SHORT WARS & Cyber

netics

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This article aims to say something about short wars, with reference to the role of both hardware (especially air power) and software (how the hardware is most effectively and intelligently used) in such conflicts. Short wars, it is suggested, particularly matter because it is at least a possibility that the political will to engage in long wars is evaporating in most developed countries of the world. One much canvassed reason for this is that modern publics have become unwilling to tolerate casualties and less deferential to authority figures who might try to educate them differently. Vallance makes the interesting point that as and where the number of women in front line service roles is growing, as is the case within developed states, this public intolerance of casualties can only increase.[2]

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The style of the present article is to make some general observations about war as a phenomenon in order to be able to define what in practice may be involved for those who wish to retain war as a policy option but to escape the constraints set by modern public opinion when it wills the ends without willing the means. The observations are not completely general, however. The discussion does not consider the use on or off the battlefield of weapons of mass destruction. Furthermore, the wars are thought of as conventional in the other sense of involving at least armies and possibly air forces on both sides. Indeed, to keep the discussion's feet on the ground and avoid excessive abstraction the Gulf War of 1991 is allowed to cast a strong shadow on the analysis and is indeed explicitly referred to on occasions.

To begin with, it is at least arguable that the tendency of modern war is, or has been until recently, towards prolongation and in long wars (e.g. Korea, Vietnam) casualties simply grow in proportion to the length of the war.[3]

So a short war, if it can be successfully organised, promises a ceiling on casualties. So our analytical task is simplified in that arranging for a war to be short automatically allows the arranger to economise on his casualties.

To a cyberneticist, the long wars referred to above (along with the two world wars of this century) were long simply because there were feedback (negative) loops acting to stabilise the wars against attempts at an early resolution and hence to prolong their existence. An aeronautical engineer with cybernetic bent might compare such wars to the flight characteristics of a traditionally well designed aircraft. This plane will possess very good natural stability as a result, e.g. of dihedral on its wings. In one way this is obviously a good thing, but it does mean that the more inherently stable an aircraft is, the harder is it to get it to change direction in the way you want it to and sometimes, especially for warplanes, this can be a bad thing. Hence modern aircraft designers will often 'design out' what makes for inherent flight stability and get it instead on tap through sensors and active manipulation of flight surfaces by computer (hence 'fly by wire'). When rapid changes of direction are required, the stabilising computer is temporarily turned off (to produce a predictable effect, of course). If the 'design feature' of long wars that gave them stability could be identified and intelligently turned off, this will produce a short war.

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Clues as to what these 'design features' of war may be come originally from the American cyberneticist Voevodsky.[4] In fact it turns out that historically the most important has been a simple ratio (like the inverse of the dihedral angle) – the quotient of the average number of enemy units a unit of yours can put out of action in unit time, divided by a compound measure of the efficiency of the enemy's supply of men and materiel to the theatre of war and his support for those already there. When this ratio is small, the war will be stable and hence prolonged: when it is large, or can be made large, the war will be short and be won by whoever can manipulate the ratio in his favour.

This is perhaps a rather roundabout way of saying that for you to manufacture and win a short war it is necessary for you to cripple the capacity of the enemy to sustain a long one whilst maintaining your own capacity to fight for longer than he can.

