South Ossetia', p. 11; Chang, 'Russia Resurgent: An Initial Look at Russian Military Performance in Georgia'.

[35] Twelve Tu-22M3R are believed to have been converted to a reconnaissance role, thus the 'R' designation. Jamie Hunter, 'Loss of 'Backfire' Over Georgia Highlights Aircraft's Deficiencies', *Jane's International Defence Review*, Vol. 41, November 2008, p. 25.
[36] Vladimir Karnozov, 'Lessons of the Five-Day War', *Flight International*, Vol. 174, No. 5155, 9-15 September 2008, p. 22; Lake, 'Air War Over Georgia', p. 19. To fly its aircraft, the Air Force apparently offered pilots bonuses, which in some cases were turned down. Reuben F. Johnson, 'Tennis Shoes and Stolen Toilets', *The Weekly Standard*, Vol. 14, Issue 10, 24 November 2008;
[37] Barabanov, 'The August War between Russia and Georgia'.
[38] Barabanov, 'The August War between Russia and Georgia'.
[39] Barabanov, 'The August War between Russia and Georgia'.
[40] Vladimir Karnozov and Niall O'Keefe, 'Conflict May Trigger Russian Upgrde', *Flight International*, Vol. 174, No. 5152, 19-25 August 2008, p. 9.
[41] Speech accessed at: President.kremlin.ru, 26 September 2008.
[42] Mikhail Barabanov, 'Reform of the Combat Spirit', *Kommersant-Vlast* (Moscow), 20 October 2008.
[43] Barabanov, 'Reform of the Combat Spirit'.
[44] Barabanov, 'Reform of the Combat Spirit'. See also Denis Telmanov, 'Divisions to be Cut into Pieces: The Ministry of Defence is Continuing the Reformation of the Organization and Staff Structure of Divisions', *Gazeta* (Moscow), 28 October 2008.
[45] Nikolay Poroskov, 'Russian CGS Briefs Foreign Attaches on Military Reform', *Vremya Novostey* (Moscow), 11 December 2008.
[46] See: Viktor Litovkin, 'In the Armed Forces: Troops Without Colour-Bearers', *Nezavisimaya Gazeta*, 27 October 2008; Viktor Baranets, 'The Airborne Troops Have Been Hit by Reform: The Airborne Troops Tula Division May Be Disbanded', *Komsomolskaya Pravda*, 25 October 2008.
[47] 'Russian Air Force Head Optimistic About Force's Future', *ITAR-TASS*, Moscow, 19 December 2008.
[48] 'Russian Air Force Cuts 50,000 Officers', *Kommersant* (Moscow), 21 November 2008, accessed at: http://www.kommersant.com/p-13628/military_reform_Air_Force/.
[49] In combined-arms units they are company and battery first sergeants, platoon commanders, crew chiefs of high-frequency mobile communications systems and of field artillery non-visual target acquisition, training unit instructors, and battalion paramedics, etc. Litovkin, 'Troops Without Colour-Bearers'.
[50] 'Russia: Commander Outlines Air Force Training Reform', *Zvezda TV* (Moscow), 4 November 2008.
[51] 'Russian TV Profiles Ryazan Airborne Troops Academy', *Rossiya TV* (Moscow), 15 November 2008.
[52] 'Russian Airborne Troops Commander Reports to Military Council', *Interfax* (Moscow), 18 November 2008.
[53] 'Russian Air Force Spokesman Says Quarter of Conscripts Suicidal', *Interfax* (Moscow), 20 November 2008.
[54] Authors' emphasis; 'Russian Air Force Spokesman Says Quarter of Conscripts Suicidal'.
[55] 'The Russian Air Force Recovering', *RIA Novosti*, 14 August 2008.
[56] Dmitry Solovyov, 'Russian Army Not Fit for Modern War: Top General', *Reuters*, 16 December 2008.
[57] Colonel-General Aleksandr Zelin, Commander-in-Chief of the VVS, said that Su-35 is essentially an export version of the Su-27. It has fifth-generation technology widely used on it; its new engine, 117S, allows it to fly at supersonic speed without afterburner use. It also

has vectored-thrust engine nozzles. Its other systems are identified as the Irbis-E phased-array radar, two MFI-35 colour LCDs, a multi-function module with a built-in display processor, IKSh-1M head-up display and a control module. The fifth-generation fighter aircraft will begin to enter service from 2015-2017 at the earliest. Currently there is just one Su-35, with two more 'to be completed soon' with service deliveries of the Su-35 planned around 2010-2011. 'Russian TV Adds Detail on Su-35 Fighter Aircraft', *NTV Mir*, Moscow, 14 September 2008.

[58] V.M. Burenok, 'The State Armaments Programme: Development Methodology', Military Thought, March-April, 2004; 'Russian Armed Forces Chief of Armaments Interviewed', *Krasnaya Zvezda*, 2 October 2008.

[59] 'Russian Armed Forces' Chief of Armament Interviewed," *Krasnaya Zvezda*, 2 October 2008.

[60] "Russia to Modernize Tu-143 Reconnaissance Drone', *Interfax*, (Moscow), 11 November 2008.

[61] Reuben F. Johnson, 'Georgia Experience Sparks Russian UAV Order', *Jane's International Defence Review*, Vol. 41, November 2008, p. 5.

[62] Mikhail Lukin and Vladimir Savin, 'All Russian Aviation', *Kommersant-Vlast*, 25 August 2008.

[63] Aminov, 'Georgia's Air Defence in the War with South Ossetia'.

[64] Jamie Hunter, 'Loss of 'Backfire' Over Georgia Highlights Aircraft's Deficiencies', *Jane's International Defence Review*, Vol. 41, November 2008, p. 25.

[65] Sergey Ptichkin, 'Visible-Invisible', *Rossiyskaya Gazeta*, (Moscow), 11 September 2008.

[66] Ptichkin, 'Visible-Invisible'.

[67] 'Russia to Complete 'State Trials' of Mi-28N Night Hunter Helicopter in December', *Interfax* (Moscow), 1 December 2008.

[68] 'Russian Armed Forces' Chief of Armament Interviewed', *Krasnaya Zvezda*, 2 October 2008.

[69] Denise Hammick, 'Russia Withdraws from Georgian Buffer Zones', *Jane's Defence Weekly*, Vol. 45, No. 42, 15 October 2008, p. 6; 'Georgia: The Risks of Winter', p. 9.

[70] Brooks Tigner, 'Georgian Crisis Sparks Energy Security Debate', J*ane's Defence Weekly*, Vol. 45, No. 43, 22 October 2008, p. 28.

# Letter from America

**By Gp Capt Carl Scott**

*Photo by Master Sgt. Ken Hammond, U.S. Air Force*

On October 29 2008, the New York Times reported Defence Secretary Robert Gates comments before the Carnegie Endowment for International Peace that the United States would hold "fully accountable" any country or group that helped terrorists to acquire or use nuclear, chemical or biological weapons. The statement was intended to articulate a reinvigorated vision of deterrence, going beyond the cold war notion that a president could respond with overwhelming force against a country that directly attacked the United States or its allies with unconventional weapons. Gates went on to say:

"Today we also make clear that the United States will hold any state, terrorist group or other non-state actor or individual fully accountable for supporting or enabling terrorist efforts to obtain or use weapons of mass destruction — whether by facilitating, financing or providing expertise or safe haven for such efforts,"

He said it was important to modernise the nation's nuclear arsenal as a hedge against what he described as "rising and resurgent powers" like Russia or China, as well as "rogue nations" like Iran or North Korea and international terrorists. By declaring that those who facilitated a terrorist attack would be held "fully accountable," Mr. Gates left the door open to diplomatic and economic responses as well as military ones. And, to be sure, the United States has acted forcefully before against those who sheltered terrorists, with the invasion of Afghanistan to oust Al Qaeda and its Taliban government supporters after the attacks of September 11th 2001.

In the wake of a series of attacks by US air and ground forces in Pakistan, senior officials also sought to justify an attack against a suspected Iraqi insurgent leader in Syria on 25th October by saying that the administration was operating under an expansive new definition of self-defence. The policy, officials said, provided a rationale for conventional strikes on militant targets in a sovereign nation without its consent - if that nation were unable or unwilling to halt the threat on its own.

This could represent a dangerous escalation in US preparedness to use force, potentially outside of the bounds of international law and accepted practice, further destabilising marginal states and isolating the US from its putative allies, or as the basis for a new dialogue with potential adversaries: strategic coercion.

