Viewpoints

Military Momentum – Increasing Velocity to Offset Reducing Mass

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Act Swiftly and with Resolve - Chinese Proverb

Introduction

The global financial crisis and other complementary factors have forced western governments to examine defence expenditure and many western armed forces now face a quantifiable reduction in overall numbers of assets and personnel. On average, military expenditure amongst European nations has fallen almost 2% annually during the past decade.[1] The largest cuts have been introduced in the smaller European Union (EU) member states, with rates above 20 %; for example Latvia cut its defence budget by 21% in 2009 and Lithuania its by 36% in 2010. The majority of middle-sized countries have, on average, implemented military spending cuts of 10 to 15%; Portugal cut its defence budget by 11% in 2010; Romania cut its by 13% in the same year and the Czech Republic cut its defence budget by 10% in 2011. Larger EU countries like Germany and the United Kingdom will cut their defence budgets by about 8% between 2011 and 2015.[2] The implications for our armed forces are obvious and we must examine all aspects of our business so that we can determine how best to organise, train and equip ourselves for an uncertain future. One approach is to reconsider more fully our thinking on military momentum.

Defining Momentum

Momentum can be defined as "the impetus gained by a moving object or the driving force gained by the development of a process",[3] alternatively, in the field of physics, momentum is

defined as a "measure of movement equal to the product of the body's mass and velocity".[4] Whilst the former definition is useful to express the capacity for progressive development, or in other words, the power to increase or develop at an ever growing pace, it is against the latter definition that this article will concentrate. In doing so, we must also understand what we mean by velocity, which is "the speed of something in a given direction".[5] The distinction between speed and velocity is critical because speed alone is unlikely to compensate for a reduction in military mass.

Against our definition, it is clear that a stationary mass has zero momentum. We must recognise this fact as we re-enter the "contingency space" following our prolonged exposure to expeditionary operations. As we reset, we must develop our understanding of how we move from a graduated readiness posture with little or no momentum into an employment phase where we will need all the momentum we can generate. The Defence Joint Operating Concept[6] provides the conceptual underpinning of how we will do this.

Critical Mass

In his seminal work, "Ten Propositions regarding Air Power"[7] Philip Meillinger stated that "precision air weapons have redefined the meaning of mass" and in many ways he was correct. Nevertheless, he would also likely concede that there is a compelling need to be alive to the concept of critical mass. A critical mass is defined as "the minimum size or amount of resources required to start or maintain a venture".[8] This means that there is an irreducible minimum military force level (critical mass) below which no increase in military velocity can compensate. This critical mass includes not only the fighting element but also supporting elements particularly in the areas of mobility/lift, sustainment, training and education.

National Strategy provides the foundation for the determination of critical military mass, in other words, national strategy describes what the government wants its armed forces to do. Two documents, the National Security Strategy[9] and the Strategic Defence and Security Review,[10] articulate UK strategy. Although it would be a fascinating exercise, it is beyond the scope of this article to suggest what the critical military mass for the UK should be. However, these documents provide crucial context and it is important to examine a number of the key deductions. Firstly, we must consider the complex range of threats that we face; secondly, we must understand the global nature of UK interests and thirdly we must be aware of the need to decide and, if necessary, act quickly.

The National Security Strategy defines two core security objectives; ensuring a secure and resilient UK and shaping a stable world. It prioritises the areas of counter-terrorism, cyber, international military crises and disasters and highlights the importance of understanding. It also seeks greater integration across government and with the private sector. The National Security Strategy is set against the notion of no "strategic shrinkage" or loss of national influence, thus alongside diplomacy, aid and cultural influence, credible, capable armed forces of the correct size are a mainstay of our national strategy.

