BRITISH ARMY REVIEW

NUMBER 128 **WINTER 2001–02**

THE MAGAZINE OF BRITISH MILITARY THOUGHT

ARMY

British Army Review

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Autumn issue	31 May
Winter issue	31 August
Spring issue	31 December

Contributions for all sections of the magazine may be submitted at any time and will be included in the earliest issue possible.

Payment: The Editor regrets that no payment can be made for material published.

Contributions, Correspondence, and Contact. All contributions and correspondence should be addressed directly to the Editor, but readers are requested to direct telephone enquiries relating to distribution to the Administrative Officer. Detail:

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Cover: **Cockpit of Central Asia, graveyard of reputations**
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British Army Review No 128 is distributed as a General Staff Training Publication (AC74100–28) by:
Defence Supply & Distribution Centre, Mwrwg Road, Llangennech, LLANELLI , Carmarthenshire, SA14 8YP
Scale of issue as directed by Publications Branch DGD&D. Extra copies may be requested through the Admin Offr (see above). Individuals and organizations not entitled to free issue may obtain copies on prepayment by application to DSDC Llangennech. Supply under prepayment is subject to approval by the Editor on a case-by-case basis.

Designed and set in New Baskerville™ and Univers® by The British Army Review.
Printed in England under arrangements of Astron Document Services for MOD.

THE BRITISH ARMY REVIEW

NUMBER 128 WINTER 2001–02

We have all got a lot to learn and we have all got something which, out of our own experience and study, we can teach. This magazine is to enable us to share the results of that experience and that study.

From the Foreword to the first issue (as The British Army Journal), January 1949
by Field Marshal the Viscount Slim, Chief of the Imperial General Staff

Contents

Editorial

THIS EDITORIAL IS INEVITABLY DOMINATED BY THE events of 11 September 2001 and their aftermath. The enduring quality of the special relationship between the United States Armed Forces and our own has brought a particular poignancy to our view of the images of human suffering and devastation in New York and Washington. Shared experience with Americans on operations, training, exchanges and liaison, has developed so many personal links, with individuals as much as institutions, that the British military community can only feel that the violation extends to our own family.

In the military sense, the rules have changed. The form of the attacks on the United States brings a new dimension to warfare. There is a boundary, albeit ill-defined, between acts of terrorism and acts of war. Scale has a part in this; traditionally, terrorist organisations have operated within limits in order to limit the degree of outrage and response. Until now, this limit has been defined by Lockerbie, the Beirut barracks bombing, and the two US Embassy attacks attributed to al Qu'ida – with European terrorist organisations being more restrained.

Targetting is as important as scale. One feels that those who planned the 11 September attack were familiar with the Warden analysis of state targets, and had read their Clausewitz. This was an attack, not only on people or even institutions, but on the centre of gravity of a state.

The result is that the capacity to make war, real war, has moved down to small group level. The attackers have also given the lie to the theory that a mass effect attack needs to employ the traditional weapons of mass effect – chemical, biological, radiological or nuclear – which would have involved substantial investment both in acquisition and means of delivery. And one man's terrorist is another's asymmetric warrior.

The possibility of an attack of this nature has been a given for many years. The implications of a strategic-level strike by a no-target enemy, however, have been relegated to the too-difficult tray. It has been easier to develop theories for warfighting as understood in warfighting theory developing circles, while dealing with any real enemies by technical overmatch, as for Omdurman. Unfortunately we are now looking at the situation we predicted in the Editorial to Issue 116 of this magazine; a hundred years on, we may have found our new Boers – and if the current opposition is eliminated or neutralised, the example is still there.

* * *

WRITING TEN WEEKS AFTER THE ATTACKS ON THE WORLD Trade Centre and the Pentagon for distribution in January, one is forced to stay with generalities as to the progress of operations. There have been so many twists and turns of events since operations over, inside and around Afghanistan began that any prognostication is likely to make the prognosticator look stupid less than a week later. However, it is not at all impossible that by the time this edition is in the hands of troops, Osama bin Laden will be in custody – or no longer extant. Whether or not this has been achieved, it appears likely that the Afghan end of the al Qu'ida organisation will have eliminated as an effective force.

This does not, of course, mean that al Qu'ida as a whole will have been rendered ineffective – in fact, the quasi-state organisation existing in Afghanistan was irrelevant, or even detrimental, to the functioning of an international terrorist network. The September 11 operation was apparently mounted from a Western European base, and Western cities provide far more cover and better command and control facilities than do Central Asian caves. Defeat therefore, with or without the death or capture of Osama, might well be followed by a surge of terrorist activity, based on contingency plans already in place, and executed by a decentralised operational organisation. However, if there is no such surge, no spectacular, in fact nothing, or at most a Real IRA-scale bombing campaign, does the *'war on terrorism'*, with its associated emergency provisions, continue?

If there was any good feature of the September 11 attacks, it was that there was a visible and accessible target for retaliation. A future large-scale attack, probably exploiting another unanticipated asymmetry, might not offer the same opportunity. Equally, a low-level but extended bombing campaign would be even more difficult to counter than those of the IRA and associated groups, given the difficulties of penetrating an organisation having al Qu'ida's characteristics. In these circumstances, the opposition will be dictating how much or how little of the war we will have to take – the very opposite of the *'optional wars'* to which we have become accustomed over the last ten years. Christopher Bellamy pointed out some years back (in *Knights in White Armour*), that our society is already attuned to a certain level of endemic violence from criminal activity as well as terrorist action. If the scope of terrorist action in the future does not greatly exceed that which has already been experienced over the past thirty years, the population as a whole may accept a higher level of violence in day to day living in preference to an excessive level of doubtfully effective preventive security.

Meanwhile, in Afghanistan the classic pattern of tribal groupings at loggerheads is emerging. While

hoping for a workable solution to emerge, we hope even more that no one will attempt to ***impose*** a settlement. We have been here before – often: *'a man lies here, who tried to hurry the East'.*

* * *

TURNING TO MORE PAROCHIAL MATTERS, THE PERIOD since our last issue has seen the MOD going public on the rework of the SA80 system. The good news is that the A2 versions of the IW and LSW will be reliable, trustworthy weapons. The bad news is the extent of the rework which has proved necessary. Whatever spin may be put on the public face of the programme, it is apparent that the problems were not only down to manufacturing and quality control but to fundamental design defects.

However, the worst feature of the story has been the long-term denial by higher management that there has been anything seriously wrong with the system, in the face of user experience and dissatisfaction. In BAR 127, we published [redacted]'s critique of *'the easy speeches that comfort cruel men'.* The fighting power of British forces depends heavily on the moral component, which in turn derives from trust between the soldier on the ground and his leaders – and one of the responsibilities of command is to ensure that the commanded have the right tools for the job. Issuing misleading assurances to soldiers who are aware that their equipment is inadequate is a good way of eroding trust between leaders and led. The Editor has been down this road, being once upon a time armed with a Sten...

* * *

THIS ISSUE IS MORE HISTORY-HEAVY THAN MOST. MORE OF this in a moment, but we begin with two papers from the DGD&D stable setting out the Directorate-General view on the shape of warfare in 2015 and 2025 respectively. We stress that these are not presented as policy, *'these-things-shall-be'* material. The reason for publishing them here is to give readers their chance to have a go, to comment, and to develop ***and share*** their own ideas about this futurology.

[redacted] then demonstrates that the business of security engineering has developed from a somewhat hit and miss approach into an empirically-based structured planning process. This article is followed by two on the subject of urban warfare, both of which in their turn challenge current thinking. US Air Force Colonel [redacted] *'Urban Warfare: Balancing Our Approach'* first calls in question the received wisdom which has it that future conflict will take place largely in the cities, and goes on to challenge the accepted approach to the mechanics of urban warfare. This he assesses as a process involving large numbers of infantry soldiers fighting the *'three-block war'* in a conflict whose whole shape is determined by low-level tactics. [redacted] argues that the operational and even the strategic levels of war should receive greater consideration in the context of urban warfare – in particular in determining whether involvement is indeed necessary. At the tactical level he argues for a more all-arms and joint approach to the problems.

[redacted]s *'FIBUA: the Tactics of Mistake'* is a reprint of an article published in ADTN in 1994. Based on exercise experience in Berlin and elsewhere as well as a study of Russian methods and British Second World War experience, it advocates a more manoeuvre-based approach to both offence and defence in urban warfare. Exercise data indicates that this results in fewer casualties to the attacker. A further interesting statistic emerging is that the defence suffers many more casualties than does the attacker. The content remains entirely relevant to today's conditions; we hope that it may provoke more of a response than it did last time round.

Our final doctrine-based article is [redacted] application of mission command principles to the day to day problems of military life. Actually, the article is more about the application of the estimate process to everyday problems than of mission command per se. There is an atmosphere of panacea about this piece – and although he includes budgetary matters as a factor, he does not provide the methodology for making them go away.

The year 2001 marked the 100th anniversary of the Royal Navy's Submarine Service, and given that we were provided with a pithy article by Commander [redacted] it would have been downright churlish not to have included a reference to the event.

Military Law is a serious business, but going back to W S Gilbert and beyond, the Law in general has had its exploitable soft spots. Professor [redacted] charts the career of one 'Theodore Ende, who can properly be classed as the greatest barrack-room lawyer of all time. Not only did Ende frequently take on the War Office (and win) in several cases arising out of mistakes in court-martial procedures, but also took Arsenal Football Club eventually to the House of Lords over a matter of rateable values – and won.

It is encouraging to find junior officers with the time to write articles for BAR, and even better when they are of the quality of [redacted] piece on the moral component (all right, it was an essay competition winner but none the worse for that).

As mentioned above, we have more than a few pages devoted to historical articles in this issue. The first is [redacted] study of the manpower sucked into private armies of one sort or another in the Second World War, with particular reference to the

Chindits. The criticism is a fair one; the main problems with large-scale special forces in a major on-going war are the dilution of quality they produce in the main force, the fact that their time in action is usually limited, and that if misemployed in a general duties role they tend to have less combat power than their orthodox equivalents. The *'them and us'* syndrome is even more of a factor in operations in peace, when only people with funny-coloured hats are invited to do the shooting – Special ***Boat*** Service in ***Kabul***?

Lieutenant Colonel [redacted] ongoing saga of the 1939–40 BEF puts on another chapter with *'Keen as Mustard'*, his characteristically full and mightily researched study of the Force's offensive chemical capability. Present-day gassers are invited to note the massive levels of contamination which were routinely planned. Those boys did ***not*** mess about!

Finally, [redacted] explores one of the byways of history from the Seven Years' War. British amphibious operations have a mostly deservedly bad press down the years, usually for casual planning and slap-happy preparation (and that includes Suez 1956). The Descent on St Malo in 1758 was an exception as far as the preparation was concerned, although the operational planning was, well, nebulous. As it turned out, a well-found force was successfully embarked and transported to the French coast, put ashore with few problems, and a secure fortified camp established. The difficulty came in bringing the siege train to St Malo – the land route was unsuitable and it proved impossible to land the train close to the objective. As a result, following the destruction of the local shipping, the force retired without laying siege to St Malo itself, and re-embarked having achieved little. As a study in planning and command, this minor operation deserves interest.

A small Tilt-Yard this time; Spartacus commends the Syndromes from [redacted] *The Rules of the Game* to all with an interest in command and control, [redacted], resting from their labours on matters doctrinal and developable, have a go at the medals business, and that's it. In the correspondence section we would highlight a response from FM Lord Carver to [redacted] *'A Year Observing Command and Control'*, supportive of the principle of *'keep it small and simple'*.

And finally – the Editor has at last done some indexing.

The Bertrand Stewart Trust – Changes to the Essay Competition

The Bertrand Stewart Trust was established in 1922 to administer a bequest by the late Captain Bertrand Stewart, which was to fund a prize for

> *'the best article, paper or lecture on some military subject, the study or discussion of which will tend to increase the efficiency of the British Army as a fighting Force.'*

The format of a traditional essay was established as the vehicle for the Competition. As a result of the increasing emphasis on joint operations during and since the Second World War, the Trustees extended the scope of the Competition to include set questions on joint subjects. The marking panel includes representatives of all three Services.