**Deterrence in the contemporary world**

*'The best victory is when the opponent surrenders of its own accord before there are any actual hostilities. It is best to win without fighting… …There has never been a protracted war from which a country has benefited.'*

**Sun Tzu**

There can be no doubt, that deterring conflict, as a strategy, is infinitely superior to committing forces to the field. From Sun Tzu to the present, by way of the great clashes of the twentieth century, it has been noted that once committed, no side wins, resources are consumed, moral and

political capital expended. Empires fall at the point of victory, unable to absorb the costs of peace. The map of Europe in 1900, resplendent with Imperial Eagles and preening martial pride, bears little resemblance to that of 2000. The victors and vanquished alike have disappeared from the global stage. A few pale shadows linger; a post-industrial, post-imperial Britain bears the name of its Imperial antecedent, though none of the influence. The Saxe-Coburg-Gothas are mute alongside the Hapsburgs and Romanovs. History is littered with the bones of great Emperors and their loyal Generals. Great bellicose leviathons have consumed decades of cultural growth, the lives of millions of innocents and the product of years of industry, then lapsed into deserved obscurity.

Now, in turn, the modest liberal democracies, founded on sound principles of freedom and empowerment of the common man, are following the parade of ancestors into imperial overstretch, deluded by a neo-conservative fantasy of unbounded power.

*'…alarm bells are ringing throughout the US Defense community as the realization sinks in that the Defense Department is facing the makings of a 'perfect storm'. Runaway operations and maintenance costs due to the wars in Iraq and Afghanistan; soaring personnel obligations; enormous reset, recapitalization and modernization needs; intentional growth in the size of the Army and Marine Corps and the eventual decline of wartime supplemental spending will all combine to require the Pentagon and Congress to make some very difficult choices.'*[1]

The costs are manifold. The direct financial cost of warfare is staggering, but the lost economic opportunities border on the inconceivable; the diversion of industrial capacity, the focus of the many creative attributes of a developed state on the technology of force; the destruction of lives, besides those merely wasted; the consumption of political capital, both internally with the rise of dissent and fragmentation of society as the vacuum of propaganda replaces intellectual curiosity and diversity, and externally with the loss of trading partners and the cultural enrichment of engagement. The failure of diplomacy that leads to conflict also leads to power balancing behaviours amongst both opponents and uncommitted states. In short: Primacy in the international system is actively consumed by violent action. Strength is respected, by man and state, but aggression, the casual resort to lethal violence, is not. Friends waver and distance themselves, it engenders fear in those that may be considered enemies. And should the war be lost, then the game, the future credibility of the belligerent, is lost. All is gambled, at great expense, on an uncertain outcome.

It is central to our future, therefore, in the United Kingdom and in the United States, that we find a means of deterring conflict, of coercing opponents and assuring friends. The alternative is that we continue to grind away our own societies and our credibility on the global stage in sustaining fielded armies in remote desert provinces, the ground of our enemies choosing, in conflicts that are discretionary, but once begun, increasingly demanding of blood and treasure.

*'We need a new model for deterrence theory, and we need it now. Time is not on our side. This model must possess three particular attributes. First, it should espouse the highest standards of nuclear preparedness... Secondly the model must be credible... Lastly any model of deterrence needs to address the challenges posed by extremists and ideologues…How do we deter an idea or a movement?'*

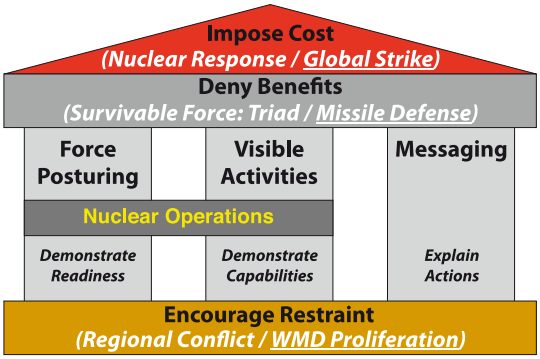
**Adm Michael Mullen, US Navy, Chairman of the Joint Chiefs of Staff**

A decade or more ago we moved away from the strategy of deterrence that had served us well in containing the conflict between those favouring capitalism and those who held greater faith in human nature. It was a flawed kind of deterrence, that gradually fell into disuse. It was a simple thing. You threatened your opponent with catastrophic force if he acted against you. If he started something, you 'cleaned his clock' as one Chairman of the Joint Chiefs of Staff so succinctly put it[2]. This glorious simplicity was, of course, far from a complete solution to the pressures in the international system. It offered little, in isolation, of reconciliation or recognition of cause. Maintaining credibility of the threat was challenging. At times it demanded studied 'irrationality' on the part of leaders to add credibility to the threat of nuclear war[3]. It forced opponents into alternate strategies, proxy wars in South East Asia, Africa and the Middle-East and the exercise of 'soft power', diplomatic and economic manoeuvring, and the sponsoring of deniable actions by sub-state groups. It spawned decapitation strategies, assassinations and the sponsorship of corrupt and brutal regimes. All of these alternates, flawed as they were, offered less damaging alternatives to open confrontation between heavily armed nation states. But in the current environment we have lost our appetite for deterrence. The damage caused by terrorist attacks, frequently insignificant compared to the carnage ensuing the clash of armies, have been deemed sufficiently important to warrant the deployment of armies to foreign soil and, ultimately, far greater cost and loss of life to all the protagonists.

The banal enthusiasm with which neoconservative politicians in the United States over-estimated the ability of armed force to resolve complex issues, has paled as they were driven from office. In their wake, the Nation faces a greater challenge. If operations in Iraq and Afghanistan are curtailed, without conspicuous success, then the deterrent effect of their power is weakened further. If the struggle is continued indefinitely, the costs in blood and treasure grossly outweigh any potential benefit. Therefore, the need now is to develop a theory of deterrence that meets the challenge of the current environment.

There is a residue of deterrence theory available, though much may need to be refreshed and much discarded. Dealing with existential threats posed by accountable, identifiable nation states remains a relatively simple transaction. Nuclear weapons deter such threats. It may be the only utility they hold, but it should not be undervalued. The work undertaken by Gen Elder and the US 8th Air Force, is addressing many of the challenges. The model he offers for nuclear deterrence is familiar:

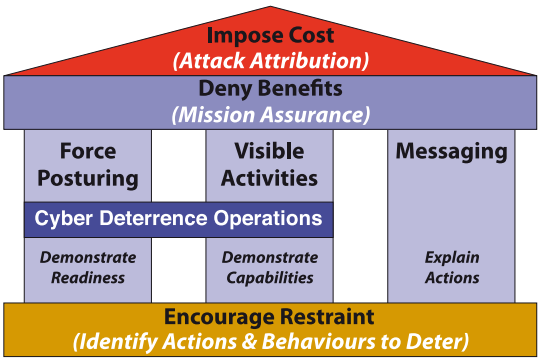
## Deterrence Operations




The fundamental challenge is to provide a credible threat that deters a course of action by making the costs outweigh the benefits. That is dependent on displaying capability and the will to employ it, a capability which is sufficiently nuanced that its use would be legitimate, deliverable and damaging to the opponent. The messaging element is a dialogue to define the bounds of tolerable behaviour, with a clear understanding of the ramifications of crossing that line. A defensive element of the strategy is to ensure the benefits of hostile action are largely denied to the opponent, whilst our offensive action would impose unacceptable costs. The difficulties of messaging and interpreting the decision-making personalities and processes of the target state are managed by a cadre of culturally aware intelligence specialists, trained in language, history and politics of the target state. The same model is used by the nascent USAF 24th Air Force to provide a basis for cyber deterrence.

The defensive and aggressive elements of the deterrent process are direct equivalents of the nuclear scenario, mission assurance to deny the access required by the cyber attacker, and the identification and response to attacks to impose costs. A useful beginning, but only a beginning. The underlying assumption is that the dialogue occurs between single, hierarchical entities, which have managed exchange of red lines and signalling. But how do you deter unilateral, unsponsored 'proxy' action, or non-state actors without identifiable sponsor states, disrupting through cyber attack?