Both the National Security Strategy and the Strategic Defence and Security Review reflect the establishment of the National Security Council, which was one of the first actions of the current coalition government in May 2010. The government established the National Security Council to coordinate and deliver the Government's international security agenda and it is the highest-level government forum for collective discussion of the Government's objectives for national security. In essence, the National Security Council should set the strategic vector for defence and the other elements of the national security apparatus. However, although established to provide a strategic perspective, the Council has recently been criticised for focusing on operational matters and short-term imperatives rather than long-term strategy.[11]

So armed with the National Security Strategy, the Strategic Defence and Security Review and guided by the National Security Council we should be able to answer the question - what doesthe government want us to do? Firstly, we must defend the UK homeland and its overseas territories; secondly, we must conduct forward engagement in support of government objectives and thirdly we must project military power in support of national interests. These defence functions provide the departure point from where we can determine our critical military mass.

As military mass invariably comes at a price, there is a danger that budgeters will seize on the concept of military momentum as a driver for force cuts. But before they do, they must first understand the highly dynamic nature of military velocity. Velocity is subject to a great many variables and these may conspire to create situations where it is impossible to generate sufficient velocity for a given mass. Consequently, military momentum will be sub-optimal and we may be unable to match or out-strip the military momentum of an opponent. Nevertheless, military velocity can mitigate some reduction in military mass and this article will examine how we, as militaries and air power practitioners in particular, can generate velocity to deliver the same or greater momentum at a time when our military mass is reducing.

Many already recognise that we must recast our consideration of military mass. Referring to the Royal Marine Lead Commando Group in an interview with Jane's Defence Weekly,[12] Brigadier Martin Smith, Commander, 3 Commando Brigade, Royal Marines stated "SDSR decided that we would be optimised for intervention, which is something we have specialised in for some time. However, it has caused us to modernise the way we operate. To an extent, we are substituting mass, for tempo, accuracy and understanding. This demands a range of capabilities and competencies beyond what was common 30 years ago". As we move forward, it is increasingly likely that others will express similar views.

Setting the Velocity Vector

"If you cry 'Forward', you must without fail make plain in what direction to go. Don't you see that if, without doing so, you call out the word to both a monk and a revolutionary; they will go in directions precisely opposite?"[13]

Speed, along with reach and height, is one of the abiding strengths and core characteristics of air power. Speed allows the rapid projection of military power. Our ability to complete missions quickly and generate tempo allows us to exploit time, the fourth dimension.[14] Thus any employment of airpower inherently comes with one element of the velocity equation satisfied. However, speed applied in the wrong direction or for its own sake will not deliver the velocity or momentum we need. It follows, therefore, that if we are to generate military velocity and momentum we must apply air power's inherent speed in a set direction. We must therefore design, organise and train all of our air command and control structures, mechanisms and processes to ensure that the direction set by the Commander is the direction travelled.

Before we move on to some considerations on command and control we need to explore our understanding of tempo. Tempo is "the pace of an activity or process"[15] it follows, therefore, that if we can dictate tempo then we can control the momentum of a given mass. In military terms we need to view tempo as the ability to operate at the speed of the problem and thus it is entirely dependant upon the complexity of the problem set. The current and future battlespace can be characterised in many different ways, for example, the UK's Future Character of Conflict pamphlet[16] describes the future battlespace as congested, cluttered, contested, connected and constrained. Whether or not we all agree with these characteristics, it is true that two abiding characteristics are, and will continue to be, uncertainty and chaos. Faced with uncertainty and chaos, our Commanders must seek to bring greater degrees of certainty and order and for this to happen we must be able to develop our situational understanding rapidly.

Our level of understanding at any given moment will determine the degree to which we can operate at the speed of the problem and consequently exercise control over campaign tempo. At the outset of a campaign, a Commander's understanding is unlikely to be sufficient to control tempo fully and a degree of operational and tactical patience will be required. As their understanding builds, Commanders throughout the joint force, will be better able to control tempo to their advantage. To do so they must continuously frame and reframe the problem in order to maintain their understanding. To achieve this we must apply tools and processes that place information in the correct context, at the right place and at the right time. Both information and context will flow from various sources and we must therefore ensure that every level of the joint force feeds and is fed by the others. This will allow commanders and the joint force to move from a position of situational awareness (knowing **that** something is happening) to one of situational understanding (knowing **why** something is happening).