For some time and for the last two years in particular, the future of the Competition has been causing concern to the Trustees. The quality of the 2000 essay entry was such that the judges were unable to agree collectively to recommend any individual as a prizewinner. The 2001 Competition has produced just two entries (one of which arrived three weeks after the closing date). These are particular instances of a general phenomenon – which is that the essay is a dying art form. It is also apparent that the form of the Competition, involving as it does set subjects, is an inhibiting factor.

The Trustees have therefore decided that from 2002 they will make a single cash award, the Bertrand Stewart Prize, for the article published in the British Army Review in each calendar year which best meets the criteria set out above, joint-related subject matter remaining eligible. The 2002 Competition will run from the Spring issue (BAR 129). To take account of the present volatile financial climate, the amount of the Prize will not be fixed for the time being, but it will be in the range £250 – £500, the intention being to keep it at the upper end of the range.

It is intended that the requirements governing the eligibility of articles for the Prize should be kept to a minimum, so as not to inhibit authors in approaching their chosen subjects, and to produce the largest possible pool of entries. Marking will continue to be carried out by a panel of judges following preselection of a short list of finalists by the Secretary to the Trustees.' Detail will be published in the Winter 2001-02 edition (No 16) of Army Doctrine and Training News), in the next issue of BAR, on the DGD&D website, or direct from the Editor BAR/ADTN.

OPERATIONS AND DOCTRINE

The 2015 Battlefield

By Brigadier C S Grant OBE
Director Land Warfare

Introduction

MUCH HAS BEEN WRITTEN ABOUT THE NATURE OF FUTURE warfare. The authors range from academics and scientists through to journalists and fiction writers. The product provides many valuable insights and alternatives into the future operating environment. However, in many cases they stop short of actually describing how we will fight on that battlefield. In order for the Directorate General Development and Doctrine to develop work on the Emerging and Future Army we need to take these many strands of work and distil and extrapolate them into a view of what they will mean for us. This article is drawn from the Directorate's work on the 2015 Battlefield.

One thing we can predict with some certainty (and there is not much certainty in prediction!) is that the Battlefield of 2015 will be different from that of today. However there will also be some elements that remain constant. The constants are as important as the changes and so this piece will not only illustrate what will be different but what we think will remain unchanged.

This article sets out a description of the future battlefield in 2015 from an Army perspective but it is set firmly in a joint context. To do this I will examines the future battlefield of 2015 under the following headings summarising the constants and changes at the end of each part.:

The Setting
The Future Battlespace
The Doctrine
The Battlespace – an analysis
- **Deep Operations**
- **Close Operations**
- **Rear Operations**

Command on the 2015 Battlefield

The Setting

THE GEOPOLITICAL ENVIRONMENT AND THE BATTLEFIELD in which the Army will operate in 2015 will be different from that of today. However, warfighting will remain the benchmark against which to train and prepare but Other Operations will be the most common form of commitment, and the Army will be structured for both. The requirement to engender fighting spirit and ethos will be enduring. These are the realities that we loose sight of at our peril.

In 2015, from the UK perspective, wars will increasingly be fought as a member of an alliance or ad hoc coalition. More will be done multi-nationally and the Army will have improved its technical

connectivity with our allies as well as developing a common doctrinal understanding to improve interoperability. Despite the trend to use armed forces in a far wider range of operations, warfighting will remain the ultimate test for military forces. We know all too well that some operations, initially non warfighting, may slide into warfighting as circumstances change. Indeed, warfighting and Other Operations may be conducted concurrently in the same theatre. Despite technological advances and new weapons the brutal nature of conflict will remain. It is likely that the desire to commit armed forces to conflicts, which may escalate to warfighting, will decrease. The decision to commit could be delayed. However, once committed there can be no alternative to victory. Equally, operations that start of as those of choice may become operations of national interest.

Adversaries

Future adversaries will be more diverse and unpredictable. They will mix conventional armoured capabilities with hybrid variations incorporating more sophisticated weapons upgrades such as defensive aides suites (DAS), surveillance and target acquisition capabilities. However they may equally include irregular forces, terrorists and militia. There can be no assumption that they will think as we do or be constrained by casualties, media perceptions, moral issues or international law. They will attempt to exploit as vulnerabilities our publicly espoused values. They may not respect the moral constraints placed by us upon the use of military force; for example land mines, lasers and chemical attack. We will need technological and doctrinal counters to protect our own forces against such attacks and retain the understanding and ability to use some of these means, for example mines, should circumstances change and success and the containment of casualty levels depend on it.

The Impact of Asymmetry

The reach of war in 2015 will go way beyond the clearly defined limits of the theatre of operations, as it is understood today. Asymmetric attack will become an increasing feature of warfighting. Asymmetry is of course not new and is about far more than terrorist attack. Enemies will make every attempt, unconstrained by the geographic limits of Joint Operational Area, and throughout the whole coalition or alliance, to inflict a wide range of attacks. They will focus on the strategic cohesion of the alliance or coalition and the operational centre of gravity. We must develop our own asymmetric capabilities to attack the enemy; be it in terms of information operations, command and control warfare or the use of special forces to attack enemy vulnerabilities and disrupt key elements of the their infrastructure.

The Joint Campaign

Operations in 2015 will be set within a joint campaign. The Land, Air and Maritime components will still exist but they will operate more closely together under the direction of the Joint Task Force Commander, according to a fully integrated campaign plan which synchronises all the lines of operations, including the non-military ones, as part of the campaign plan. This will only be made much easier by exploiting digital communications, bringing improved integrated operations and situational awareness. The Army Commander will increasingly draw on joint capabilities in designing his scheme of manoeuvre. Technology will be a key driver, and the availability and use of information will change the way the Army operates. The joint battlespace will be an increasing reality, where control by procedures has been changed to exploitation of opportunities. This will assist the Commander at each level to shape the battlefield and to take on the enemy on his terms. We must expect the more sophisticated enemy to launch similar challenges against our infrastructure, our C^3I and high value assets. The enemy will mount information operations to disrupt our own.

THE SETTING

THE CONSTANTS	THE CHANGES
• Warfighting remains the benchmark • Asymmetric attack • Fighting Spirit and Ethos	• Increasingly multinational • Future Adversaries with more diverse capabilities • Increasing moral and legal constraints • Joint and increasingly integrated • Availability and use of information will change the way the Army operates.

The Future Battlespace

THE FUTURE BATTLESPACE WILL BE MORE COMPLEX AND diverse than it is today. There could be many more players, from disparate organisations, many of whom will have a part to play. Connectivity with all of these will be more challenging. Closer liaison at the joint level, moving towards integration, where long range ground based and maritime systems, more unmanned aerial vehicles and conventional air will compete with each other for use of the battlespace. This is also true of multinationality where such links must be established with other armies and components to ensure greater interoperability. This will be particularly difficult when ad hoc coalitions of the willing are brought together.

A combination of improved communication systems, better strategic and operational intelligence and the desire to decisively project ones own forces over greater distances, will increase the volume of the battlespace significantly. The less dense battlefield, describing an area of operations which is relatively less densely populated with military forces, will be a part of the future battlespace. However, it will not be characterised by isolated force elements with large gaps between them: but rather the ability to disperse forces more widely while still massing effect. Where there are gaps to fill, they will be covered by manned and unmanned surveillance, reconnaissance capabilities and screening forces. While the future battlefield will not be the non linear chaos that some imagine: it will certainly be less-linear. However the importance of secure flanks, linking formations, logistic lines of supply and rear area security, will be as important military factors as they have always been. There will however be a premium on remaining dispersed and being able to mass effect rather than massing force. When forces are massed they will do so on their terms and with suitable force protection. To this end, air superiority will continue to be the key factor in enabling dominant and decisive land manoeuvre.

THE FUTURE BATTLESPACE

THE CONSTANTS	THE CHANGES
• Air superiority will be key to enabling decisive land manoeuvre	• A more complex and diverse battlespace
• Non-linear battlespace	• More players
	• Increased volume of the battlespace

The Doctrine

YOU WOULD EXPECT ME TO SAY SOMETHING ABOUT DOCtrine, and I will not disappoint. Manoeuvre and the Manoeuvrist Approach, rather than attrition and reaction, will remain the hallmarks of success. Although, as so eloquently expressed by Christopher Bellamy, operations will inevitably be a mix of both attrition and manoeuvre.[1] Digitised communications and integrated ISTAR will be the key influences in delivering high tempo. However, by 2015, while communications should enable a much clearer picture of one's own forces, full interoperability with allies, at least on the technical level, is most unlikely, especially in a diverse coalition. The more coalition partners involved the less likely this will be. Common doctrine and understanding will form the basis for interoperability.

Of course our Doctrine will have evolved; to remain relevant and to cover the nature of current and future conflicts it must do. The terminology used to describe operations in the battlespace may well also have changed. However, irrespective of future changes in terminology, the basic framework of deep operations, close operations and rear operations provides a relevant and well understood framework to describe the 2015 battlespace today. The doctrine for Air Manoeuvre will have developed and the capability to deliver it should be in place.

THE DOCTRINE

THE CONSTANTS	THE CHANGES
• The Manoeuvrist Approach	• Terminology
• Tempo as the key to success	• More emphasis on Capabilities that enhance Tempo
	• Greater interoperability through common doctrine

The Battlespace – An Analysis

USING THE CURRENTLY UNDERSTOOD TERMINOLOGY OF deep, close and rear operations I will describe the nature of each of these elements of the battlespace in 2015. However, the separation between the three will be less clear as each impacts and overlaps on the others. This may lead to changes in the description of the framework. However, within this construct, there will be an increased premium on the ability to defeat the enemy at arm's length. As technology delivers a new ability to manoeuvre simultaneously and decisively against an enemy, throughout the total battlespace, it will deliver an improved balance between operations in the tactical deep, close and rear. This will be achieved by focussing investment in deep attack systems with a consequent reduction in the relative resources committed to the close battle. This will be explained further as each element is developed.

Deep Operations

In this time frame the current hierarchical structure of Corps, Division, Brigade and Battlegroup will remain valid although the potency at each level will increase. Today in warfighting the lowest level at which deep operations are concurrently prosecuted with close and rear operations is division, but by 2015 this may be possible at brigade level. In 2015 the desire to achieve decisive effects with deep operations rather than simply using them to shape the battlefield for decisive close operations, will become the key objective. Deep operations will begin at the strategic and operational level, before the committal of the main forces. Deep operations will be the principal means to attack the enemy's will, cohesion and ability to sustain and regenerate his efforts. They will attack an enemy's centre of gravity - physically or psychologically. To do this they will use a mix of capabilities including media operations, information warfare, economic sanctions, diplomacy and the surgical use of special forces. At the operational level before and during the military campaign, deep operations will embrace all facets including psychological and information operations, offensive and defensive EW and the whole range of military activity. In the early stages of any warfighting campaign, there are likely to be serious legal and political constraints on the ability to apply the full spectrum of attacks to deep targets. The campaign plan must be sensitive to these but equally must be prepared to be robust when the payoff may involve a significant potential to reduce own casualties.

Once the forces are committed at the tactical level, deep operations, which are by no means synonymous with distance, will be delivered at significantly greater ranges and over a wider operational battle space and planned further out in time than previously. Long range precision artillery, Air Manoeuvre, EW and the contribution of both maritime and air, fixed wing and long range missiles, will deliver synchronised fire at ranges well beyond those expected today and out to perhaps 300 kilometres and more. These effects will be enabled by digitisation, ISTAR and situational awareness. The links from *'sensor to shooter'*, the latter perhaps more accurately described as *'exploiter'* (embracing capabilities other than fire), will continue to challenge the commanders who will strive to engage moving and fleeting targets.

Indirect attack is only one element of deep operations and is unlikely, on its own, to be decisive. The need to commit ground forces in deep manoeuvre in conjunction with indirect fire will remain. These may be committed to deep operations by the use of air manoeuvre supported by ground manoeuvre forces linking up with them to deliver decisive affect. Special forces will play a key part in these operations. The Air Manoeuvre element, usually operating at Corps or Land component level will be a key capability in enabling the Army to deliver operational impact. In order to deliver successful air manoeuvre operations at greater distances across the volume of battlespace, air manoeuvre formations will need to be increasingly self sufficient and have more of their own organic capabilities. These will include limited ground based mobility, indirect fire, SEAD and reconnaissance assets. A complex mix of ISTAR assets will be employed in informing and sequencing the operation. The ability to launch AH and support helicopters and sustain them at a distance will mean that some logistics will have to be tailored to meet the specific demands of air manoeuvre. For deep operations to be fully effective battle damage assessment will be a critical priority. All of this will make great demands on the various headquarters, planning these complex and integrated operations. There will be a balance to be struck between detailed planning time and retaining tempo.