## Cyber Detterence




The same questions are compounded when considering kinetic action by non state actors. How do you deter an opponent, one who feels his core values are sufficiently challenged that he is prepared to seek martyrdom as a desirable outcome? How indeed, do you deter an idea? These are the challenges of the next few years: To understand the nature of the challengers, to identify the decision-making processes that inform their actions, to understand the demographic they represent, their aspirations and values, and address the cost and benefit calculus that will encourage, or inhibit their behaviours.

It is not that it is difficult, therefore cannot be done. The alternate is unacceptable because it is unsustainable and is reducing our own power and the quality of life in our own societies. It is difficult, but it is essential. Issues of identity, accountability, anonymity, deniability need to be addressed. The decision making processes of our challengers can be understood. They are rational. A dialogue with such entities can be achieved. It may not require the traditional channels of diplomacy to reach them, but then these channels themselves are a transient product of a particular European system for exchange between monarchs. They are neither timeless nor immutable.

**How do we begin to construct a doctrine for 'non state' deterrence?**

One might suggest that it has always existed. It exists within states, where recourse to lethal force is reserved for the state, where laws exist and are enforced. When the Khans built pyramids of skulls, city states fell into compliance. In Hama in Syria, when an assassination attempt on a minister signalled the beginning of Islamic unrest, a great tract of the city was levelled. In the wake of the troops, the buildings were bulldozed and the population driven into exile. There was no further internal dissent.

Whilst superficially effective, suchactions are not sustainable on the global stage, or by liberal democracies, accountable to the aspirations of their populations, allies and international law. It may, therefore, be necessary to consider some guidelines for the emergent doctrine.

The 8th Air Force, again, have identified a number of 'lost arts' of deterrence. Aspects of the calculus that have been neglected, which offer an immediate path to ensure state to state 'peer' deterrence, but also offer road signs, pointing toward the demands of more complex dialogue.

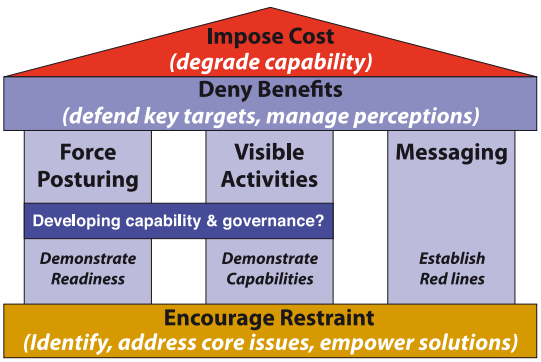
- Adversary analysis. It is necessary to understand, in intimate detail, the culture, psychology and history of an opponent. To predict the outcomes of our signals and to anticipate the calculus, the values, he will employ. To understand the processes by which decisions are made and enacted.
- Mission Assurance. The ability to safeguard a capability and deliver, with confidence, the required effect.
- Escalation control. The dialogue is central to ensuring that both antagonists are able to understand the level of force their behaviours will precipitate, without automatic recourse to mutually ensured destruction.
- Managing ambiguity ('redlines'). Actors, be they states, organisations or individuals, behave with a least two levels of policy. Declaratory policy and operational policy. The dialogue may be wildly threatening, seemingly unpredictable, to give credence to a threat or comfort to the constituency. This ambiguity is central to the negotiation, but must be understood as such.
- Conventional and non-alert deterrence forces. The level

and nature of forces deployable in the event of a crisis are many, all of which contribute to a spectrum of potential responses and serve to signal will and intent.

- Assure allies. The ramifications of action, or even threatened action, can resonate through friendly and neutral entities.
- Credibility as function of capability and will. The will to commit force is central to its credibility. The capability and the will must be evident to an opponent. Our own democratic decision making constrain and shape the nature of activity governments can undertake. Illegal, immoral or irrational actions generally result in a change of government, not in a change of behaviour in an opponent.
- Military to military engagement as an element of deterrence. A keen understanding of capability and shared understanding of objectives shapes thinking and advice offered in crisis.

In the cold war, our opponents were very easy to find and understand, but difficult to destroy. The reverse is true in the current operating environment. Our opponents, or challengers, are dispersed and frequently anonymous. They may act in support of the interests of a nation state or theology, but are not under control of any central authority. They are frequently post-modern syndicated entities, virtual, but with a logic, comparable to a franchise, branded but largely self-employed. This suggests that the most immediate challenge is not to destroy the opponent, we have more than enough strike capability to reach out globally and destroy, but to find, to analyse and understand his motivation, his decision-making process and values. Each challenger, economic, theological or cultural entity, trans or sub-state, has a rationale, an identity, and a demographic on which they draw and a constituency on whose behalf they act. For each these must be clearly understood and articulated to inform the levers which might influence behaviour. Pressure may then be applied, through potential or actual actions, which will coerce in a predictable and measurable manner.

**Unconventional Deterrence**




At the core of that challenge is the need to identify an opponent. The identity, the self-image, that motivates him to act, not the shorthand language of outrage we employ in the press and in politics which serves no purpose other to fuel righteous indignation. No-one is a terrorist, or an extremist. People act for a reason. They have a putative cause, declaratory and operational policy. Understand the nature of that identity and that reasoning, determine what he holds dear, that

we might hold at risk. It is very rarely his life. Determine who holds him to account. Who can restrain him, and how might we influence them to encourage that restraint. Most people act on behalf of a constituency, it may be a physical, ideological or elective community, but they act in accord with the logic and values of that constituency.

The next challenge is to ensure credibility of the threatened action. We know significant force will only be employable, in democratic or rational states, against an existential threat. The pin-prick of small scale disruption, designed to cultivate fear and pressure social or legal changes, to draw resources or draw recognition to causes and communities may be most effectively addressed through dialogue. It may require the application of pressure to shape that dialogue. That pressure may be drawn from any or all aspects of state power, but must be acceptable to the constituency of democratic governments and the international community, or it will not be deliverable, sustainable or effective. A state that assumes it may act beyond the law, outside the accepted practices of the international system, is likely to find unanticipated consequences, diminution of power and power-balancing behaviours amongst those that feel threatened. The lesson of Guantanamo Bay is that action taken outside of the law diminishes us and serves the interest of our opponents. It was as true when Grotius formulated legal guidance for the conduct of War[4] as it was when President George W Bush assumed the helm of the global superpower.

A further problem arises in considering this coercive dialogue. How do you define victory and disengage from a conflict, when the outcomes, successes and failures, are largely unseen and perceptions shaped by media? There are no parades through Paris, no flags on the Reichstag. It is not in our collective nature to draw back from a challenge, lest we be considered weak, and other opponents are encouraged to act.

*'The British nation can be counted upon to carry through to victory any struggle that it once enters upon no matter how long such a struggle may last or however great the sacrifices that may be necessary or whatever the means that have to be employed; and all this even though the actual military equipment at hand may be utterly inadequate when compared with that of other nations.'*

**Adolf Hitler in Mein Kampf**

It may be unwise to exercise the national characteristics identified by Adolf Hitler, in expressing his wish to avoid conflict with Great Britain from his Bavarian prison cell. It is a recipe for 'imperial overstretch' when exercised by powerful nations and a recipe for disaster when conducted by a declining economic power with finite resources and significant legacy opponents from its age of greatness. Fortunately the United Kingdom has an alternate history of managing perceptions to its advantage. It would be difficult, for example, to find cause for celebration in the British handling of affairs, military and political, in Palestine, Cyprus, Northern Ireland, Mesopotamia, Kenya, India, Southern Africa and the Americas. And yet we pride ourselves on a reputation for the conduct of counter insurgency

operations. Clearly it can be done. Success is a matter of perception.

We might summarise these considerations for coercion and deterrence in the contemporary environment as: Analyse, identify, understand, influence.

- Understand the nature of Identity, address real actors, not ghosts, pre-conceptions or clichés. The military cannot afford the luxury of indolence afforded politicians and the media.
- Legality and international norms of behaviour are non discretionary.
- Understand the nature of power and the limits of military force. Attraction is greater than repulsion in shaping behaviour.
- Acknowledging legitimacy in cause. The roots of conflict resolution lie in the cause and conduct of the operation. Address root causes, not symptoms.
- Manage Perceptions. A critical element, speaking to your own constituency, your allies and that of your opponent. Defining and communicating success.

These are a few faltering steps toward the challenges we must address. When politicians speak without wit or wisdom, when international relations are governed by sound-bites masquerading as policy, it is for the military to understand what might be achieved, what might be delivered and that which cannot. To draw our Nations into unwinnable, unsustainable conflicts is, at best, negligent, and at worst vainglorious and self-destructive.