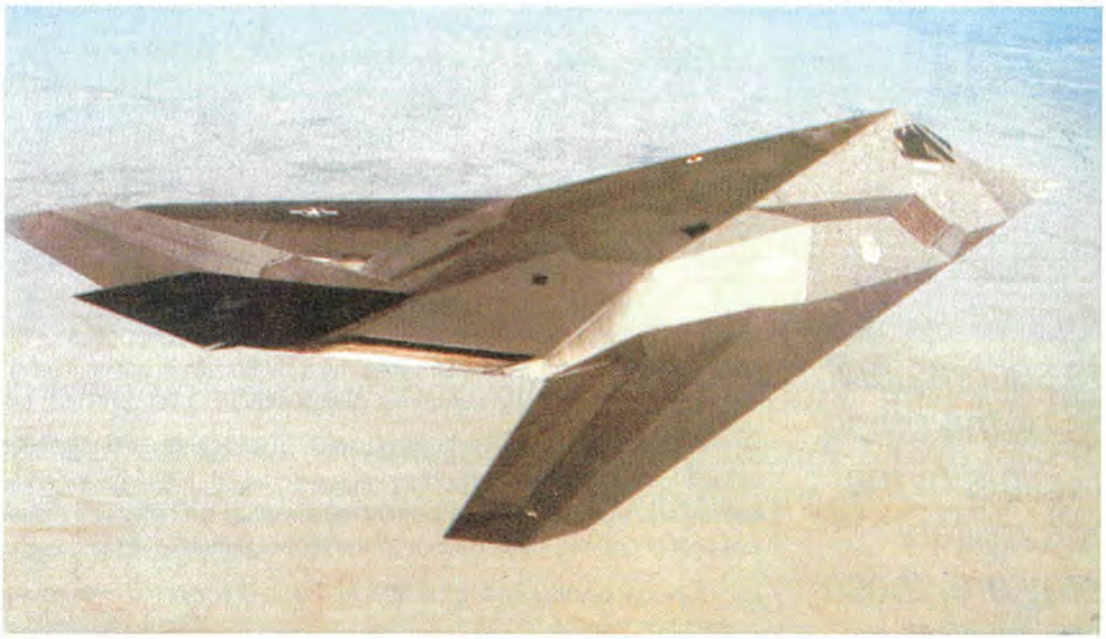
The resources necessary to sustain a long war are demographic in the sense of a supply of trained manpower and economic in the sense of an ability to maintain the flow of men, rations, weapons, munitions, fuel, and spares to the armies in the theatre of war, whilst maintaining a functioning economy domestically. So even not very warlike-seeming acts can contribute to denying the enemy a capacity to sustain a long war, such as economic sanctions which begin, blockade-like, slowly to eat into his general economic stability, and the related activity of alliance-building on your part (unilateral sanctions rarely make sense), which can deny the enemy allies, by pre-emption, and which can much more immediately than sanctions cut into his demographic and economic capacity to sustain a long war by denying him the chance to obtain almost instant transfers of military assets and resources from friendly states.

AIR POWER

More obviously warlike measures to achieve the same end come with the war itself and the early use, in wars like the Gulf war,[5] of air power behind the lines to attack the storage sites where the enemy's strategic reserves of fuel, ammunition, rations, spares etc., are held; the nodes and connecting networks of supply within, primarily, the military segment of the enemy's economy at large; and the arteries along which supply to the armies in the field flows.

This is however strictly conditional upon a number of factors which we can put under two headings: command of the air and precision in the exploitation of that command.

First, there has to be an imbalance between the air and missile power (offensive and defensive) of the two sides in your favour if you are bent on making the war short whilst ensuring that your staying power exceeds the enemy's. Indeed, without superiority, the air (understood as subsuming missile) attacks carried out to make for a short war will themselves become extended over time and air losses will correspondingly accumulate. This means that the air assets available for the ground war will be eaten into, putting the outcome of the ground war in doubt unless new assets are obtained which of course means a long war rather than a short one. In a short war there is certainly no time to train more pilots or even build much in the way of replacement hardware, so losses can only be made good by diversion from somewhere.



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Secondly, air power behind the lines needs to be used with precision, in three senses of the term.

(a) In a short war there may be no time to learn through trials and error where key targets such as fuel dumps or the other nodal points of the enemy's military economy are; these must be known in advance and this means good military and economic intelligence.

(b) Precision attacks on strategic reserve sites and economic nodes reduce to a minimum the need for repeat sorties to make up for earlier failures and avoid giving the enemy time to adapt his defensive measures or even his economic infrastructure to the fact of attack.