DEEP OPERATIONS

THE CONSTANTS	THE CHANGES
• Corps, division, brigade and battlegroup hierarchy	• Increasingly Joint and integrated deep attack
• Attacking the enemy Centre of Gravity	• Increasingly decisive deep operations
• Need to commit ground forces in deep manoeuvre	• Greater reach
• Difficulty in the indirect engagement of moving targets	• Air Manoeuvre will deliver greater operational impact
	• More complex planning

The Close Operations

Despite the desire to defeat the enemy at arm's length close combat will be inevitable. On the one hand there will be close battle for those air manoeuvre and ground units deployed in deep operations. On the other hand, where decisive results are not achieved by deep operations, close operations will continue to play their part in decisive action. By 2015, close operations, particularly at the lower levels of brigade and battlegroup, are likely to retain many of the same constants we understand today. Successful manoeuvre will be achieved by finding and fixing the enemy and then applying decisive advantage both by a mix of indirect and direct fire. However, fixing may increasingly be a precursor to containing, isolating and neutralising rather than committing ground troops to an immediate assault. Forces must be structured to enable the commander to manoeuvre successfully in contact, provide a reserve and the capacity to exploit rapidly, thus achieving and retaining a tempo of operations superior to that of the enemy. At the lower tactical levels, where combat is conducted predominantly at line of sight distances, mutually supporting direct fire will remain a key requirement for success in both attack and defence.

Close operations will remain the most demanding of tasks. They are likely to become increasingly hazardous as technology delivers more lethal systems against the soldier and his platform and it will become more difficult for *'shooter'* systems and cuers to remain undetected. Within close operations it will frequently be the act of last resort to deploy large numbers of soldiers to close combat. But the requirement for close combat will not disappear just because of the hazards of conducting it. Close combat will remain a vital capability with which to take on the battle, particularly in complex terrain,[2] air assault and in an asymmetric environment, once other capabilities have exhausted what they can contribute. It will also be key for delivering specialist reconnaissance. It will continue to make the greatest demands on the individual and the team. The brutal nature of close combat will be enduring but the trend will be to make close combat less close. While developments will never completely negate the need to close with the enemy, the aim will increasingly be to locate the enemy, neutralise his capabilities and break his morale and courage to fight, while at a distance. In this way he will give up and can be isolated, fixed and bypassed. To reduce the inherent risks in close combat both soldiers and their platforms will fight in a more dispersed manner and those in the close combat zone will be increasingly individually more capable.

So what does this mean at the sharp end? Well, to meet these diverse needs, the character of the combat and combat support arms will evolve in warfighting:

- The infantry will be characterised by more capable, FIST[3] equipped soldiers, more highly trained and more capable of independent action than today. The individual weapon will increasingly be a weapon of last resort rather than first choice. They will still fight in and from Warrior, albeit more capable, but in a much more focused way as situational awareness, digital communications and their integration with other arms improves. They will be capable of not only line of sight (LOS) but non line of sight (NLOS) engagement in an extending zone of close battle. Once dismounted they will continue to have crew served weapon systems capable of reaching out beyond line of sight, maximising the battlefield awareness provided by digitisation. In urban combat the infantry will need new capabilities[4] to prevent loss of tempo and high casualties.

- Armoured platforms will operate in a more dispersed manner and will deliver shock action through precision direct fire, particularly against platforms and static targets, rather than massing for intimate support. Despite the proliferation of unmanned sensors and UAVs, manned reconnaissance will continue to be one of the most important and demanding aspects of the close battle.

- Close support artillery will continue to provide a range of versatile indirect fire systems with improved precision, effects and reach. They will still provide massed effect, but from increasingly greater ranges and with better reach enabling engagement from dispersed locations. There will be less requirement for dedicated indirect fire observers as digitisation will increasingly enable every soldier in the close battle to call for and bring down fire. However, artillery specialists will still provide the fire support co-ordination cells providing guidance and co-ordination of single service and joint and multinational capabilities to the commander. They will determine and task the appropriate means, not only ground based but air and maritime, to deliver synchronised engagement from dispersed locations.

- Provision for mobility and counter mobility, still resting with the Sappers, will also require a greater degree of autonomy for the reduced number of other arms platforms in the close combat zone. Their support to battlefield mobility will remain an imperative; the ability to have a clearer view of the battlefield and to be

able to work around, rather than through, obstacles may enable some elements of battlefield engineering to be devoted to other tasks. Increasingly *'clever'* ways will be sought to enhance mobility and provide counter-mobility.

- The use of the attack helicopter must not be overlooked in the close battle. While the use of air assault formations will primarily be for air manoeuvre the capability of AH in close support will make an important contribution.

All deployed forces who find themselves in the contact battle – not just infantry – will require increased training in both defence and limited offensive action as part of their core skills.

Air Manoeuvre forces will have to combine all the above characteristics in order to capitalise on their reach and ability to act decisively once deployed. In addition to information from higher levels, they will synchronise the cueing skills of specialist recce, the capabilities of the attack helicopter and UAV to provide real time information to fight the close battle. The mobility of the ground based elements once inserted will be a critical factor in achieving tempo. Timely indirect fire, particularly given their own limited firepower, will be an integral part of their operation.

The logistic footprint will be optimised to enable the tempo of the close battle. CSS organic to the Battlegroup will be tailored to the predicted nature of the battle using the principle of mission sustainment. It will be more agile with improved survivability as a result of better protection and situational awareness. Medical and equipment support will be carried out as close to the point of injury or damage as possible. CSS will be modular, equipped and capable of providing support across the formation. That which is not critical to the immediate battle will be grouped at formation level. C^4I will provide global visibility of material and situational awareness. The increasing use of embedded diagnostics will enable the development of prognostic systems and the move towards pre-emptive maintenance. These will allow assets to be directed and focused to meet the formation commander's priorities.

None of these changes must mitigate the ultimate need to retain ability for close quarter fighting – but it will be on our terms rather than our enemies'.

CLOSE OPERATIONS

THE CONSTANTS

- Close combat will be inevitable
- The most demanding task
- Find, Fix and Strike.
- Forces structured to achieve tempo will need elements to Fix, Strike (or contain) exploit and with a reserve.
- Mutual support with direct fire elements

THE CHANGES

- Increasing alternatives to Striking including isolation and neutralisation.
- Increasing range and volume of the close combat zone
- More difficult to conceal both sensor and shooter
- Changes in the way the Combat Arms fight:
  - More capable infantry
  - Armoured effect from more dispersed locations
  - Artillery – less requirement for dedicated indirect fire observers but increasing joint effects
  - Engineers – greater degree of autonomy
  - Greater Aviation contribution to close battle
- More emphasis on Air Manoeuvre Close Battle

Rear Operations

The importance of rear operations will increase rather than diminish. By 2015 rear operations will be a fundamental part of the campaign, integrated in every way into the planning of all operations. The need for the commander to maintain his freedom to manoeuvre and to support and sustain operations while preserving his force will be increasingly important. It will require increasing numbers of forces, some specifically designed for rear operations. The core of these forces will come

from the forces that have the widest utility throughout the spectrum of conflict, increasingly becoming known as medium forces. They will conduct a wide range of tasks providing a framework of security. There will be insufficient troops to cover all the likely tasks and the approach must be flexible, mobile and intelligence focussed rather than static and reactive. There will be the requirement for other capabilities. Rear operations will require integrated air defence, both ground-based and from the air, to defend against cruise missiles and UAVs. The threat from theatre ballistic missiles must be countered. NBC, particularly given an enemy who is likely to use chemical and biological warfare in asymmetric attacks, will be of increasing importance and proper NBC recce detection and decontamination will be essential. Engineers will be in greater demand to create and maintain routes, clear obstacles, improve defences, carry out EOD tasks and maintain the infrastructure. Rear operations will have to co-ordinate and contend with a host of distractions, even while warfighting, such as refugees, aid agencies and the Media. Here the realities of contractor support to operations may become a liability to the commander.

Sustaining the force, already described in close operations, will be significantly enabled by digital technology. A more focussed logistic support system, which can monitor and predict requirements will bring logistics to where they are needed, rather than when they are asked for. Such a precise logistic system brings its own vulnerabilities and will still necessitate a degree of redundancy. The requirement to minimise the logistic footprint will mean that supplies will through run from their in-theatre point of arrival, through the rear areas to the manoeuvre formations. There will be a greater degree of multinational logistic support than is the case today. While this essay deals principally with the in-theatre battlespace, this vulnerability will have implications all the way back to the national supply line.

Command On The 2015 Battlefield

FINALLY, LET ME TURN TO THE BUSINESS OF COMMAND. By 2015 the improvements in C2 and ISTAR will have delivered secure communications, situational awareness and a range of applications to transmit orders, co-ordinated firepower and changes of plan are in place. There will be a better understanding of the commander's intent throughout the force. Taken together all the developments will enable the rapid development of plans, their speedy translation into action, and their adaptation to changing circumstances.

What will not have changed is the historical roles of the commander. The need for leadership, clear decision-making and decisiveness will be undiminished. However, some of the necessary attributes will have changed. The enormous inflow of information will mean that the commander will no longer be able to know and have visibility of all the available information (if indeed he currently does) on the battlefield. He will have to make clear his key information requirements and have the discipline to fight the battle at his level without succumbing to the temptation to directly control his subordinates. Intellectually, the commander's biggest personal challenge will be to operate at a tempo (absorbing information, divining the enemy's intent, deciding and issuing orders) that will deliver success while not completely exhausting himself and his staff.

A hierarchical command structure will still be needed to deliver unity of effort across the force, but a great ability to transmit the commander's intent should allow Mission Command to flourish at all levels. Commanders will need to resist the temptation to over-direct their subordinates or become involved in decision making that properly belongs to lower levels of command. Technology will enable the rapid information flow throughout the chain of command. In order to achieve the high tempo of the flat information structure, and not be swamped by detail, commanders will be ruthless in setting out their critical information requirements and their staff will have to

REAR OPERATIONS

THE CONSTANTS	THE CHANGES
• A fundamental part of the campaign • Wide range of tasks providing a framework of security • Maintain freedom to manoeuvre, support and sustain operations while preserving force	• A greater need for more capable medium forces • Better defence against theatre ballistic missiles and UAVs. • Increased NBC requirements • Smaller logistic footprint

apply a rigorous information management discipline. The electromagnetic spectrum will have to be exploited on a joint basis.

At the highest level, the synthesis of strategic and operational level ISTAR will enable the commander of the future to plan further ahead and with greater clarity. Transmission of his orders and intent and the updating and changing of plans will be delivered far more rapidly than is currently the case. However good the alliance or coalition situational awareness of its own forces, the integration of all ISTAR assets to produce a near real time picture of the enemy will still be an aspiration. A considerable amount of physical ISTAR processing and interpretation will still need to be done in each headquarters not only to determine the who and where, but also the what; that is the enemy intent. This will be geared to supporting the commander's need to get inside the enemies' decision/action cycle and set the tempo of operations. The battlespace will, in a sense become increasingly transparent with commanders having much greater visibility of their own and enemy forces. Nevertheless, there will be a premium on commanders exercising judgement and decision making based on both information and experience.[5]

There is no indication at present that the headquarters of 2015 will be significantly smaller than it is today. Indeed with the need to conduct 24 hour/7 day operations without detriment to tempo, the staff may increase in numbers. There are however two aspects that may have come into play. The first is the increasing ability of the commander to remove non-essential elements of his headquarters and remote them back to the rear area or perhaps further to the home base without prejudice to the supply of information or other functions that they provide. *'Reachback'* also provides the commander with the ability to access a wide range of powerful additional, home-based capabilities, for ex-ample, courses of action analysis. Secondly, the commander himself may be increasingly able to remove himself from the mass of his headquarters, to move forward and directly influence the battle as technology will deliver to him the information he requires to make decisions wherever he is. The headquarters and the command structure will be more focused on the needs of the commander and traditional staff structures may have been replaced by an effects-based or functional approach more attuned to delivering integratedoperations throughout the battlespace. The headquarters itself may be more modular in structure with some core warfighting elements and other additional modules[6] to meet specific operational requirements.