The final words in this piece are drawn from Grotius, writing in the 17th century, quoting in turn from Tacitus in the first. There are constants in our historical tradition, which we ignore at our peril.

*'One cannot but admire the character, which Tacitus has drawn of the Chauci, a noble and high-spirited people of Germany, who, he says, "were desirous of maintaining their greatness by justice, rather than by acts of ungovernable rapacity and ambition — provoking no wars, invading no countries, spoiling no neighbours to aggrandize themselves, — yet, when necessity prompted, able to raise men with arms in their hands at a moment's warning — a great population with a numerous breed of horses to form a well mounted cavalry-and, with all these advantages, upholding their reputation in the midst of peace."'*

**Hugo Grotius (1583-1645)**
**'On the Law of War and Peace'**
**Chapter 22: On the Unjust Causes of War.**

'Upholding their reputation in the midst of peace'… the very essence of deterrence.

**The author is grateful to:**

Gen Schwartz, COSAF, for his address at the AFA Conference in Washington DC and the RAF US conference in the same city.

Lt Gen Elder (Commander USAF 8th Air force) for his addresses at the 'Cyber Awareness Conference' Shreveport Louisiana, and the RAF US Conference in Washington DC, both in October 08.

Maj Gen Lord (AF Cyber transition) USAF for his address at the same conference in Shreveport Louisiana.

Gen (ret'd) Hayden (Director CIA) for his address at the AFA Conference in Washington DC.

Professor Yezid Sayigh, KCL.

Joint Force Quarterly, 4th Quarter, 2008. 'It's Time For a New Deterrence Model' Michael Mullen, Admiral US Navy, Chairman of the Joint Chiefs of Staff.

Boston Globe, September 30, 2008. 'Avoiding the Choices of 1914 and !938'. HDS Greenaway, reporting the views of Secretary Gates.

New York Times, October 29, 2008 'Gates Gives Rationale For Expanded Deterrence' Thom Shanker.

For an engaging perspective on the nature and role of identity, see Amin Maalouf, 'In the name of identity: Violence and the Need to Belong' (2003).

Dated, but valuable studies of coercion in diplomacy:

'The Limits of Coercive Diplomacy' by Alexander L., David K. Hall, and William E. Simons George (1971)

'Strategic Coercion: Concepts and Cases' by Lawrence Freedman (1998)

**Notes**

[1] Michele A Flourney and Shawn Brimley, Centre for New American Security, September 2008.
[2] General John Vessey, CJCS 1982-5
[3] President JFK was keenly aware, during the Cuban Missile Crisis that he had to appear unreasonable, less the Soviet Union call his bluff on nuclear options.
[4] Hugo Grotius, On the Law of War and Peace 'De Jure Belli ac Pacis' Translated by A. C. Campbell London, 1814

# Historic Book Review

## Air Power in War

### Lord Tedder

Publisher: Hodder and Stoughton, London (1947)

Reviewed by Air Cdre Neville Parton

*'I am utterly convinced that the outstanding and vital lesson of the last war is that air power is the dominant factor in this modern world and that, though the methods of exercising it will change, it will remain the dominant factor so long as power determines the fate of nations.'*[1]

This bold and confident statement comes from another of the very few books to be written by an individual who would go on to reach the senior-most position within the Royal Air Force, and who has subsequently been described as '…an unusual officer, far outside the normal mould for senior military figures.'[2] Perhaps best known as the architect of air/land integration in North Africa in 1942, he also acted as Eisenhower's Deputy in the Supreme Commander role, and ended his Service career as CAS, succeeding Portal in the post in 1946. He was atypical of his generation inasmuch as he was one of the few wartime officers from the First World War to reach senior rank without having been decorated for gallantry, although he had a considerable period of active service at the front. As with theother reviews in this series, an overview of Lord Tedder's life is provided before considering the publication itself; in this case however, as Tedder's wartime career is well known to most students of air power, the synopsis will concentrate on those aspects of his life that are perhaps less recognized.

So let us begin by considering the man himself. Arthur William Tedder was born on 11 July 1890 at Glenguin (now Glengoyne), a distillery near Stirling in Scotland, where his father was stationed as a member of the Inland Revenue. He attended Whitgift School from 1902 to 1909, and was a particularly keen member of the Officer Training Corps, as well as a cross-country runner and first XV member for two years. Here he became fascinated by astronomy, and also developed an enthusiasm for theatre, both as an actor and organiser. From school he proceeded to read for a history degree at Magdelene College, Cambridge, between 1909 and 1912, where again he was an enthusiastic member of the OTC, and also maintained his interests in cross-country running and astronomy.[3] Although a teetotaller throughout these early years, he was given to student pranks through his time at Cambridge, but still managed a creditable 2nd-class Honours (Division 2) in history, and stayed on for a further year to carry out a research project. The latter resulted in his winning the Prince Consort Prize, with the thesis work being published by the Cambridge University Press in 1916.[4] Despite his

clear academic aptitude, and liberal leanings, he decided, much to his family's surprise, to make a career for himself within the Colonial Office, and was accepted as a cadet for initial service in Fiji, leaving in February 1914. Within six months though the outbreak of war prompted Tedder to return to Britain, where he was offered a commission in the Dorsetshire Regiment with antedated seniority (a reflection on his successful OTC service). However, a knee injury resulted in a posting not to the front line, but to a depot at Calais. Having heard of another individual who became an airman after damaging his knee, Tedder applied to the Royal Flying Corps (RFC) for a transfer, and was (eventually) successful, being posted for pilot training in January 1916.[5]

He made rapid progress in training and left for France in June 1916, to join No 25 Squadron, operating the FE 2b aircraft. By August he had become a flight commander, and by December 1916 had some 323 hours under his belt, covering a range of bombing and reconnaissance missions. However, in January 1917 he was posted as the Commanding Officer of No 70 Squadron, on promotion to major. Forbidden to fly over enemy territory, as was standard for squadron COs at the time, he was still able to demonstrate that he was an efficient and capable leader, and certainly caught Trenchard's eye in a favourable manner. In July 1917 he was returned to the UK to command a training squadron, but in March 1918 was selected for service in Egypt. The journey out was eventful – his ship having been torpedoed on the second day of the journey – but he arrived in mid-May and took over a training wing. He was not a particularly keen pilot, but ran the training organisation again in a quietly efficient manner, and was promoted to lieutenant colonel.

Returning to the UK in 1919, Tedder was fortunate to be offered a permanent commission as a squadron leader, and had two squadron commands in quick succession, before being charged to take No 207 Squadron, operating DH 9a aircraft, out to Constantinople as a result of the Chanak crisis – during which he managed to fall foul of Hugh Dowding.[6] Subsequent appointments included the Royal Naval Staff College at Greenwich in 1923, and then, on promotion to wing commander, a flying training school at Digby the following year. A brief interlude in the Air Ministry began in late 1926, working for Dowding, but the following year he was selected to attend the Imperial Defence College, commencing in January 1928, before moving on tobe an instructor at the RAF Staff College in 1929, where he would spend three happy years. Promoted to group captain in 1931, he became the deputy commandant for a short while before moving to the Armament and Gunnery School at Eastchurch, where he brought a much-needed sense of realism and operational efficiency – even monitoring the aerial exercises from his own aircraft. He had obviously continued to impress the RAF hierarchy, as he left Eastchurch to return to the Air Ministry as Director of Training in 1934, in the rank of air commodore. Tours of overseas training bases followed, as well as reviews of training methods and equipment; unsurprisingly, Tedder was the

individual responsible for the initial procurement of Link Trainers for the RAF. Finally, in 1936, Tedder gained his first operational command since the war, as Air Officer Commanding RAF Far East, based at Singapore. This was to be a hectic posting, with a command that reflected all the problems of both the lack of inter-service co-operation and inadequate (in fact, antiquated!) assets, as well as a growing realisation of the difficulties of defending Singapore from any modern enemy.[7] However, he was promoted to air vice-marshal during the tour, and made a number of recommendations to improve the capability of what little air power existed, as well as allowing for rapid reinforcement.