(c) Nodal points need to be attacked with precision to avoid collateral and wasteful damage in the form of death or injury to civilians marginal to the military sector of the economy and its transport arteries, which could create sympathy for the enemy and hence divisions on the domestic front. Vallance is probably correct that your own public's sensitivities to casualties extend to cover those inflicted, even inadvertently, on enemy civilians.[6]

At least as importantly, the avoidance of collateral damage makes feasible aspirations to put the use of air behind the lines on a psychological par with the use of air tactically, on the battlefield, in that it is only combatants that are being attacked, directly or indirectly, in either case. The new option then arises of using air in this manner sooner, rather than later as a form of escalation more or less reluctantly undertaken as a result of a stalemate on the battlefield.[7] Indeed the classic escalation logic gets turned on its head. If economising on your own casualties is paramount, the high degree of mechanisation of air (provided the conditions outlined above are met) means telling and significant blows at the enemy's

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war-making capacity with comparatively few of your own side's lives put at risk and therefore possibly a sensible way in which to open hostilities (a consideration we return to again, below). And the more effective it is, the fewer casualities you have to expect from the ground phase of the war.

A short war, we repeat, has to be fought with the forces available at the start of hostilities, since there is simply no time to mobilise, train, equip etc. fresh forces and ship them to the theatre of war. This puts another premium on alliance-building, since allies can be an immediate source of trained troops and operational equipment. Moreover, since the war has to be fought with the men and material in hand, and no more, this argues for the economical use of forces in the war theatre, e.g. attacks launched against real enemy positions and not against some chimera of out of date or otherwise poor intelligence.

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ERRORS UNFORGIVEN

This latter point can be considerably broadened out. Long wars have certain 'advantages' for those directing proceedings, one of them being that errors even at the highest levels of command are rarely fatal – mistakes can often be recouped since there is usually time to do so. In a long war there is simply time to learn from one's mistakes, time to replace unsuccessful commanders with better ones (even time for better ones to evolve from the lower branches of the officer corps), time not only to train manpower but even to retrain them when necessary, and even time to design and build new sorts of weapons. Short wars are not so forgiving. Having laid the foundations for a short war by action off the battlefield against the enemy's supply lines and infrastructure the war may well still have to be fought on the ground. If you can fight it in as error-free a manner as possible whilst encouraging the enemy to make as many mistakes as possible this will pay immediate dividends in that the war will be over sooner and your casualties correspondingly lower still. So, for example, in a long war surprise can only have temporary effects, whereas in a short war it can prove decisive. But, to stress the point, typically there is no time in a short war to *learn* how to fight in a more error-free manner – this is a skill (along with the complementary skill of knowing how to induce the enemy to make errors of his own) that must be brought to the battlefield directly from peacetime exercises and military academies. Of course fighting as part of an alliance puts an upper limit on how error-free one's conduct of the war can be expected to be. The more *ad hoc* the elements of the alliance are, the less pre-war familiarity there will be between the commands of the constituent parts and the more scope for mutual misunderstanding.

On the other hand, there is one striking advantage those directing long wars do not possess. With a short war we are speaking of a war fought to a grand strategic plan – the plan that it should be short. It is only in short wars that detailed plans make very much sense because in a short war there is comparatively little time for the unexpected to intervene, on the probabilistic assumption that the best laid schemes of men always go awry provided they are given time enough to do so.

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THE BATTLEFIELD

We have already remarked more than once that short wars have to be fought with forces in being. Correspondingly, those planning a short war should not cut things too fine in their calculation of the size of forces required. Any apparent surplus of men and materiel can be regarded as an instantly available reserve, the only sort likely to be of any use at all. If they are needed, well and good. If they are truly surplus they will not need to be kept on standby for very long. There is on the other hand no point in accumulating allies indefinitely. For one thing this takes time; for another, the size of a probable minimum winning coalition is unlikely to be much more than 3 times that of the enemy's strength. Some such numerical advantage is necessary unless you enjoy a guaranteed qualitative technological superiority (e.g. tanks capable of resisting twice as many attempts to destroy it and anti-tank land and air forces twice as good at destroying enemy tanks than those of your opponent).[8] One thing or the other (or both) is needed to offset the enemy's natural strengths of being able to fortify and dig in, with the additional possibility of comparatively short logistical lines, familiarity with local geography, etc., since having the enemy on the defensive (which is why we ascribe to him the above natural strengths) is part and parcel of fighting the war according to plan.