It is likely that from the Division upwards the commander will be dealing with components from other nations. These will bring their own problems in terms of interoperability, varying standards, doctrine and political direction. While Mission Command will remain fundamental to the British way of command there will be other coalition partners with quite different command philosophies. Nor will the commander be able to concentrate exclusively on operations as increasing real time national and political pressures, enabled by improved communications, will inevitably cause him to look backwards as well as forwards.

COMMAND

THE CONSTANTS	THE CHANGES
• Historical roles of the commander will not have changed • Hierarchical command structure	• New Secure communications, better situational awareness and a range of applications to transmit orders, co-ordinated firepower and changes of plan • More Focus on *critical* information • Different HQ and staff structures • Non essential elements of HQ remoted back to the rear area or the home base • Increased personal challenge to operate at a tempo that will deliver success while not completely exhausting the commander and his staff. • Battlespace will be increasingly transparent

Endpiece

WELL, IS THIS A REASONABLE VIEW OF THE 2015 BATTLEfield? Only time will tell; but DGD&D does not have a monopoly on the view of future warfare and if you have a view, complementary or counter to what has appeared above let us hear bout it – either by writing direct or through the pages of this journal.

NOTES

1 Christopher Bellamy, In Praise of Attrition, inaugural lecture as Professor of Military Science and Doctrine, Cranfield University, 14 June 2001.
2 Urban, jungle and forest and mountain.
3 FIST - Future Integrated Soldier Technology.
4 Bunker busters, fuel-air missiles and micro-UAVs.
5 This can be likened to the analogy of a poker player and a chess player. The former (the current commander), with limited information based on a knowledge of his own forces and some deductions on the others must rely on a degree of chance. The chess player (tomorrow's commander) sees all his own forces and (most of) those of his enemy, but not the intent. This will not guarantee success. He must deduce intent and use his skill and experience to defeat the enemy.
6 For example Air Manoeuvre, CIMIC, Rear Operations Command and humanitarian tasks.

One of the privileges of being the Editor is to have first bite at the cherry when it comes to commenting, as DLW invites us all to do.

We don't find ourselves in dispute with DLW over the picture of the 2015 battlefield, being very taken with the implication that wars may well be 'more intense View 2' in nature. We do differ on one fundamental concern, affecting our whole approach to warfighting.

There is a dichotomy at the root of the doctrinal thinking embodied in this article. On the one hand, mission command emphasises the principle that to overcome the chaos of the battlefield, commanders at all levels must be prepared to operate autonomously, frequently out of touch with their superiors. On the other, the fighting methods described here are totally dependent on the availability of communications – not just voice radio but high capacity data networks. The more the principles of the current revolution in military affairs are applied, the more critical this dependency. Regular readers of BAR will by now be familiar with Carbuncle's Eleventh Principle of War: 'every dependency brings with it a related vulnerability'. It may fairly be argued that the centre of gravity of future forces operating according to the Western paradigm will be their reliance on high-grade communications. A comparison of the articles 'Digital Storm' in BAR 116 and 'Digital Dardanelles', in BAR 117 illustrates the up- and downsides of this dependency. Our CIS will be a high priority, high payoff target, particularly vulnerable to an adversary less dependent on high-end systems (he will, however, be likely to safeguard the local mobile phone network; this offers a possible reversionary mode for ourselves).

I am concerned that in striving to maximise the performance of CIS, survivability may be considered a secondary requirement. Users accustomed to the performance offered by COTS equipment in a benign environment may not be satisfied with what can be achieved with hardened systems. And dependency on data streams places a high price on error (operator/system induced or enemy inserted) detection and correction – as anyone who has ever typed a wrong character in an email address will know. If it's an artillery fire mission...

If vulnerability of communications is taken into account as a major factor in force design, some very different parameters come into effect. Such principles as unity of command, decentralisation of support weapons, and a greater reliance on direct fire, come into their own. This tends to produce organisations and command structures similar to those in the WWII German Army – with a heavy emphasis on autonomy and capability at the BG level of command (we don't seem to hear much about unity of command these days, but it was a significant factor in the tempo of German operations in both World Wars). It also tends to run against the whole thrust of DLW's article. This mismatch suggests that the future shape of the Army ought to be determined by the extent to which the next generation of CIS can be trusted to perform its missions in a threat environment.

We would challenge DLW's assumption that the current structure of the command chain should remain unchanged in 2015. Even if every level remains in place, we think that there is mileage in the idea that some levels of command are more 'important' than others; that some should provide a full battle management and service support capability while others are there only for the leadership, as opposed to the management, aspects of command. As an illustration, corps HQ in the WWII US Army did not have a logistic function; the link was army – division (this is not to advocate that this was necessarily a good thing). However, I cannot escape the feeling that there is one level of command too many between fireteam and corps – particularly if the IT can be relied upon to work. It has been pointed out that to eliminate a level of command would play hell with the MS system, so the idea is probably a non-starter – for the worst of reasons.

Nevertheless, we believe that there is a clear and present need for a 'how we fight' review going from bottom – the individual rifleman – to top. The reviews of the last 15 years have all been top-down in their approach – probably because senior civil servants find it difficult to comprehend anything that happens below brigade level...

An Army For 2025+

[redacted]

"Predicting the future course of military events is a risky business."[1]

Over the last two years several key papers that determine the way in which the Army should develop have been written and endorsed by ECAB. The Future Army Concept Paper defined the Ends – those concepts and capabilities required of an Army in the 2025 timeframe. The Force Development Options Paper and Strategy for the Army then defined the Ways – the options for attaining those Ends in the long (2010-2020) and the medium term (2005-2012) respectively. This article pulls all three papers together, within the context of Defence thinking, in order to describe the characteristics of an Army for 2025+.

While any look at the future – particularly one based a quarter of a century ahead – is fraught with dangers and must be speculative, this article has drawn heavily on current endorsed work and has sought to define an end-state for the Army. It has tried to explain, in broad terms, what the Army could look like in 2025+ should all those ideas espoused in the present set of strategic Army papers be developed. Clearly things will change as the strategic and domestic environment shift and Defence moves to stay in step. Nonetheless, it is important that we have a view of where we are going and this article provides that outlook.

Assumptions

Any discussion of the future has to be based on a set of assumptions – tenets that we think will endure and will continue to play a key role in the shaping of the Army. If these assumptions change, then we shall probably have to address Question 4 and this may result in a shift in the way that the Army will conduct its business. The key assumptions for our Army of 2025+ are:

- Promotion of UK security interests within the framework of NATO/EU Defence, as both evolve, will remain the bedrock of UK policy.[2] The US, however, will be the only nation capable of providing the framework for major, high intensity coalition warfighting operations,[3] although UK and France could provide a European framework for warfighting operations that are more limited in scope and scale.[4]

- The Army will remain a mix of volunteer full-time and part-time professionals.[5]

- The intent for the UK to play a leading role in promoting international stability through the provision of forces with a high degree of military effectiveness in multi-national expeditionary operations will remain extant.[6] For warfighting operations, the UK would be acting as a leader or member of a coalition or alliance force.[7]

- Joint thinking, and the essentials of the Manoeuvrist Approach to operations (including Mission Command) will remain the foundation of British Defence/land component doctrine.[8]

- The Army is increasingly based in UK, except for operations and garrisons.

- The main Defence Planning Assumptions will be broadly similar, and a form of harmony guidelines will remain in place.[9]

- A formation readiness cycle, underpinned by the principle of graduated readiness, will remain the mechanism for delivering the required land component of the Joint Rapid Reaction Force,[10] and for other deployed operations.

- The continued importance of UK retaining framework nation status of the ARRC.[11]

- For as long as the prospect of substantial public order policing demands on the scale seen at Drumcree in recent years, the Army should retain the capacity to provide support for the police [in Northern Ireland] in meeting those demands.[12, 13]

Resources

In developing the Army for 2025+, it is prudent to plan on the basis that resources will remain broadly at current levels. Where resource constraints force a choice, it is endorsed Army guidance[14] that the emphasis should be on delivering a coherent, sustainable and balanced capability (generate, deploy, operate), rather than absolute numbers of weapon platforms. Furthermore, that investing in ability should be valued above investment in numbers of platforms, people or stocks, and that any shortfalls in manpower which are necessary should be taken in the area most easily and quickly replaced. Finally, that it will be important to maintain an appropriate level of investment in physical infrastructure, in particular Married Quarters and Single Living Accommodation. However, if Defence Planning Assumptions change or other circumstances dictate, this guidance would have to be reviewed.

The Strategic Environment

There is no identifiable threat to the fundamental security of the UK[15] within this timeframe. It is, however, difficult to predict potential future opponents with any degree of certainty. They are likely to differ widely not only in size, capability and sophistication, but also in perceptions, values and motivation. Potential adversaries will, to a varying degree, transform from industrial-age to information-age forces, and many information-age technologies (particularly commercially available off-the-shelf) will be available to all. Whilst the UK will aspire to achieve technological superiority or at least parity, this will not always be possible: in certain areas, potential opponents may be able to achieve technological overmatch either on a local basis or more widely. Opponents will also attempt to exploit asymmetric opportunities to undermine technological superiority. Asymmetric threats may focus, inter alia, on alliance/coalition cohesion, sensitivity to casualties, cultural issues, legitimacy, and rules of engagement. These threats will apply throughout the battlespace. The use of complex or urban terrain to negate technological advantage is also likely to increase. There remains, in addition, the longer-term possibility of a major discontinuity – a fundamental change in the security environment – that may require the Army to expand or adapt in size or capability beyond that currently envisaged by Defence Planning Assumptions (DPAs). The difficulty in forecasting potential future opponents or discontinuity re-emphasises the need to retain a resilient and flexible force structure to deal with the unexpected.

Operations

In 2025+, the Future Army will be capable of Alliance/coalition warfighting, with an emphasis on rapid expeditionary force projection for high intensity operations. Using those forces/capabilities designed for the above, the Future Army will also be capable of national-only warfighting and Other Operations.[16] It will be more strategically deployable, more tactically mobile, and designed to use the same force pool to deliver rapid effect, warfighting, and Other Operations.[17] All of our planned key equipments will be in-service: TRACER, UAVs, ASTOR, LIMAWS, COBRA, Apache AH-1 etc, all linked together by BOWMAN and its associated information systems. Some of the above will be approaching mid-life update or replacement – providing the opportunity to harness the technological advances that should be available by then. Digitization will be broadly complete, allowing significant connectivity with other joint and multi-national headquarters and forces. Digitization will support the philosophy of Mission Command. Weapon platforms will be smaller and lighter, and the legacy systems of 2000 (Warrior, AS90 and CR2) will no longer be in-service. While it will have broad utility and versatility to undertake all operations required of it by the Government,[18] the first task for the land component will remain the ability to contribute to success at warfighting at up to what is currently termed, Large Scale.[19]

The need to achieve tempo will drive the requirement for smaller, leaner, more lethal warfighting forces in which advances in logistics, C2, ISTAR and long range precision engagement will be highly significant.[20] A combination of smaller forces, increasingly capable sensors and long range precision attack are likely to further increase the trend towards dispersion; this will be exploited in order to avoid detection and hence increase protection. The balance of effort allocated to Close operations is likely to become less, as technology should allow for fighting more remotely and over longer ranges. However, the need to conduct aggressive close combat is enduring, especially in the most demanding, yet probable, environment for conflict – urban areas – and consequently, ground forces will be of sufficient mass to provide both the endurance and presence required for such tasks.[21] Deployability will become a key criterion for equipment design.