In 1938, Tedder was summonsed back to the Air Ministry by one of his patrons, Air Marshal Sir Wilfred Freeman, to join him in the Directorate of Research and Development, where he was to become involved with the desperate rush to not only expand the RAF, but also to re-arm it with modern and capable aircraft and weapons. He performed well in this role, which included moving the entire department to Harrogate at short notice, at least until the arrival of Lord Beaverbrook, with whom there was a considerable amount of mutual antipathy. After a degree of political interference, and a fortunate break, Tedder was appointed as the Deputy to Air Chief Marshal Sir Arthur Longmore at Middle East Air Command in November 1940.[8] He would spend three years in the Middle East, taking over as the Air Officer Commanding-in-Chief in May 1941 when Longmore was removed from post, and during this period successfully forged – or perhaps re-developed – the principals of effective integration of air and land forces. As has already been stated, the rest of Tedder's wartime career will not be covered here, but it is worth noting that he was not a natural choice as a wartime commander: Churchill was initially concerned by his lack of command and operational experience during the inter-war years, where he had spent a considerable amount of time in either the training or procurement worlds. The 'outstanding national and allied commander' appeared from a background that did little to suggest his tremendous capacity for inspirational leadership and driving inter-service co-operation.

His post-Air Force career, reflecting his breadth of interests, spanned a variety of areas. Having taken up an appointment as one of six BBC governors on departing the Service at the end of 1949, he was surprised to be asked to accept a one-year appointment within three months as the head of joint-services in Washington, and then as Britain's first representative on a newly formed NATO executive committee. A year later, in June 1951, he was installed as the Chancellor of Cambridge University, a position which gave him a tremendous degree of personal pleasure, second only to becoming President of Surrey County Cricket Club in 1953. Tedder also became involved in business, as a director and chairmen of the Standard Motor Company (later to become Standard Triumph International). He maintained a life-long friendship and close correspondence with Eisenhower, and also stayed close to the issue of facilities for other ranks

in the form of the Malcolm Clubs, which he and his second wife, Toppy, fought hard to maintain even as his health began to fail. In many ways he had a life that was oft-touched with sadness: both his first and second wives pre-deceased him, and he lost both a son and step-son in RAF service.[9] Yet throughout his life, and even while battling against Parkinson's disease at the end, he remained full of both humour and enthusiasm. Any readers who wish to gain a deeper understanding of Tedder are strongly recommended to read Vincent Orange's biography, *Tedder: Quietly in Command*, as well as *With Prejudice*, his war-time memoirs.

Having thus learnt something of Tedder as an individual, we now need to turn to *Air Power in War*. The book itself was based upon a series of four lectures given by Tedder at Cambridge in 1947, who had been invited to give the annual Lees Knowles lectures in military science that year.[10] An official version was produced by His Majesty's Stationary Office, as well as the publicly-available publication from Hodder and Stoughton upon which this review is based – although there is very little difference between them. Given its origin, it will perhaps not come as a surprise that it is organised into only four chapters – based upon the lectures – nor that it is quite short, running only to 124 pages, and is ***eminently*** readable. The four chapter headings covered The Unities of War, Air Superiority, Air Power in Relation to Sea Power, and The Exercise of Air Power, and each chapter was longer than its predecessor, with the final chapter coming in at two-and-a-half times the length of the first – from which it is possible to gain a first impression as to where Tedder placed the main emphasis of his work.

The first short chapter, on the unities of war, clearly lays out Tedder's stall. Using sources ranging from Sun Tzu to Bacon and Liddell-Hart, it elegantly introduces one of his key themes – that of preparedness for whatever conflicts the future might bring. He begins with a highly cogent quote from Mahan:

*'It behoves countries whose people, like all free peoples, object to paying for large military establishments, to see to it that they are at least strong enough to gain the time to turn the spirit and capacity of their subjects into the new activities which war calls for.'*[11]

The importance of being able to 'gain the time' to prepare for a conflict was then contrasted with the traditional British approach of relying on her naval forces for security, and having an army only for Imperial policing, becoming involved in Europe as little or as much as we desired. However, all that had changed in 1914, when we became a *de facto* continental power, and were faced with the challenge – now in three very different environments – of being ready to buy time in the event of a crisis.

A slight diversion was provided by mention of the introduction of atomic weapons onto the scene, and after commenting on the coining of the phrase 'weapon of mass destruction', Tedder went on to outline his own thoughts in this area:

*'I do hope we shall not dress up our attitude towards atomic warfare in any similar camouflage of morality [referring to the denigration of gunpowder by knights in the Middle*

*Ages]…let us face up frankly to the hard fact that the use of this new weapon is not a question of morality, but is simply and crudely a threat to the very existence of civilisation.'*[12]

It was clear that he saw expediency rather than morality as the best defence, in that it would be too 'awful' to be used, which was perhaps a trifle naïve given the destruction wrought by conventional bombers during the war which he had been so intimately involved with. However, he returned to his main theme by considering what lessons we should draw from the war that had justbeen fought, and sounded a particularly cautionary note:

*'Sometimes I feel we have a tendency to concentrate too much on our successes and our enemies' failures and consequently to draw our lessons too much from the final stages of the war. I suggest there is a danger in this… Surely it is the problems of the early stages of the war which we should study…Here is the real and vital test of our defence policies.'*

The 'real and vital test' was then linked to the Munich crisis, where it was clear that Britain was not ready, and desperately needed both the year which Chamberlain bought as well as the eight months of the 'phoney war'. However, having come close on two previous occasions (i.e. the World Wars), Tedder's clear concern was that we should not end up in such a position again. His belief was that any future war would be both total and world-wide, and that this would require a different approach to 'economy' in peace-time, with the aim of having united and efficient armed forces, able to work co-operatively rather than in competition, and thereby ready to act swiftly as 'one of the world's policemen.'

The second chapter, covering air superiority, was also relatively short, and considered the subject from a particularly practical perspective. Air power was defined as the ability to use the available air space as you wished, while denying its use to the enemy. However, in order to exercise air power, air superiority had to be achieved – and indeed the same held true at sea even from relatively early on in the war – in that sea power could not be exercised without sufficient air superiority. The fight for air superiority though had to be regarded as a campaign rather than a battle, with the added problem that those being supported on the surface often did not feel secure unless they could see the Air Force over them. The Germans were perceived to have had a simple approach to this in the early days of the war, using all-out surprise attacks to destroy any air opposition, followed by destruction of aircraft factories to prevent the force being re-equipped or rebuilt. However, in the Battle of Britain they were not able to gain air superiority from the outset, and then moved to stages in their campaign which required such superiority in order to be a success.

A strong case was made for the fact that comparisons of relative strengths of opposing air forces were not as simple a guide to likely superiority as was the case with land or sea forces:

*'There is in fact no rule-of-thumb solution to the problem of securing air superiority, no simple formula…it is not capable of any precise or mathematical assessment. Orders of battle may be a very misleading criteria…I could only*

*say I "thought" and "felt" that the air situation would be all right…'*[13]

Tedder then identified that the pre-war RAF belief in the importance of the offensive was correct by considering what happened as the Germans diverted more and more of their effort onto defensive measures, in that while their ability to produce aircraft, and in particular fighters, steadily increased throughout the war, they were not able to make use of them. He cogently pointed out that in the third quarter of 1944, German monthly fighter production was higher than that of the British and American aircraft industries combined, and yet at this time the Allies had almost absolute air superiority, which, as Speer pointed out, was simply because as soon as the aircraft were produced the Allies destroyed them. In Tedder's words:

*'I emphasise this point because it is a principle fundamental to any understanding of air power. An air force composed of fighters alone is not an air force, and is not a defence…'*[14]

From this perspective, the strategic air offensive forced the Luftwaffe to fight for air superiority over its own 'vital living space' by day and night which, in conjunction with events on the Eastern front, effectively led to the organisation being bled dry of experienced aircrew. A keen fan of General Smuts, Tedder concluded by quoting his comments from the First World War regarding the need to secure 'air predominance', before finishing with his own thoughts:

*'One sometimes hears it said that the air battle must be won first, before land or sea operations can take place; that can be misleading: air superiority must be established, and the greater the degree of that superiority the better, but the air battle is continuous, and when it is won the war is all but won.'*

Chapter three concentrated on the relationship between air power and sea power, and the differences that had become evident in terms of traditional understandings of how sea power operated. Although longer than the previous chapters, it did contain a considerable degree of repetition. Taking examples from the Norwegian and Mediterranean campaigns, the case was strongly made that sea power could no longer operate unless it had sufficient air superiority, with losses of significant capital ships an inevitable consequence of operating within an area where the enemy had clear control of the air. Operations around Crete were examined in some detail, with Tedder's deduction that:

*'The price in surface ships was three cruisers and six destroyers sunk; one battleship, one aircraft carrier, three cruisers and one destroyer seriously damaged; and one battleship, four cruisers and six destroyers in need of extensive repairs…[once again] magnificent, but not war…to operate surface ships under an enemy air superiority… which was unchallengeable – this was clearly no longer an operation of war.'*

The successful action at Dunkirk, where a barely-sufficient level of air superiority enabled the evacuation flotilla to operate with a tolerable level of losses, was contrasted with Tunis in 1943, where clear Allied air superiority combined with sea power resulted in the capture of 248,000 German and Italian servicemen due to a complete inability of the enemy

to evacuate by sea or air. Positive examples were also cited, such as the official attribution of shipping losses in the Baltic and North-West European sea-board North of the Straits of Dover, which concluded that 88 per cent of the 2,471 enemy ships sunk or damaged were due to aircraft action.