To see this, we repeat that you are fighting the war according to the strategic plan that it should be short. For the plan to have a hope its implementation needs to be proactive, creating in turn an enemy response that is reasonably predictable and hence capable in turn of being planned for, and so on. This means throwing the enemy on the defensive (if he is not there already). For the war to be short there should be no unnecessary waiting: the war will constantly have to be taken to the enemy and quickly lest he should take the initiative. Ideally this means no waiting for daylight or better weather or even for your troops to catch their breath – tired troops should be rotated with fresh ones.

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To take the war to the enemy means, naturally, forces suited to offensive use, embodying mobility which means mechanised forces on land and of course in the air. The actual duration of the war, as we have already stated, will be determined by the interaction between the relative rate at which you inflict battlefield losses on the enemy and the extent to which you have crippled his capacity to re-supply and re-man his armies. The greater the rate at which you force the enemy's armies to expend their substance and the greater the damage you have done behind the lines to his supply, the shorter the war.[9]

Numbers and planning, hardware and software, interact in an interesting way. Fighting a short war according to the strategic plan that it should be short permits the sort of proactive tactical plans we have been discussing also to be made in advance – each is a link in the chain. Fighting according to plan places fewer demands on the skills of field commanders who ideally simply follow a blueprint and ease the task of the central command which will, up to a point, know by map and by timetable what is happening and when and where, even if communications with the tactical level were absent or difficult. This is more important where a large body of troops may be involved than a small, and more important when we are dealing with an allied action rather than that of a unitary command, where mutual familiarity bred from common experience reduces the chances of misunderstandings.

FORCED ERRORS

Somewhere between the tactical and strategic level of planning come plans to capitalise on the enemy's mistakes. In a short war, we repeat, mistakes are particularly serious since there may be no time to recover and a serious mistake by the enemy will shorten the war further. However there are two difficulties here. First, in a short war the intention is not to give the enemy much time for anything, including the time in which to make mistakes. Secondly, even if he should make a serious

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mistake in the time available, a mistake arising from natural fallibility could be made in any aspect of his conduct of the war and your war plan may not be flexible enough to take full advantage of such 'random' errors on his part: a completely flexible plan soon ceases to be a plan at all. Even so, such enemy mistakes are welcome (otherwise we could not logically call them mistakes). But the best sort of mistake for the enemy to make is one that you have planned for. The mistake is now predictable and plans can also be made on how to exploit it. Such predictable mistakes do arise naturally at the tactical level towards the end of a lopsided short war when the enemy is under intense pressure and mistakes on his part become almost the norm and can indeed be planned for at least in a general way. But these are typically small mistakes.

Big mistakes require the enemy to be in a sufficiently coherent condition to make a big mistake and that will be nearer the start of a lopsided short war than the end. Arranging for the enemy to make such a mistake at or near the start of the war – involving on his part an error in the geographical disposition of some major part of his forces or in their state of readiness – can be factored into your planning as strategic surprise. How to take advantage of this mistake can also be factored into your

planning and an important aspect of this will involve denying the enemy in his still relatively coherent condition any opportunity of recovering from his mistake. Essentially, the enemy is desired to be in a sufficiently coherent state to be able to make a big mistake but not coherent enough to effect any sort of recovery. Since you are working to a plan or blueprint, a complete blackout on communications in the theatre of war once the plan is put into operation would hurt the enemy more than it would hurt you, since communication would be an essential part of any chance he had of recovering from his errors. At its simplest and most basic, this suggests a preference on your part for night-time operations. Naturally, a complete blackout on enemy communications coupled with a total inability on his part to learn anything from your own would be even better, for two reasons. First, it might allow you to profit from any mistakes made by the enemy of the random kind discussed above and secondly, even when working to a plan, with large and, especially, diverse forces unforeseen slippages from schedule are likely even in a short war and the coherence of your own operations would obviously benefit from good communications horizontally between field commanders and vertically between them and central command.