Force Structure

The Army in 2025+ will be based around Ground Manoeuvre, Air Manoeuvre, Firepower, Find, Command Capabilities including the requirements

for Sustainability, Force Preparation, Protection, and Deployment and Recovery.[22] Technology may allow an evolution of our light and heavy forces toward common equipment with a wide range of skills[23] and at least as capable as our current heavy forces. Every individual TA soldier (and where possible formed TA units) will have a clear and defined mobilised role within the Army orbat;[24] some discrete capabilities will still, however, be supplied by the TA. Directed mobilisation would allow their wide utility, especially for Other Operations. The Principle of Four still applies, although technology, once in-service and proven, is likely to enable brigades and divisions to be structured differently with a shift in the balance between direct fire, and firepower and enablers; this should improve tempo. ISTAR assets and long range precision firepower could be grouped to create synergy and improve responsiveness. The structure of the deployable Army[25] will be based on pools of capability: ground and air manoeuvre formations with the latter, along with corps troops, providing the deep operations capability for HQ ARRC, as well as contributing to theatre entry. All formations will be able to conduct operations throughout the spectrum of conflict, and may need to be able to take NATO/EU forces under command.[26] Modularity in the structure and its ability to adapt to the differing demands of NATO, EU, ad hoc coalitions and national operations will be important.

Force Preparation

People. People will remain fundamental to the Army's operational effectiveness; the Army will remain heavily people-focused, and will continue to place a very high priority on full manning. High quality individuals, all of whom have long term potential, will man the Army.[27] The Army will be mostly UK-based with more units and training establishments located close to areas in the Midlands and in the North, from which the Army recruits significant numbers, but will also build on the investment and strong community links that exist in other garrisons.[28] This would provide a stable family base for married and long term partnered soldiers and should also allow similar stability for single soldiers who choose this option. Some overseas garrisons will still exist. This garrison commitment is likely to be managed by a combination of *'mulement'* (both individual and unit) and by longer-term based personnel, some accompanied.[29] A degree of personal choice will be available – including tour length. Although there will be specialists, soldiers will become more multi-skilled[30] to reflect the complex expertise required for the 2025+ battlespace. The warfighting ethos must be retained and there will have been heavy investment in *'fighting clever'* through deeper education of leaders at all levels; and the culture of individualism in leadership, initiative and self-confidence within the philosophy of Mission Command will still be encouraged.[31]

Training

Combined Arms training will remain the main driver in the preparation for operations.[32] made easier by the weight reduction of new weapon platforms. WFM is likely to achieve increased availability of the operational fleet. Fleet rationalisation will become key: the imperatives of economies of scale together with continued pressure on the equipment budget will drive us to rationalise equipment holdings and vehicle fleets, and equipment and vehicles generally will become more multi-role with utility throughout the Spectrum of Conflict. Simulation, used for mission rehearsal and low level training, will improve readiness, and all barracks should have computer-based tactical trainers.

Sustainability

Directed logistics will result in a leaner system, thereby reducing the deployed footprint of our forces. This will be achieved by commonality of components, total asset visibility, prioritisation, and a flexible and a responsive transport system.[33] Vehicle System Integration and embedded diagnostics will lead to improved system health monitoring. When combined with prognostic systems, they will enable pre-emptive maintenance and lead to better mission sustainment. Improvements to logistic C4I should result in a more modular approach, based on easily interchangeable units and sub-units that can readily be re-grouped with minimal disruption.[34] Contractor support and commercial solutions could be in place to relieve scarce Army resources in the more benign environments.[35]

Summary

This article has placed a stake firmly in the sand at 2025+ and described what our Army of the future might look like. It is a necessarily speculative view, it has to be – nobody can predict the future (and if they could, would they please let me have the six numbers for next Saturday's draw) – but informed speculation has to be an important part of both Defence's and the Army's planning process. Our equipment is designed to last for 30+ years in most cases, and our estate is certainly planned in similar chunks, and therefore we have to try and identify the types of environment and operation in which we may become involved in a similar timeframe. Designing future equipment to fight the last war is not a credible option. The secret of success is not predicting the future; it is in creating an organisation that will thrive in a future that cannot be predicted, and that is the ultimate goal to which we should all be working.

This is, of course, not the entire picture. The article has not, for example, outlined the possible structures for the Army of 2025+. This work is ongoing. The topic was discussed at CGS's Future Army Study Period held at Warminster just before Easter, and will result in a paper that provides structural options for 2025 to ECAB later in the year. These structural options will be explained in a subsequent article for this journal.

NOTES

1 *Defence Strategic Plan 2000* (hereinafter *DSP 2000*); Enclosure 1, "The Strategic Context 2000"; p 56.
2 *The Future Army Concept Paper* (hereinafter *FACP*), D/VCDS/18/1 2nd PUS/7/6 (140/00) dated 23 Feb 00; para 7
3 *Strategy for the Army* (hereinafter *SFA*), AB/P(00)4 dated 1 Nov 00; para 3b
4 *The Future Strategic Context for Defence*, MODWEB 7 Feb 01; para 78.
5 *FACP*, para 7.
6 *Ibid.*
7 *SFA*, para 3c
8 Fn 5, *ibid.*
9 See *DSP 2000*, Annex B
10 *SFA*, para 4b
11 *Ibid*, paragraph 4c
12 *The Report of the Independent Commission on Policing in Northern Ireland* (The Patten Report); paragraph 8.12
13 *DSP 2000* para 4.15. Any reduction in manpower or infrastructure should, in the first instance, be exploited to increase the robustness of the force structure to cope with the stresses generated by certain patterns of concurrent operations, and provide resources for additional capabilities
14 See *SFA*, para 6g
15 *Strategic Context Paper* D/PUS/11/3/1(930) dated 24 Jul 00; draft minute to the PM
16 *FACP*, para 10
17 *Towards the Future Army – The Options for the Development of the British Army 2010–2020* (hereinafter *TFA*), ECAB/P(00)16 dated 19 Dec 00; para 21
18 See *DSP 2000*, para 3.7
19 *TFA*, para 8c
20 See *DSP 2000* para 4.10
21 See *TFA*, para 18
22 *FACP*, paras 24-32; see also *TFA*, para 21
23 See *TFA*, para 21
24 *Ibid*, para 20
25 The make up of these structures will be informed by the Future Army Structures Study, a series of OA packages that reported in Feb and Mar 01. The conclusions from this study were used at CGS's Future Army Study Period (FASP) where the topic for debate was 'Future Army Structures in the Digitized era – 2015+'. Over the coming months, the product from the FASP and the OA work will be corralled into an ECAB paper, delivered in its final form in Nov 01, that will outline structural options for the Army in 2015+.
26 *TFA*, Enclosures 1–4.
27 *Ibid*, para 24b.
28 *SFA*, para 7g
29 *DSP 2000* para 4.14 states that where possible we should use our strategic lift assets to demonstrate our capability to reinforce our remaining garrisons rapidly
30 *DSP 2000* para 4.22
31 *TFA*, para 24b
32 *Ibid*, para 30.
33 *Ibid*, para 32.
34 *Ibid*, para 33.
35 *Ibid*, para 34.

(Editorial comment on the previous article largely applies to this as well.

What concerns us is that neither piece takes into account the 'tacticisation of strategy' – the fact that what you can achieve at the highest level is determined by 'the sordid details of the actual man-to man struggles which so often made manoeuvre possible' (Kirke Report, BAR Special Edition April 2001, p 82). Putting it more politely, operational and higher level doctrine stands on the shoulders of tactical, not the other way about. It is significant that the new key systems quoted above (paragraph 'Operations', p 11), as fully in service in 2025 are all either Find related or stand-off. The legacy systems for the close battle will have passed away – but there is no mention of what will replace them. Son of FRES?

There is a very real problem here – that the requirements of high-end warfighting on the 'Western paradigm', in decreasing the emphasis on close operations, are drawing resources away from the kind of forces which are of the most use in Other Operations. And the likelihood is that Other Operations will still be providing the bulk of the Army's real commitments in either the 2015 or 2025 timeframes.

What we are seeing here is a smaller scale reflection within the Army of the current tri-Service situation, where a large proportion of the spending on the Royal Navy and the RAF is irrelevant to the demands of today's real operations – which actually call for more RFAs and trash haulers!

We applaud the sentiments expressed at the foot of the left hand column on p 11 – that there may be some discontinuity resulting in a major change to the threat picture. We suspect that 2020–30 is the leading candidate decade for such an occurrence, and that it is likely to be climate-related. Which, of course, points up the pitfalls of prognostication.

[This note was written prior to 11 September 2001. Whether the events of that day and their consequences will bring about a real paradigm shift remains a matter for empirical observation rather than speculation.]

A New Approach To Security Engineering

[redacted]

Introduction

Security Engineering is not a new concept or practice. Traditionally, it was subsumed within the subject of fortifications and defences. It reflected that aspect, which provided the balance between the position, the defenders and the equipment they used. It has evolved and today addresses a discrete part of Force Protection,[1] though perceptions of what it actually is and how to do it are often confused. Much of this confusion arises from the terminology used during the planning stage and the usual security classification of the end product. The language used by the intelligence analyst, engineer and financier are different and their respective priorities are different whether conducted in industry, for government agencies or within the military environment. There is also confusion between nations to complicate multinational deployed operations. Consequently, as it is something that appears so confused and peripheral, it is regularly disregarded as a requirement.

The problem is that the requirement to protect resources[2] remains irrespective of location or colour of uniform. For the reasons given above, the realisation of the requirement usually follows an attack in which resources have been lost with significant collateral damage. With time, different attacks heighten different aspects of security until the whole installation/camp is a confusion of unrelated protection measures built in response to successful attacks. There are many industrial and military installations around the world that demonstrate this most effectively. It is often difficult to determine the true cost of an installation security plan that has evolved in this reactive way. However, rough order comparisons quickly show that a consideration of security engineering at the start of construction and the co-ordination of the security engineering plan would achieve significant financial savings – at least 40% over 12 years in one case history recently studied. This argument is always more powerful with the benefit of hindsight, though it is only one additional factor to consider at the start of project planning for any installation construction/layout.

JSP 440[3] provides a checklist approach to security planning, but can misdirect the user into inappropriate and sometimes counterproductive planning. A workable result can be achieved if used by a multi-disciplinary team with the freedom to actively interpret the findings. However, it is often used by inexperienced personnel without sufficient knowledge of the associated factors. The oft-heard complaint that JSP 440 is good for protecting documents and little else is unfair if the manual is used as it should be. However, the protection levels and requirements are orientated towards protecting resources that can be locked away and there still remains an inherent lack of synergy. It is specifically a misunderstanding of the exist-

ing procedures for security planning and reactive, rather than planned, engineering.

This article suggests a definition of security engineering in the UK and offer an integrated approach to its practice that can be used in both civilian and military infrastructure.

Definition

There is no standard definition of security engineering. It is often helpful to remember what the component meaning is first. The Collins English Dictionary defines security as *'protection of assets to prevent unauthorised access'* and engineering as *'the profession of applying scientific principles to the design, construction and maintenance of equipment and installations'*. Given the definitions used by PJHQ to define its actions, the following definition is suggested:

> *'The design and provision of protection for critical resources against attack, sabotage and theft in new and existing infrastructure.'*

Concept

Principles.[4] The underlying principles of security engineering are balance, co-ordination and flexibility. It must above all be threat driven and risk balanced with the ultimate goal of providing a fully integrated system that is sufficiently flexible to respond to evolutions in the threat.

Threat. The identification and definition of the threat is the cornerstone to cost-effective security engineering. However, it is rarely enough to simply identify a weapon's effect against a structure. Hardening is not always the most efficient solution and understanding how the weapon is delivered will identify alternative methods of protection. For example, wire-guided missiles are vulnerable to cross wires such as electricity pylons and electric fences and even some vegetation. Similarly, if the target is obscured so that the missile cannot acquire, the opportunity and so the chances of attack are reduced. Effective landscaping is used to great effect in many parts of the world to deter intruders and/or frustrate attack. There are three key descriptors of the threat that should be known.

- ***Type.*** Identify what type of aggressor is a threat to the resource. There are basically three types of aggressor: Opportunist, Professional and Fundamentalist. Each applies equally when considering terrorist, criminal or military aggression. The opportunist is not necessarily focused on the resource in question, but will attack if an opportunity is presented. The professional will be well trained and motivated and be focused on attacking the resource in question. However, he intends to escape or at least survive. The last type is the fundamentalist who will attack to achieve an aim at all costs. The suicide bomber is the most publicised variety of fundamentalist, but the defining characteristic is that the end justifies the means and collateral damage is largely irrelevant.