Consideration was also given to the Pacific and U-boat campaigns. The former was considered to be a special case due to the great ranges involved, which made the use of carrier aviation a prerequisite. However, the continued advantage in terms of performance of land-based aircraft was also noted. Examination of the U-boat problem culminated with a graph which showed the increasing proportion of U-boat casualties caused by air compared with surface vessels, where, from 1943 onwards, aircraft scored the majority of successes in every year.[15] This element ended with a short exposition on the 'fleet in being' and its likely future influence, given that the majority of capital ships on all sides had fallen prey to aircraft or submarines – with of course a significant number coming to ignominious ends in 'safe' harbours or anchorages. No final conclusion was reached, other than that the lessons of the war needed to be carefully considered alongside scientific assessments of impending possibilities, with the emphasis on being ready for the future.

The final chapter pulled all of the preceding elements together, and made the case for air power in a compelling manner, perhaps being one of the first publications after the Second World War to include a considerable degree of factual detail regarding the actual impact on the German war effort produced by the Allied Air Forces. Although Tedder began by making clear that he did not believe that air power by itself could win wars, and that it was the balance between the three arms of defence which was important, the bulk of the chapter was spent in determining how much air power could contribute towards winning a war. The extreme flexibility of air power was identified as one of its 'dominant characteristics', which in conjunction with centralised control allowed a power of concentration that was 'unequalled' by any other form of warfare. The changing approach towards the bomber over the course of the war from the other services and government perspectives was noted, moving from what was initially perceived as an extravagance to become an essential element in almost all campaign plans – and the consequent danger of dispersal and waste of effort due to too many calls upon the force. As Tedder put it himself:

*'Air warfare cannot be separated into little packets; it knows no boundaries on land or sea other than those imposed by the radius of action of the aircraft; it is a unity and demands unity of command.'*[16]

The idea of the Air Force going off to fight some form of private war, somehow removed from that of the rest of the forces, was also addressed – and firmly rebutted, with a clear exposition of just how much advice, guidance and control was provided by other military and government leaders via a range of committees. Perhaps the only slightly discordant note was an exposition on the value

of an air force in counter-insurgency operations, although this was relatively brief.

An overview of the Allied bomber offensive against Germany was provided, which formed the largest part of the chapter – and was introduced, with perhaps a wry smile on Tedder's face as he delivered the words, by comparing the first directive issued to Bomber Command in 1940 after the German invasion of the West (i.e. France), with the last directive issued to the Anglo-American strategic bomber forces – both giving oil and lines of communication as the priority targets. His point was that bombing policy had swung through a huge circle. The differing types of target sets were considered, together with the impact of night operations – and the rationale underpinning the 'area' attacks against German towns. Mention was made of the forces diverted to air defence by Germany; where nearly 900,000 people were employed on the anti-aircraft defences by 1944, which was very close to the peak strength of the entire RAF during the war. The growth in tonnage of weapons delivery onto German targets was contrasted with the decline of that on England, and particular attention was paid to the effects produced on the railway system in France prior to D-Day, where traffic was reduced to a third of its normal level, and with wider consequences for the rest of the German rail system, which was unable to provide raw materials to the war industries due to the loss of rolling stock.[17] The consequences of targeting oil production at the same time were also considered. Tedder's closing summary was quite simple: at the start of the war, air power, in the form of the RAF, had been just strong enough to hold the enemy back from the heart of Great Britain's war effort, and provided that essential element of time to allow all three armed forces to be built up to enable a fight for victory, as opposed to survival, to commence. Air power had also provided the only means to continue the fight against Germany itself, for at least four years of the war, and had contributed significantly towards enabling victory both at land and sea. Looking to the future, while it was accepted that sea power was still vital to the nation's security, in Tedder's mind it was air power that in any future conflict would inevitably determine the end result.

So how should we regard Tedder's book today? The world has obviously changed a great deal, especially with regard to societal values and the norms of international relations, as well as the type of conflict that we are currently engaged in. From our perspective, perhaps the most important elements are those that relate to the need for preparedness, and understanding the impact of changes in technology on future warfare. The concept of the size of standing armed forces in a democracy being determined by the need to be capable of withstanding an initial onslaught, and thus allowing the nation to bring itself onto a war footing in order to succeed in an all-out conflict possibly seems dated today, although the analysis that identifies technology as a potential way out of the conundrum was highly prescient.[18] Furthermore, his advice to look at learning the lessons from the beginning of a conflict, not just the end, is well worth bearing in

mind. The analysis of the impact of the Combined Bomber Offensive also still stands as an excellent summary of this area of the war, and a powerful argument for the effects that air power can create in a major conflict. And although our futureologists at present predict more of the same, applying some careful thought to the less-likely end of the conflict spectrum through Tedder's eyes might make for some uncomfortable thoughts. Notwithstanding any of the above, while his memoirs make for excellent reading, *Air Power in War* stands as a testament to an individual who knew a great deal about the application of air power in a joint environment, and from which present and future generations of airmen will always be able to draw something of value.

Orange, Vincent. *Tedder: Quietly in Command*. Edited by Sebastian Cox, Studies in Air Power. London: Frank Cass, 2004.

Peden, G.C. *Arms, Economics and British Strategy*. Cambridge: Cambridge University Press, 2007.

Tedder, Lord. *Air Power in War*. First ed. London: Hodder and Staughton, 1947.

**Notes**

[1] Lord Tedder, *Air Power in War*, First ed. (London: Hodder and Staughton, 1947), p 123.

[2] Series Editor's Preface to: Vincent Orange, *Tedder : Quietly in Command*, ed. Sebastian Cox, Studies in Air Power (London: Frank Cass, 2004), p xiii.

[3] Air Chief Marshal, Trafford Leigh-Mallory, was also a member of Magdelene College, and although he and Tedder were students at the same time, they were never particularly friendly. In fact, Tedder had prickly relationships with a number of future RAF senior officers, including (as will be seen), Dowding and Slessor.

[4] The precise title of his thesis was *The Navy of the Restoration from the Death of Cromwell to the Treaty of Breda: its Work, Growth and Influence*.

[5] His first application was made in March 1915, which appeared to have foundered in a sea of red tape, and he was advised to re-apply in December 1915.

[6] Dowding sought disciplinary action against Tedder for having taken more spares than he should have done. The request for action was overturned by Trenchard, but Tedder never forgave Dowding, and considered him unfit for high command. Orange, *Tedder: Quietly in Command*.

[7] All biplane types, consisting of Short Singapore IIIs, Vickers Vildebeest and Hawker Audax – no fighter types at all.

[8] The man originally proposed for the job, Air Vice-Marshal Owen Boyd, had been landed at Sicily instead of Malta on the outward journey, and as a result had been captured.

[9] His son was killed in action in 1940 on a daylight bombing raid over France, whilst his stepson died in a training accident in 1946.

[10]

[11] Tedder, *Air Power in War*, p 15.

[12] Ibid., p 19.

[13] Ibid., p 39-40.

[14] Ibid., p 44.

[15] Ibid., Opposite p 82.

[16] Ibid., p 91.

[17] A number of the graphs used by Tedder to illustrate his points are reproduced at Annex A.

[18] For more on this concept see G. C. Peden, *Arms, Economics and British Strategy* (Cambridge: Cambridge University Press, 2007).