END POINT

What are the broader implications of short war? One is that short does not necessarily mean cheap. A short war is a war that has still to be paid for but now the payment has to be made in advance. The taxation implications of this are certain to be resented since we are discussing peacetime defence expenditure for arguably remote contingencies. So, if short wars mean sizeable forces in being, fiscal realities may mean that such forces, if available, may only be available outside the very richest states to alliances or concerts of states rather than individual states. In one sense, this may be an advantage, since large peacetime military establishments – especially of a kind with the sorts of offensive capabilities we have outlined – can obviously be provocative. Where only alliances or coalitions of states have the ability to use these short war forces, this is almost a guarantee that they will not be used lightly. Another, perhaps equally obvious implication, is that

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enemies and potential enemies will not want to play to your strengths but to your weaknesses and will be keen to deny you the option of a short war. They may be able to do this through guerrilla style campaigns, or other so-called asymmetric responses. However there will be a limit to how far this can be taken. Guerrilla campaigns are not always appropriate (they would not have been much use to the Argentines in the Falklands) and ambitious states (such as today's China) are normally more interested in emulating already powerful and successful states than in inventing or staying with supposedly appropriate military techniques of their own.

Sub-state groups are of course a different matter. But the question of what cybernetics may have to say about the application of airpower in peacekeeping or peacemaking roles, however important, will need to wait for another article.

NOTES

1 The author wishes to thank (a) the British Academy for financial support and (b) his former research student Costas Koliopoulos for his persistent curiosity on matters connected with surprise in warfare.

2 Air Commodore Andrew G.B. Vallance, 'Purple Airpower: the Future Challenge', *Air Power Review*, Vol 1, No 1, 1998, p.17. I am not sure that this sensitivity to casualties extends to those incurred by enemy armed personnel, although enemy civilians may be a different matter, where they are the victims of warlike attack. Whether their suffering from the effects of blockade-like sanctions falls into the same category is less clear.

3 See, for a compilation of in-theatre war casualties from the US Civil War to Vietnam, John Voevodsky, 'Modeling the Dynamics of Warfare', in D.E. Knight et al (eds), *Cybernetics, Simulation and Conflict Resolution*, (New York, Spartan Books, 1971), pp.145, 170.

4 Modeling the Dynamics of Warfare'. See also Ian Bellany, 'Modelling War: An ecological approach', ECPR-ISA Conference, Vienna, September 1998.

5 Not all short wars are like the Gulf War in this respect. In the Falklands 1982, Argentine supply lines were choked off by the application of sea power.

6 'Purple Airpower: the Future Challenge', p.17.

7 Mason would seem to sympathise with this line of thinking with his doubts as to whether the old distinction between 'strategic' and tactical' use of airpower any longer makes much sense. See Air Vice-Marshal Tony Mason, 'The Future of Air Power', *Air Power Review*, Vol 1, No 1, 1998, p.34.

8 In the Gulf War, Iraqi land forces in-theatre seem to have numbered about 250,000 but they might have been double that figure. Coalition strength in-theatre was 795,000. See Stephen Biddle, 'Victory misunderstood: What the Gulf War Tells us about the Future of Conflict', *International Security*, Vol 21, No 2, Fall 1996, p.141, and, for earlier estimates of Iraqi strength, *Strategic Survey 1990-1991*, (London, Brassey's/IISS, 1991) p.68.

9 The Gulf War contained a curious episode of waiting in terms of the interval between the employment of air power to cripple the enemy's capacity to sustain the war and the launching of the land offensive. To have done both simultaneously would have forced the enemy to fight on two fronts from the start. To do as was done maybe reflected some sort of escalation thinking in action on the back of a high estimation of the effectiveness of the air arm of the Coalition and its capacity by itself to bring the enemy to heel. But it ran the risk of handing the initiative in the timing and thrust of the land war to the enemy – indeed of provoking him into such a thing. In fact, the air war began on January 17th 1991. Initial targets were the enemy's capacity to sustain the war, and his air defence assets, with lesser priority given to attacks on troop emplacements, mainly those of the Republican Guard. Air attacks on the latter were then progressively increased in intensity from January 20th. The ground war proper did not begin until January 29th, when the Iraqis advanced in battalion strength into Saudi territory. They were repelled, but the Coalition did not take the ground offensive until February 12th. Gulf war chronology from *Strategic Survey 1990-91*, pp 58, 74

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