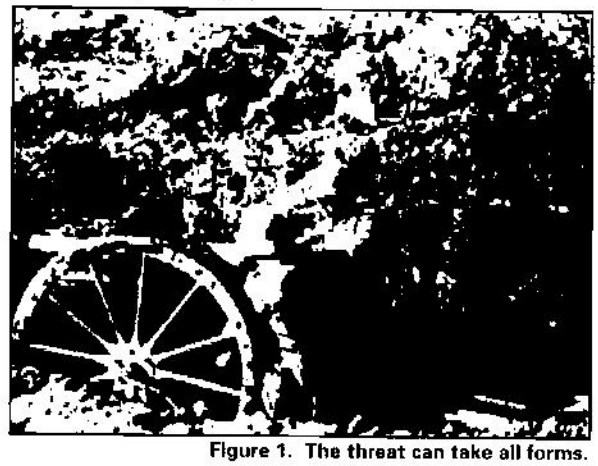

Figure 1. The threat can take all forms.

- ***Capabilities.*** The threat capability will define the speed, technical skill, support of the aggressor and his recovery period to the next attack. This directly translates into response periods and surveillance systems used. The more technically able the aggressor and the better his intelligence, the greater the emphasis on operational security, centralised control and decentralised response. This in turn increases the requirement for increased manpower and more specific and well rehearsed procedures.

- ***Method of Operation (MO).*** The MO will identify how the aggressor is likely to attack, his intelligence methods, how well trained he is and what level of independent action he is permitted. This allows the commander to consider stand-off methods of frustrating the attack before having to look at immediate physical protection to the resource.

Protection Philosophy. There are five factors to consider on protection philosophy. These are often dictat-

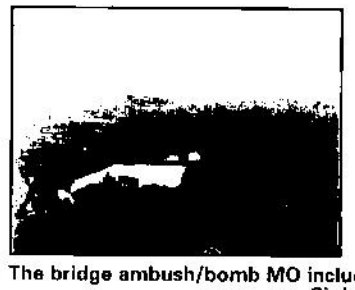

Figure 2. The bridge ambush/bomb MO includes Line of Sight to target.

ed at the time by the current threat, operational tempo or political environment. However, they can change and at very short notice so the security plan as a whole and the security engineering plan must remain flexible.

- ***Active and Passive.*** An active approach is to dominate the immediate surrounding area and to restrict the aggressor's freedom of action. When accompanied by a well-considered psychological operations campaign, it is highly effective against insurgents and terrorists or in rear areas. Conversely, the passive approach is to provide immediate physical protection to the resource. Often thought of as a *'Fortress'* approach, it may be the most appropriate for embassies or installations in friendly countries. Both require effective intelligence and local police liaison to be successful.

- ***Containment and Shielding.*** The question of containment or shielding is essentially whether the capture of the attacker is more important than the limited success that he may achieve. Containment seeks to prevent an attacker's escape and is most effective against professional soldiers or terrorists. Conversely, shielding seeks to keep the attacker away from the resource being protected. In practice, there will often be a combination of the two where the inner cordon/perimeter will shield and the outer cordon/perimeter will contain.

- ***Threat Delivery Spectrum.*** The threat delivery spectrum is a simple range of attack media and these are listed below. For each one, the threat is analysed to produce an individual threat spectrum to reflect that particular capability. Consider the threat and attacker's means and ability to deliver it. Often the true capability will be in excess of the usual attacks to allow a reasonable recovery period. For each delivery means, consider the particular threat as a spectrum of capability and sub-divide by recovery time where appropriate. For example, one of a hypothetical attacker's human-delivered threats is a car bomb capability up to a maximum of 500kg TNT in one attack. However, anything over 200kg TNT would increase his recovery time significantly because of the difficulties in moving large quantities of explosive from different supply dumps to the operations area. Therefore the spectra become 0–200kg TNT three days, and 200–500kg TNT twelve days. Intelligence will be able to say which type of attack is more likely over a given period, but the engineer knows that the groundwork will have to support protection for 500kg TNT even if only 200kg TNT protection is built at the outset. The threat delivery spectrum is:

  - ***Electro-Magnetic Spectrum (EMS).*** All forms of surveillance and target acquisition.

  - ***Human.*** All forms of human delivered threat from car bombs to mail bombs to sidearms.

Figure 3. Car Bomb.

  - Small Arms. Anything that can be used by one person at a stand-off with no immediate support.

  - Crew-Served Weapons. Any weapon that can be used from a stand-off position and requires immediate support for the firer – from the General Purpose Machine Gun to artillery pieces.

  - Air-Delivered Weapons. Anything that is dropped from height onto the target. This can be inert objects dropped from a structure to bombs dropped from an aircraft.

- ***3-D.*** 3-D stands for Deception, Dispersion and Duplication.[5] These are assumed to be familiar concepts to all readers and are not discussed any further. It is useful to consider this against nodal mapping[6] to determine the best layout.

- ***Co-ordinated Planning.*** Co-ordinated planning is an all-informed logical estimate process that begins with the threat assessment to develop a vulnerability assessment and a statement of requirement and so the plan. The principal planning committee comprises the Commander, Provost, Intelligence, Operations and Engineer. These reflect the key stakeholders in the plan, which must be a synergy between infrastructure, manpower/procedures and equipment that allows the main function/mission of the installa-

tion to continue with the minimum of disruption. The other stakeholders will include the local commander, logistics, finance and communications. The key decisions must be made by the commander based upon the available information and never by consensus, as the plan must tie in intimately with the commander's mission and concept of operations.

Practice

Outline. The final security plan will be based upon a clear philosophy that supports the Commander's mission. The balance of manpower to equipment to hard infrastructure will vary according to the immediate and emerging threats and the prevailing environment.[7] However, to achieve the right balance with the correct flexibility will depend upon a careful security estimate.

Threat Assessment. The threat assessment is the single most important part of the estimate process and must be carefully considered. It should include as complete a profile of the aggressor as the intelligence picture will allow, covering training, intelligence, support, goals, capabilities and case histories. It is understood that a full intelligence picture is not always available and value judgement will be required. Each attack capability must be scrutinised to provide the threat spectrum analysis discussed above, which will allow an accurate vulnerability assessment and informed risk balancing.

Vulnerability Assessment. The vulnerability assessment is based upon the threat assessment and the commander's identified critical resources in priority. The priorities are based upon the consequences of loss and must include the political, mission and financial consequences. The vulnerability assessment product is the identification of which resources are to be protected in priority and from what threat. This provides the starting point for the security estimate and is often presented as Operational Requirements for Security Measures.[8]

Estimate and Plan. The estimate process[9] is common to most military organisations[10] and is increasingly used by other agencies and industry. The estimate allows the effective solution of problems rather than instinctively opting for a limited threat solution that may not be appropriate to the synergy of the combined security measures. The result is the security plan and the provision of clear guidance to all stakeholders.

Protection Matrix

The most commonly used method of determining protection measures is to use a standard matrix where each incremental increase in protection corresponds to a given Protection Level. The Protection Level is the reaction to the assessed Threat Level. Typically, the Threat Levels are graduated: Negligible, Low, Medium, High and Imminent. The Protection Levels correspond to the familiar scale of alert states from Zulu, through Alpha, Bravo and Charlie to Delta; Zulu means no threat. The Bikini system of alert states follows a similar structure. The precise definition of Threat Level and Protection Level is decided by the local theatre command. This is a quick and simple process suited to the early stages of an operation where

Ser	Protection Measure	Alpha	Bravo	Charlie	Delta
(a)	(b)	(c)	(d)	(e)	(f)
1	COLPRO inside camp for all personnel				X
2	Hardened sentry post at main gate	X	X	X	X
3	Search bay and chicane at main gate	X	X	X	X
4	Blast walls and bunds			X	X
5	Extend perimeter fence ground clearance beyond existing 20m			X	X
6	Parking areas and additional hard-standing fenced off		X	X	X
7	Security lighting for entry and parking areas	X	X	X	X
8	Alarm system for impending attacks	X	X	X	X
9	Area lighting for vulnerable points within compound	X	X	X	X

Table 1. Extract from a Typical Protection Matrix

intelligence and logistic systems will not have achieved the robustness associated with mature operations. For example, a theatre or district is currently at Protection Level Alpha and so has a standard package of basic protection measures. There is an increase in threat and all camps are directed to move to protection level Bravo, which involves a range of mandated improvements. There is little if any site-specific analysis or evaluation conducted, or expected. This system is ideal for expeditionary initial (0–6 months) and temporary (up to two years) camps as it provides clear and coordinated direction and simplicity of logistic and financial planning. More importantly, these measures will generally be easily recoverable and not represent a major sunk cost when applied to temporary camps. Once semi-permanent and permanent installations are planned, the scale of infrastructure and investment is that much greater and the standard matrix approach is inefficient. Permanent installations will need their own protection plan based on worst case, as described above, with the stage implementation of protective measures risk balanced to realise efficiencies in cost, manpower and time. For example, a standard protection measure may be to construct a blast proofed access control point when for a particular site the stand-off from the control point to the protected resource may well negate this requirement altogether. However, the matrix system is often abused at the outset by making no provision to escalate to higher levels of protection when initially establishing the camp/base/compound.

Risk Balancing

Conceptual. Risk balancing is a tool that can be used either during the estimate process to qualify possible courses of action or later to determine the progressive implementation of complex capital security projects. As with all risk assessment techniques it balances the probability of an event against the consequences of that event occurring. However, as it seeks to balance an intelligence analysis against financial certainty, a common reference system is required that is statistically modelled. Similarly, evaluation of the consequences often includes the commander's own subjective opinion. The system suggested here is spectrum risk analysis of security engineering investment,[11] though more simply called Security Investment Appraisal (SIA), and provides the commander with a decision making tool that can be supported by all his stakeholders.

Probability. The threat assessment will strive to provide a rough probability that will indicate, relatively, whether there is an increased likelihood of an attack occurring or not. To attach a statistical probability to this is impractical and therefore it is sufficient to simply begin with 25% increments. For each specified threat spectrum there will be a maximum capability and the probability required here is the likelihood of the full threat capability being realised. For example, if a terrorist's maximum capability is to assemble and deliver a 4 tonne TNT car bomb, the probability is the likelihood that he will do so. Following an event, the probability of the full threat being realised will briefly drop and then rise according to the reaction time identified for that size of event. (See Figure 4) The residual probability is therefore the probability of the full threat being realised given the latest event. As this statistical modelling must establish a trend, Bayesian Modelling[12] is used. Frequentist models are ineffective.

The threat probability is on the left-hand vertical axis. The consequence is shown on the right-hand vertical axis. The horizontal scale shows time with each event and residual probability plotted. The overlaid consequence line refers to a protection project that results in effective consequence reduction as each stage of the project is completed. The purpose

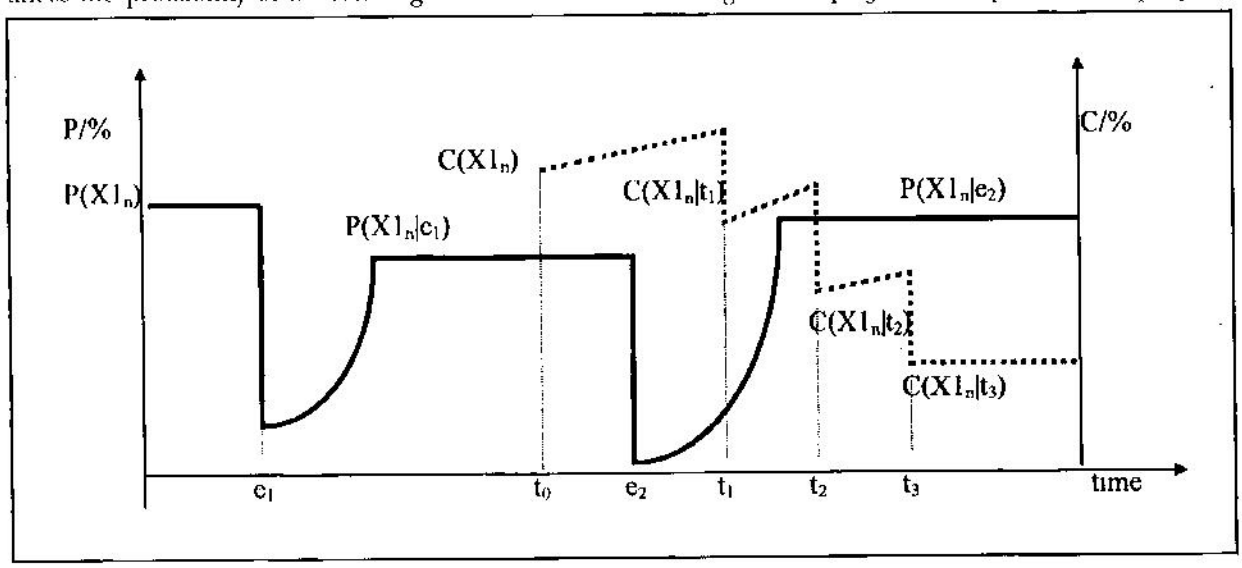

Figure 4. Risk Assessment Chart.

of the chart is to determine the point where the investment in security measures is no longer cost effective for a given threat probability.