# Book Review

## The Past as Prologue: The Importance of History to the Military Professional

Edited by Williamson Murray and Richard Hart Sinnreich

Reviewed by Gp Capt Ian Shields

In the summer of 2003, the British Army's Directorate of Ground Development and Doctrine (now part of the Development, Concepts and Doctrine Centre) sponsored a conference on 'Past Futures'; the same conference was subsequently repeated in almost its entirety at the US Marine Corps University at Quantico that autumn. This book comes from that conference – and what an excellent book it is. If any reader of *Air Power Review* had any doubts of the need as professional air power advocates to read extensively military history (and I would hope that that is not the case) then this book will persuade. It is 265 pages of high-protein, well-written prose that explores many different aspects of the past as the prologue for the future, and there is not a weak chapter in the book.

The book is split into three unequal parts. The first element, the introduction, is dominated by an essay (based on his opening address at the conference) by the incomparable Sir Michael Howard. Those familiar with his early 1990s work *'The Lessons of History'* will not be surprised by the direction of this essay in which he argues that while the academic study of war has expanded to consider far broader societal effects and impacts, at the core of the study of military history must lie the study of the central activity of armed forces, that is, *fighting*. A timely reminder in the present environment, when we are as much or more concerned about society as we are about straight forward military undertakings.

The seventy pages comprising Part One that follow consist of four, loosely linked essays. General Sir John Kiszely (the recently retired Director of the Defence Academy) sets out, from the British viewpoint, the relevance of history to the military profession. Understandably written from an Army viewpoint, General Kiszely charts the rise of interest in professional military, and particularly military history, in the British armed forces, ending with the assertion that we need inspirational instructors, since most of such history will have to be self-taught, a sentiment with which I fully concur. There follows an even more personal essay written by Paul Van Ripper on the same subject, but from his viewpoint as an American Marine. This, quite humbling, chapter shows how one man chose to tackle the study of military history, but very much from a self-taught viewpoint. Finally, in Part One, each of the editors contributes a think-piece. Richard Sinnreich reviews the formal teaching of military history (again, primarily from a Land perspective) and is far

from complimentary. There are broad parallels here for our own teaching, and this chapter sounds a timely warning about an over-reliance on technology rather than thinking. Finally, Williamson Murray offers some personal insights on military history and the profession of arms. He warns against seeking prediction from history, but urges that history, properly studied and understood, be used as a tool with which to unpick seemingly intractable problems.

The remaining two-thirds of the book is gathered under the collective title of 'The Past as Illuminator of the Future' and comprises eight essays arranged roughly according to the period they are discussing. This Part two of the book is a veritable cornucopia of outstanding essays. Each is of a length that it is easy to read and understand in a single sitting, but short enough that your mind does not wander. Each of the authors is clearly writing on subjects that they have studied in depth, and their enthusiasm and knowledge shine from the pages. While it would be legitimate to criticise Part One for overlap and repetition, there is no such danger in the broad sweep that is the majority of this book. Paul Rahe starts off by arguing that Thucydides, in his defining history of the Peloponnesian War, should be treated as an educator and that his book should teach, not just be read. Colin Gray continues with a robust defence of Clausewitz, contending that he is as relevant today and into the future as he has been in the past. John Gooch follows with an examination of history and the nature of strategy, suggesting that reading histories will not, in itself, offer insight, only by reading good histories and thinking deeply will this be achieved. There follow two vignettes looking at lessons to be learned, mainly from a maritime perspective, from the Royal Navy's transformation during the long era of peace it enjoyed throughout Queen Victoria's reign (by Andrew Gordon from the Joint Services Command and Staff College, drawing on his excellent book *'Rules of the Game'*), and a case-study of the Russo-Japanese War of 1904 (by Jonathon Bailey). Both argue that lessons can be learned by studying theseperiods and, by extrapolation, that the study of history aids us in identifying lessons more generally. The historic theme continues with Paul Harris' review of the resistance to change in the British Army between 1918 and 1939 (in stark contrast to the far more effective analysis by the Germans and their willingness to adapt, including copying some of the better ideas the British came up with). This chapter is particularly commendable for a very well balanced section headed 'The Reckoning' where he shows that there are two sides to every argument – a point some historians who write with the benefit of hindsight can forget. The book closes with two essays touching on very contemporary issues: Christopher Harmon asks what history suggests about terrorism and its future (and answers that it is very much here to stay); finally, Francis Hoffman looks at the history and then the future of civil-military relations.

It would be unfair to single out any one chapter as being better or weaker in this consistently excellent book. Best tackled by reading the Introduction and Part One in their

totality, Part Two lends itself to reading individual chapters. The book is thought-provoking and instructive throughout, well presented with a plethora of footnotes. Personally, I would have liked to have seen a concluding chapter by the two editors, drawing the work together, and a consolidated bibliography of the numerous works cited by the individual authors. The index too is perhaps a little sparse. However, these are common thoughts on books of this kind, essentially an anthology of the papers delivered to a conference, so perhaps I am being over-harsh. Although this book makes little more than occasional reference to air power, for anyone not yet convinced that they should read and study military history, this book will convince you. For those already convinced by the argument put forward in the book's title, this volume will offer new insights and afford new avenues of study that will amply reward the effort of reading. A first class book that I strongly recommend.

# Book Review

## Constant Vigilance

By Nigel W. M. Warwick

**Pen and Sword, Barnsley, 2007**

Reviewed by Sqn Ldr David Williams

*'…and with the dangers of infiltration ever present, the need is for constant vigilance.'*

**Operations Record Book, 1307 Wing HQ, RAF Regiment, South-East Asia, October 1945.**

*Constant Vigilance* concerns the RAF Regiment's operational history in South-East Asia Command (SEAC) drawing on the Operational Record Books, diaries and recollections of the men who fought in this forgotten theatre. It describes the humble beginnings of the RAF Regiment and how it became a specialist ground force capable of defending the critical air bridge into Burma. The success of SEAC, under the Supreme Command of Lord Mountbatten, featuring the 14th Army's General Slim and 3rd Tactical Air Force Commander Air Marshall Sir John Baldwin, was largely as a result ofthe most effective air/land co-operative effort ever seen. This could only have been achieved with the support of the RAF's transport, fighter and bomber squadrons and, without the RAF Regiment's diligence, tenacity, persistence and professionalism in the defence of these assets, the RAF would not have been able to operate from the forward bases so vital for the provision of close air and logistic support, reinforcement, aero-medical evacuation, as well as fighter cover and the interdiction of the enemy's supply lines.

At first sight, Nigel Warwick has an unusual background for a military historian. A university lecturer and qualified Doctor in Plant Biology he lives in New South Wales, Australia. Despite his profession, Warwick is in fact an ardent military historian and it was his late father's (ex-5th Grenadier Guards) interest in the Burma campaign that led him to the trail of the RAF's youngest fighting arm – the RAF Regiment. As the book's Forward suggests, Warwick's focus is not on Grand Strategy or High Command. Instead, he seeks to capture the atmosphere and attitudes of the men serving in the RAF Regiment in South East Asia at that time. The author manages to pack in an amazing amount of detail of unit dispositions, numbering and movements that gives his work enormous historical credibility and builds a detailed understanding of the RAF Regiment's development including the three major reorganisations that the Corps was subjected to. At the same time he has managed to maintain the overall strategic and operational context and, thus, it is easy to see where the RAF Regiment's contribution fitted in to the bigger picture. Warwick has also successfully incorporated the human element into his book

by placing carefully selected diary and interview accounts into the narrative, supported by an excellent collection of photographs, prints, maps and sketches. The sheer depth of research is impressive and it is hard to imagine that any relevant sources have been overlooked. Warwick's writing style is effective, but his particular skill is in his ability to weave his sources together into a compelling account of this part of the RAF Regiment's history. These accounts remain relevant to contemporary air and land operations, from the harsh environment and dangers of endemic disease and enemy action that the airmen and soldiers endured, through the sacrifices made to successfully prosecute the mission, to the critical close air and logistics support provided to land operations. Of course they differ in terms of the length of detachment; three years for married men and four years for those that were single.