Consequence. The overall consequence of a given event is the aggregate of the specific political, mission and financial consequences. Each can be debilitating and have an immediate impact on the others. For example, the social response to a dramatic but otherwise ineffectual event can directly effect the political will and continued pursuance of the mission. The political consequences are determined by the *'political advisor'* and taken from a sliding scale of negligible, low, medium, high and very high. Each carries a notional 20% increment, which can be locally adjusted according to the peculiarities of the socio-political environment. The mission consequence of an event is the commander's assessment of his residual mission effectiveness and is similarly rated. The financial consequence is a percentage value of the loss against the whole cost of the installation/resource. The aggregate of these is the foreseeable overall consequence.

Risk Assessment. The risk assessment is best done graphically and plots the probability and consequence over time, as shown in Figure 4. Note that the initial probability of the threat being realised is P $(X1_n)$ and following event e_1 there is the sudden drop and exponential rise in probability to its residual level given the event, P $(X1_n|e_1)$, and so on. At the start of the security installation project, the consequence of an attack is C $(X1_n)$ and this rises steadily as money is invested until the first stage in protection is achieved. There is a drop in the consequence since the potential damage is reduced and the further investment of money is again reflected in the steady rise in consequence until the next effective stage of security enhancement. The decision of balance comes where the consequence is at an acceptable level for the current threat and any further enhancement represents a diminishing return on continued capital investment. When comparing different installations for enhanced security measures, the risk assessment can be compared directly by multiplying the probability by the consequence to determine the risk factor. The location with the highest risk factor should be the highest priority for enhancement.

Summary

Security engineering is often a reactive measure that addresses only the immediate experience/event without consideration for the wider threat spectrum. It is rarely conducted within the operational concept and almost never as a complete synergistic process from inception to completion. A concept of security planning and specifically security engineering has been suggested, which meets the requirements of today

FOR EXAMPLE, CONSIDER AN ESTABLISHED PATROL BASE ON THE MAIN APPROACH TO A PROVINCIAL TOWN. THE BASE HAS NOMinal intruder protection and surveillance. Due to a largely effective campaign, the military infrastructure is being rationalised in line with the reduction in attacks and this patrol base is identified as an ideal location for a communications node and expansion to include the company headquarters. This changes the value of the resources and so the consequences of loss or attack. In addition, the concentration of these resources makes the base a more attractive target to the remaining threat. The favoured attack method for the existing threat is a car-bomb up to 500 kg TNT and intelligence reports suggest that there has been an increase in the probability of an attack to 42%. However, such an attack would expend the threat's capability for at least 12 days. The brigade headquarters directs that protection must be enhanced as part of this rationalisation process, whilst seeking to minimise cost. They calculate the consequences of a successful attack once the new elements have taken up residence and this comes to an aggregate of 35%. A full survey and estimate process is conducted and the stage protective enhancements identified and costed. The first stage will cost £250,000 and results in the consequence of a successful attack falling to 28%. The next stage costs £115,000 and the consequence drops further to 21%. The third stage will cost £175,000 and cause the consequence to fall to just 12%. The initial cost of the base is £1,200,000. The decision is made to proceed with the first stage as the new elements are moving in. Two weeks into the first stage 5-week project, the base is attacked by a 100 kg TNT car bomb. Of the first stage costs, £190,000 have been invested, but without a reduction in the consequence. In fact the consequence has increased because the value of the installation has increased by the £190,000 plus the value of the implementation resources. The attack was small enough to be effective with, say, a 10% loss, but without a significant recovery time. Therefore the residual probability reduced immediately after the attack increases slightly 46% within a few days. If the project had been risk balanced at the outset, it would have been clear that the significant rise in vulnerable resources would have increased the consequences beyond an acceptable level, even in the short term and other mitigating measures would be necessary during the implementation stage. When the whole cost of a successful 500 kg TNT attack is calculated during the construction phase, it would have been realised that the consequence had increased to over 70% because of the brigade combat support resources concentrated in that one location for the implementation stages. Though apparently obvious, this is rarely considered. Assuming the first and second stages of the protective works are completed and the consequence of a successful attack is now down to 21%. The brigade commander must decide whether to continue with the protection plan and reduce the consequence to 12% or spend that money on another site. The key concern now becomes the residual threat, as this will quantify the risk that the commander is willing to take. When this system is applied to all the patrol bases and installations in the brigade area, it allows prioritisation of funds for protective works.

and functions within the force protection doctrine directed by PJHQ. The concept is simple and logical, relying on effective communication between stakeholders and informed decision making.

Security engineering is the design and provision of a protective system that is balanced against the identified threat and flexible enough to respond to changes in that threat. The principles of security engineering – balance, co-ordination and flexibility – are reflected in each stage of the design and planning process from the threat and vulnerability assessments to the estimate process and formulation of the plan. The primary stakeholders are involved throughout the process with occasional input from other supporting stakeholders. However, the decisions are vested in the commander, as the security plan must support the mission and be integrated into the overall concept of operations. The net result should be a protective system that allows a functional synergy between infrastructure, equipment and manpower, which is enshrined in the procedures.

The decision on investment in protection systems will depend upon the quality of the assessments provided. In the early stages of an operation, the standard matrix system is most appropriate for common response to changes in threat. However, as the theatre/operation matures and the infrastructure becomes more permanent, the associated investment becomes more significant and the implementation of protection measures must be balanced against the cost and potential benefit (risk balancing).

Conclusion

Security engineering should be an integral part of the design and planning process for all new construction where there is a current or emerging threat. It must be based upon thorough threat assessments and be relevant, whilst remaining flexible to changes in the threat level. This can only be achieved by considering the infrastructure, equipment and manpower together against the defined spectrum of threat.

NOTES

1 Permanent Joint Headquarters (PJHQ) Joint Doctrine Pamphlet (JDP) 1/99 *Force Protection in Joint Operations.*

2 The term 'Resources' is used within its NATO definition and encompasses manpower, infrastructure and equipment. 'Asset' can be used in its place, though as the protection of human life typically remains the primary objective, whether directly or indirectly, it must be included in the definition of the term used.

3 Joint Service Publication (JSP) 440 *The Defence Manual of Security*, 1996.

4 The concept outlined here is based upon the security engineering model for deployed operations developed for the Canadian Forces in 2000 by the author.

5 Deception: measures designed to mislead the enemy by manipulation, distortion or falsification of evidence to induce him to react in a manner prejudicial to his interests. Electronic deception is a desirable component of any deception plan. (AAP 6) Dispersion: the provision of sufficient space between objects to minimise collateral damage whilst retaining operational. Duplication: introduction of redundancy in key resources by providing alternate operating facilities.

6 Nodal mapping is a form of behavioural analysis used in town planning where the key functional areas of a person's day are orientated to allow direct movement between them throughout the day. This reduces the 'fire door' response where security and protective measures are ignored because they are inconvenient.

7 The environmental factors will include the political, economic and social factors as well as the physical, geographical and climatic constraints.

8 The Committee for the Evaluation & Development In Counter Terrorism & Sabotage (EDICTS) have produced a guide to Operational Requirements for Security Measures (ORSM) for use by UK Government Departments. The process is also explained in a paper by W H T Spaight and published in the Proceedings of The Institution of Electrical and Electronics Engineers 34th Annual 2000 International Carnahan Conference on Security Technology. The ORSM is produced at two levels. The Level One ORSM is a general description of the threat and the general requirements identified by the vulnerability assessment. The Level Two ORSM is specific to a particular form of attack or protection system and discusses the requirement identified in the vulnerability assessment in detail. The Level Two ORSM sometimes follows the factors paragraph of the estimate process on complex projects or where the plan and implementation is contracted out.

9 A logical process of reasoning by which a commander considers all the circumstances affecting the military situation and arrives at a decision as to the course of action to be taken in order to accomplish his mission.

10 Known as an appreciation in the RAF and RN.

11 This approach has been tested against intelligence and incident reports for a particular area in Northern Ireland and found to very closely resemble the actual flow of events. Whilst not conclusive proof that it can be applied universally, it does suggest that the model is correct and will require careful calibration for each theatre and situation.

12 Rev Bayes developed a statistical model that would allow the user to track changes in probability arising from each successive result. This is typically used by the pharmaceutical industries when conducting trials of new medicines to spped up the recognition of trends and so reduce development and field trial costs. Each event is understood to have an effect upon the residual probability. The Bayes model allows this effect to be immediately considered. By contrast, the frequentist method of statistical analysis will consider a number of events over a discrete period of time. This method will always provide an average value for that period of time and consequently always be out of date by up to 3/2 of that period. The frequentist model is therefore inappropriate for tracking changes.

The Bayesian equation is:

$$P(A|B) = \frac{P(A).P(B|A)}{P(A).P(B|A) + P(1\text{-}A).P(B|1\text{-}A)}$$

where:

P(A) = The probability of the full threat capability being realised.

P(B|A) = The percentage of the full threat capability experienced in the Event B.

P(1-A) = The probability of the threat not being realised.

P(B|1-A) = The percentage of the full threat capability not experienced in the Event B.

Urban Warfare in the Future: Balancing Our Approach

[redacted] USAF
Air Mobility Command

'Urban myth' is a term frequently met with today. Urban warfare is a subject which has come to develop its own mythology. This may come to be regarded as a military subset of the genre.

This article, and the one that follows it, set out to challenge aspects of received opinion on this subject. There is more than a hint that both the importance, and the difficulties, of urban operations may have been over emphasised, particularly when viewed from the operational and higher levels of war.

THE CURRENT STATE OF AMERICAN THOUGHT ON Urban Warfare is out of balance. During the past several years of renewed interest and experimentation in this realm of conflict, scholars and the military community have expended most of their efforts on exploring its tactical level of operations. Until recently, they have devoted only a tiny fraction of their thinking, writing and experimentation to exploring its operational and strategic aspects. Recent Joint Doctrine publications and other writings have expanded the body of thought about the operational and strategic levels of Urban Warfare, but only barely. Consequently, the operational concepts and resource allocation prescriptions emerging from this unbalanced exploration remain overwhelmingly focused on cracking the secrets of conducting direct surface assault to clear streets and buildings. Little guidance is available to commanders (or their political leaders, for that matter) trying to determine how and when to engage in urban battles, or on how to determine their overall military and grand strategic importance.

This skewed body of guidance is not merely an academic issue – it presents at least two concrete dangers. It can lead military and civilian leaders to make inappropriate resource decisions and it can predispose Joint and Component commanders to undertake inappropriate or unnecessary battles for urban objectives. Those leaders and commanders, therefore, should be demanding a broader and more balanced urban warfare *'discourse'*. Tactics are a crucial part of the equation, of course. Effective land, sea, and air tactical capabilities make the operational and strategic levels of urban conflict meaningful rather than merely academic, But operational and strategic thought, in turn, give tactical capabilities and achievements their meaning and value. So it is reasonable to echo Army Major General Robert H Scales' opinion that we have made *'too quick a leap beyond the more conceptual aspects of war in urban terrain and into the weapons and tactics necessary to fight street-to-street and door-to-door'*.[1] The time has come to begin to bring our operational and strategic understanding of urban warfare abreast of our growing tactical grasp of that particularly daunting realm of warfare – not by slowing down tactical development, but by lighting a fire under our efforts to understand the other two levels of thought.

The Current State of Urban Warfare Thought: Strategy, Operations, TACTICS

There is an imbalance. As most individuals interested in the development of urban warfare thought likely would agree, strategic and to a somewhat greater extent, operational issues have been elements of the discourse over the past several years. But their treat-

ment has received nowhere near the volume and detail of interest as have tactical issues. A review of just the articles cited in this essay will bear out that perception. Many begin with short sections declaring the looming prevalence and likely horrors of urban battle, and then spend the bulk of their text laying out tactical prescriptions and shopping lists.[2] Except for the shopping lists, the keystone Service doctrine pubs follow the same pattern. Field Manual (FM) 90-10 and Marine Corps Warfighting Publication (MCWP) 3-35.3, both of which are titled *Military Operations on Urbanized Terrain*, expend only a few paragraphs on the place of cities in campaign planning and then spend hundreds of pages on unit tactics, weapons effects, mine warfare and the like.[3] Likewise, the major service experiments such as the US Marine Corps' URBAN WARRIOR and aspects of the US Army's Army After Next programs, predominantly focus on the tactical issues of Military Operations in/on Urban Terrain, or MOUT.[4] Even the Joint Staff's recently published *Handbook for Joint Urban Operations* has significant limitations as a guide for operational-level resource and operational planning. Written expressly to illuminate the operational-level of urban operations, this Handbook is a rich source of assertions about the theoretical and historical nature of urban terrain and combat, and of a useful categorization of Joint urban operations, as those aimed at isolating, retaining, containing, denying, or reducing urban areas.[5] But, as in the literature in general, a reading of this document provides little guidance to commanders seeking to blend a particular urban battle in their campaign plans or to best employ their particular mixes of aerospace, naval, and land forces to accomplish specific objectives. Consequently, there is virtually nothing in the document that helps long-range resource planners, such as Service Chiefs and Secretaries, to determine the likely frequency, scale, and relative importance of urban operations in the overall defense environment of the United States.

What passes currently for the 'strategic' discussion of urban warfare generally amounts to little more than an uncritical proposition that global demographics and sociology will make cities the predominant battlefields of the future.

As Third World urban populations bloom and come to consist increasingly, of young, dissatisfied *'barbarians'*, numerous authors presume that rebellions, insurgencies, factional armies and warrior bands will thrive In the rubble of failed states, cities, and megalopolises.[6] Unavoidably, therefore, most of these authors assert, or at least implicitly presume, that the United States will be drawn into the maelstroms of these urban battles, with considerable disadvantages in its cultural technological, and informational readiness to fight.[7] So certain are these writers of the patent truth of this notion that urban battles will define future warfare most of them jump past strategy as quickly as possible to get at what they seem to perceive as the more important and pressing Issues of tactics and resource advocacy. Ralph Peters, currently one of the more influential and outspoken urban warfare thinkers expressed this notion clearly, when he wrote that

> *'the future of warfare lies in the streets, sewers, high-rise buildings... shacks and shelters that form the broken cities of the world. We will fight elsewhere, but not so often, rarely as reluctantly, and never so brutally... stop preparing for [a] dream war and get down to the reality of the fractured and ugly world in which we live – a world that lives in cities... seize the future before the future seizes us.'*[8]

The operational level discussion of urban warfare in the current literature is richer than the strategic discussion, barely.

FM 90-10 and MCWP 3-35.3 for example, discuss the pros and cons of factoring cities into campaign plans, but only in a few paragraphs and in the form of rudimentary advice to avoid them, if terrain and the location of main lines of communication allow.[9] The *Handbook for Joint Urban Operations* does give more treatment to this area, but just barely, and as an exception in the realm of official literature. For example, perhaps the only time the Handbook discusses an alternative to direct urban assault is in its encapsulation of the 1995 Operation DELIBERATE FORCE air campaign against the Serb Republic. Implicitly, at least, the publication shows that the UN relieved the city of Sarajevo through air attacks mainly against targets outside its boundaries.[10] Otherwise, only a few writers have examined operational level issues in much depth, most notably General Scales and Marine Lieutenant General Paul Van Riper. Scales has discussed sieges as alternatives to direct conquests of some cities under certain circumstances.[11] Van Riper, drawing on conceptual work by the Marine Corps Warfighting Laboratory, has explored what can be considered as the intra-urban, operational level of MOUT, by advancing a concept of *'swarming'* tactics by infantry units moving through urban sectors in loose coordination, and then converging from all directions to support fellow units actually making contact with an enemy.[12] These two senior leaders also have collaborated to discuss the general problem of urban conflict, and the relative values of technology and doctrine in its conduct.[13] In broader treatments, a Massachusetts Institute of Technology Study Group, the RAND Corporation,

and others have explored the circumstances under which cities belong or will not belong in well-crafted campaign plans.[14] Additionally, several air thinkers have considered the the possibility of employing aerospace power in ways that obviate or at lest reduce the need to go into cities or to mitigate the costs of urban fighting.[15] A pending RAND study will significantly ,expand on these and other aerospace urban warfare concepts.[16] So there is a growing body of operational level discussion of urban warfare. But it remains shallow and often derided as irrelevant or of low priority, some, including again Ralph Peters, who declared that *'sloganeering about sieges and technology and nonsense about being too wise to enter an urban fight reduces our Army to satire'*.[17]

The urban warfare discourse comes alive at the tactical level, where the overwhelming presumption is that 'combat in urban areas is primarily a small unit infantry intensive operation'.[18]

Urban terrain, according to FM 90-10, *'favors the employment of infantry, supported by other arms'*.[19] In support of this view, most tactical writers presume that the vertical walls and close confines of urban terrain will relegate machine-intensive arms such as aerospace and naval forces, artillery, armor, engineers, and advanced command systems to providing support to *'huge numbers of soldiers'*.[20] Moreover, they expect that in the midst of the large numbers of noncombatants likely to be present in city battles, only infantry forces will have the *'precision'* required to operate within the restrictive rules of engagement (ROE) likely to be imposed on *'civilized'* combatants.[21] Under such physically and politically restrained circumstances, many argue that such combatants will find their advanced technology difficult or perhaps even counterproductive to apply in urban battles.[22] Indeed, suggests one analyst,

> *'the ability of US forces to overcome any opponent may be more limited by political guidance translated into operational and tactical ROE than military capability'*;[23]

In other words, the weight of current opinion is that commanders wanting to achieve objectives in cities must plan on doing so primarily with infantry. Consequently, the discourse is loaded with discussions of infantry *'penetration'*, *'thrust'*, and *'swarm'* tactics.[24] But one will search at least the open literature in vain to find concepts such as *'fleeting target working groups in urban combat'*, or *'naval operations on urban shores'*.

Not surprisingly, given their tactical focus, most urban warfare writers enthusiastically build shopping lists to complement their particular visions of urban fighting. These tend to come in *'low technology'* and *'high technology'* versions. Low technology lists usually include existing systems or systems requiring relatively minor investments to develop, such as sniper weapons, rocket propelled grenades, flamethrowers, and cell phones. High technology lists include such things as *'revolutionary new man-machine fighting systems'*, *'next-generation individual assault weapons'*, *'advanced urban combat vehicles'*, *'Vertical Assault Urban Light Transporters'*, and a host of other systems that particular writers think justify their high costs.[26] Importantly, both sets of lists reflect the prevailing notion that infantry will dominate in urban warfare.[27] The difference is that *'low end'* lists reflect the notion that ordinary units can conduct urban operations, preferably with enhanced stocks of certain otherwise conventional weapons, while *'high end'* lists usually support calls for the creation of forces specifically for urban combat.[28]

An Alternative View: Strategy, Operations, Tactics

The argument here for balancing the urban warfare discourse is simple: some of the foundational presumptions of the current state of thought and policy development are unsubstantiated and perhaps outright wrong. Put concisely, the combined body of literature and experimentation is overstating the strategic importance of urban warfare and the likelihood that the United States will engage in frequent, sustained, and large scale urban combat, even as it understates the operational alternatives available to achieve objectives and desired effects. The importance of these mis-statements, of course, is that they may lead defense planners to invest in urban warfare capabilities inappropriately and they may constrain the operational options of commanders.

To begin with strategic importance, *the case has not been made that cities will be the predominant battlegrounds and military prizes of the future, **at least not for the United States.*** That their demographics, cultural, social, and economic characteristics will make cities the arenas of frequent and sometimes large-scale conflicts probably requires little proof other than common sense. But to argue that the United States or other countries will take or be trapped by these *opportunities* to engage in urban combat frequently and/or on a large scale requires more proof than simple arguments about population growth and street thugs. As a minimum, that argument requires careful placement of urban fighting in such disciplines as military and urban history, strategic theory, the sociological and psychological make up of likely enemies and enemy organizations, national policy, and operational concepts. These disciplines offer numerous insights into the strategic realities of urban warfare, some of which suggest that:

- Urban warfare is a well-established and accommodated aspect of military and urban history; as reflected at least in military science and urban design.[29]

- The wealth and power of cities simultaneously make them attractive to conquerors and insurrectionists, while simultaneously concentrating the power of states to resist them.

- The characteristics of urban terrain tend to offer countervailing advantages and disadvantages to both attackers and defenders.[30] Urban terrain may offer defenders cover and plentiful supply of fortified positions, for example, but it also may cover the approaches of their attackers until they are very close. Accordingly, the advantage in urban combat tends to go to the side maintaining the clearest view of the battlefield and the greatest freedom to exploit that view through tactical and operational maneuver, shock and/or fire, just as it does in other realms of war.

- Urban fighting usually only makes sense in conjunction with either control of the surrounding terrain or an inadequate ability to traverse that terrain. Attackers with the option of going around urban areas often are well advised to do so. Defenders unable to draw support from or retreat into surrounding rural areas usually are committing their forces to certain destruction in the face of a force that controls the outside, particularly if it also retains maneuver advantage within the city.

- Consistently, US Marine Corps analysis indicates that *'no single factor is more important to the attacker's success than isolation of the urban area'*.[31]

- Most urban battles have been fought and won by *'standard'* forces and standard weapons pressed into the task, perhaps with some preliminary training or realignment of unit tables of equipment.[32] The exceptions, of course could include defensive victories by pre-industrial city garrisons, which often stemmed from the external and sometimes distant maneuvers of field armies or other forces.

- Cities offer fertile ground for the development and sustenance of terrorism, organized crime, civil disobedience, extended rioting, and other forms of rebellion. But, ultimately, purely urban-based insurgencies have had few successes, probably because of their inability to provide secure base areas for large-scale forces and their inability, to draw support from surrounding rural areas.[33]

- Under many circumstances *'it will be imperative to get civilians out of a city before fighting starts'*.[34] Civilian non-combatants hinder operations, may provide support to enemy combatants, and constitute a major obstacle to achieving political and military objectives where ROE are restrictive and/or restoring or gaining popular support is important. In most cases of large scale, intense city fighting, there will at least be a significant portion of the noncombatant (or at least those that would like to be noncombatant) who will simply want to get off the urban battlefield. Preparation for successful urban operations, therefore, may also include preparations to evacuate and care for potentially tens of thousands of friendly, unfriendly, or just plain scared people from urban areas and districts in short order.

Taken together, this list of insights (which is hardly definitive) may explain the conclusion of General Scales that

> *'only a desperate enemy, defending at great disadvantage, willing to sacrifice initiatives, his cities, and a large portion of his military force, has taken to defending cities. A casual glance at the last 500 years of major war history shows that as more of the world blankets itself in urban sprawl the incidents of actual street fighting have declined.'*[35]

Cities are as much traps as they are bastions for conventional armies, and then, potentially are just as risky for non-state forces as well. Of course, the propositions above bear fuller investigation, before their true implications for urban warfare theory or resource priorities can be understood confidently, particularly in the context of warlords, barbarians, and street thugs – but, that is the point of this paper. Leaders and their motivations raise another significant weakness in the notion that urban warfare should assume a dominant role in defense policy.

The open literature so far has not offered convincing evidence for the emergence of enemies simultaneously willing and able to conduct urban warfare on a large scale.

On the one hand, there is ample evidence that the *'new warriors'* and *'barbarians'* emerging in cities everywhere eschew the humanitarian values, sense of proportionality, and rules of engagement that many states impose on their armies. Consequently they are more than willing to conduct their operations in the cities