The book's early chapters describe the formation of the RAF Regiment. Personnel selected to become members of this new Corps did not realise what an outstanding organisation it was to become in such a short period of time. Warwick tells of the boredom of early mustering and training, and the fact that RAF Regiment Gunners learnt morse-code in their spare time in the vain hope that such a skill would improve their chances of changing to another trade! However, these reluctant transferees and recruits rapidly began to bond, a process that led to an intense esprit de corps and 'jealous-like' pride in which the RAF Regiment Squadrons took in their own service. Many of these bonds were formed through the harsh working and living conditions endured and the rigorous training undertaken. For instance, in Chapter I, the RAF Regiment's first Depot assault course, at Secunderabad in India, is described in great detail. Considered the hardest in this particular theatre it was responsible for a significant number of casualties in its own right. Warwick manages to balance the severity of the situation with the humour that abounded, exemplified by anecdotes and stories such as how unarmed combat at the same Depot was called 'Karoti' because this was how the Geordie physical training instructor pronounced Karate! Anyone who has read any of Spike Milligan's classic WWII memoirs, 'Monty: His Part in My Victory' for instance, will recognise a similar, if more subtle, form of 'we're all in the same boat' British military humour.

The narrative builds to a crescendo in the middle of the book during the thrust for, and capture of, Meiktila and the subsequent defence of its airfield – the landing site for the critical air bridge activities sustaining the 14th Army's push to re-take Burma and the RAF's associated Close Air Support. The exploits of 1307 Wing and its four constituent Squadrons are remarkable even for the time. Commanded by Wing Commander Bill Lander, a larger than life character, the Wing were responsible for holding the airfield. As Warwick explains, however, this could not be done on a permanent basis as there were insufficient troops to occupy it at night so involved a daily fight to clear the Japanese from the strip and its surroundings in order to allow aircraft to take off and land – perhaps best described in a quote taken from

the book:

*'At each sunset the force withdrew to the protection of its barbed-wire Box; the Japanese, knowing the airfield was left undefended, stubbornly returned to it. With first light, an attack was put in to clear them out. As soon as the airfield was reported to be back in British hands, 17 Squadron flew in. Invariably they had to help in removing enemy corpses from the runway. The RAF Regt won bloody renown in the fierce fighting for repossession of the landing ground every humid morning.'*

**CO 17 (F) Squadron RAF, Squadron Leader 'Ginger' Lacey**

Lander was eventually killed leading his men into action to clear the airfield's operating surfaces. The situation was so dire it was four days before his body and that of his runner could be recovered.

The final two chapters of the book describe the RAF Regiment's involvement in peacekeeping and stabilisation throughout the region, including the recapture of Malaya and Singapore. In the penultimate chapter, Warwick describes a particularly touching moment during the signing of the Instrument of Surrender, by the Japanese, at the Municipal Building in Singapore. When Lord Mountbatten noticed that there was no RAF Regiment representative a request was sent out to the CO of 2896 Field Squadron for an airman to come in to witness the signing. Corporal W Vance, the smartest airman on parade, was sent in and captured on camera in the well-known official photograph of the signing. Such anecdotes are indicative of the high regard in which the RAF Regiment was held by senior commanders who recognised the contribution and sacrifices its members had made. The book concludes with the draw-down of forces and the mixed personal feelings of the men involved. It also describes the physical effects of years of fighting in such a harsh environment.

While reading *Constant Vigilance* several thoughts struck me. Firstly, what a challenge writing a first book like this must be – in this case the fruit of 10 years of research – and how successful the author had been in capturing this moment in history. Secondly, having attended the book release and met a few of the remaining SEAC veterans, it was significant how animated the contributors to the book were. The founding President of the RAF Regiment SEAC Association, Mr Henry Kirk MBE, and a former colleague were eventually cajoled into standing up and talking about their experiences displaying heartfelt warmth towards the author for finally telling their story. The list price of £25 seems insignificant when you consider the sacrifice that the cast of this amazing story made and the quality of Warwick's research and writing. Although particularly relevant to past and present serving members of the RAF Regiment, this record of events in South–East Asia displays the challenges, fledgling solutions and ingenuity of the period and will touch and inform civilians and servicemen and women of all three services alike.

# Viewpoint

By Sqn Ldr Andrew Wilson

*We did it to ourselves...*

I listened recently to a relatively senior officer bemoaning the fact that the RAF had seen significantly more cuts than the Army over recent years. He was right. In 2006, the "strength of the UK Regular Armed Forces has fallen by just over a third since 1990, with the Royal Air Force falling the most (46%) and the Army the least (30%)"[1]. He asked how this could be fair or appropriate, given the unique capabilities of air power and its vital role in the contemporary operating environment. My answer to him: we did it to ourselves.

While the Army has been steadily on message that they need more boots on the ground to meet the challenges of the contemporary operating environment and that the Regimental system was, if intangibly so, vital to *esprit de corps*, the RAF has been equally steadfast in its assertion that it can efficiently deliver increasingly decisive effect at increasing longer ranges in increasingly shorter [sic] periods of time, as long as we can access the appropriate technological solutions – technology underpinning our *e-spirit dot corps*. Faced with such assertions, why wouldn't our friends in the Treasury take us at our word? We did it to ourselves.

Underpinning these assertions of the salience of technological supremacy in modern warfare was the Revolution in Military Affairs (RMA), which was vigorously embraced by the US in the early 1990s and went on, many have argued, to define their – and the Western – way of warfare as the century turned. Incidents such as the killing of Al Zarqawi in June 2006 by an air strike, which saw aircraft on a surveillance mission re-rolled, re-fuelled and retasked while still in the air to deliver the 'decisive' strike, were held up by air power advocates[2] as examples of how air power exemplified the post-RMA, networked, innovative form of warfare that was the envy of the world and the future of conflict. But, biplanes over the trenches of WWI were able to conduct both of these missions – admittedly, and by any measure, not as well, but nonetheless they observed and they bombed. I see improvement in the use of air power, but little innovation and no revolution; 9/11 on the other hand... Moreover, faced with this new form of warfare, our adversaries decided to evolve themselves, their RMA creating what some term a fourth generation of warfare (4GW)[3], which removed our operational superiority by removing the operational level,

and saw years of research, and millions of pounds of investment, wiped out by a 14 year old in flip flops with a mobile phone, internet access and an axe to grind. Where is airpower's decisive effect in the face of these threats? We hit the target on time, at range and with immaculate precision, but in doing so miss the point entirely.

Perceiving air power as anything other than another tool of the trade of warfare – albeit a remarkably adaptable and capable tool – does it an injustice and has the potential to undermine its particular strengths and capabilities in the eyes of decision makers and our colleagues on the ground. Every man who has tried to use a knife instead of a screwdriver to fix a plug, a chair instead of a stepladder to reach the attic, or a conventionally orbatted and doctrined military to fight an insurgency, will know that even the best tools can lead to failure when applied to the wrong task. Advocating air power is one thing, but spinning its strengths, its potential and genuine contributions as something other than as a useful tool to be used as part of a broader, joined up operational/strategic plan is a dangerous fallacy; one that has the potential to undermine the hard won operational relevance air power has secured in its 100ish years. Just as economic sanctions became an 'attractive compromise between doing nothing and sending in the Marines'[4] and our 'statesmens' affection for [them] has not been matched by a similar interest in analysis'[5], there is a danger that air power advocates will see it deployed as a Blood and Treasure-lite option inappropriately and ineffectively as, some might argue, NATO did in Kosovo, and continued to do so in Afghanistan and Iraq[6].

Air power is a marvellous tool that brings a plethora of advantages for war fighters and policy makers, but its advocates must be cautious in their claims and must ensure that air power research and publications such as this, place air power in the broader context of war, strategy and international relations.

**Notes**

[1] Viewed relatively, these cuts are even greater. UK Defence Statistics 2006 – http://www.dasa.mod.uk/natstats/ukds/2006/c2/table27.html

[2] General Mosely, then head of the United States Air Force (USAF), used this example during CAS Air power Conference in summer 2006.

[3] There is much debate on the nature, relevance and, even, existence of 4GW, which is the subject of other research by the author.

[4] Haass R – *Sanctions – With Care* - Washington Post 27 July 1997

[5] Forland T – *The History of Economic War* - Journal of Peace Research Vol 30 No 2 1993.

[6] Yes, air power's contribution to the initial operational battles was impressive, even decisive, but not so in the broader strategic campaign, where the West, as a whole, has been unable to act decisively.

# Notes

# Notes

# Notes

# Notes

# Notes

# Notes

# Notes

ROYAL AIR FORCE

Centre for Air Power Studies

**www.airpowerstudies.co.uk**

**Concordia res parvae crescent**

*"Work together to accomplish more"*