Understanding

Surveillance and reconnaissance from the air and space can provide much of the intelligence and information that can lead to shared situational understanding. Air and space's unique vantage point allows sensors an almost unimpeded view of the battlespace and across the electromagnetic domain. Thus air and space sensors can aid in the provision of strategic intelligence, can assist in the integration of joint action at the operational level and can enable tactical manoeuvre. However, whilst air and space sensors will provide much of the

information required, we can miss nuance and complexity because of the stand-off nature of our perspective. Quite simply, the human and social aspects that provide the context for understanding are not as readily or easily mapped as physical capabilities, objects, movement or terrain. Consequently, we must fuse information from multiple sources, not only air and space, to accomplish the transition from awareness to genuine understanding.[17]

Between now and 2014 we will see a reduction in our military commitment to Afghanistan. At the same time we must regenerate our contingency forces. As we do so, there will be an increasing premium on the responsiveness of air and space assets to generate sufficient understanding of emerging, unanticipated contingencies rapidly. We cannot derive this understanding purely through a saturation of collect sensors, instead we must match investment in sensors with parallel development of our ability to direct, analyse, process and disseminate an increasing volume of data. We must adopt new processes that allow us to identify adversary intent more readily. Advances in technology, automation and data processing may offer some solutions but investment in human analysis will be equally important.[18] The rewards from investment across this area are high, as increased understanding will bring with it a concomitant improvement in the quality of our decision-making. This, as we will discover, is a fundamental aspect of command.

Command and Control - the Blending of Art and Science

The quality of decision is like the well-timed swoop of a falcon which enables it to strike and destroy its victim.[19]

In their paper on re-conceptualising Command and Control, Pigeau and McCann assert correctly that command is a human activity and control is the establishment of mechanisms and processes to accomplish the mission effectively.[20] Military command at all levels is the art of decision-making and the direction of assigned forces to accomplish given missions. Over the years, there has been a tendency to conflate Command and Control, especially in the air environment, indeed some commentators speak of C2 as if it were a single function. It is not. Command and Control are two separate but inter-linked activities and to better frame our thinking we should refresh our understanding of command as an art and control as a science. When speaking of command in the late Nineteenth Century Moltke stated: "*Thus war becomes an art – an art, of course, which is served by many sciences. In war, as in art, we find no universal forms; in neither can a rule take the place of (a commander's) talent*".[21] Moltke uses the word talent carefully to describe a Commander's ability and capacity to exercise his initiative, creativity and judgement to succeed in his mission. This is challenging for airmen as the nature of our business means that we are easily seduced into focussing on the processes and procedures of control and we sometimes forget the enduring principles of command.

The key to effective command is an unambiguous understanding of superior Commander's intent. Intent sets the velocity vector against which we apply our speed and mass to create military momentum. A Commander must determine both the mass and velocity required

to achieve his objectives and then apply his control mechanisms to deliver them. Thus, we must design our headquarters structures, mechanisms and processes to maximise military momentum; overly bureaucratic or unwieldy Headquarters will create inertia and friction that will reduce our velocity and hamper effective military momentum. The Joint Force Commander's role in orchestrating the integration of the separate war-fighting environments to deliver momentum will be crucial.

Air Command and Control

An air force is, by reason of the nature of its work, extremely sensitive to any misdirection.[22]

The speed, endurance and operational perspective of air assets places great importance on the accurate coordination of the air plan. To maximise the operational impact of air power, we must allocate tasks and missions in a highly responsive and flexible manner. It is therefore unfortunate that air command and control is so widely misunderstood. In many ways the command and control of air assets is one of the most integrated, adaptable, flexible and high tempo military processes, yet to many it remains shrouded in mystery. Moreover, I would argue that over time, we have allowed the control function (science) to dominate the command function (art) and we have introduced complexity where we need simplicity. We must reverse this trend else we risk eroding the agility we need to best deliver military momentum.

Responsive and effective Air Command and Control is critical to the effective and efficient delivery of air and space power. It provides the means to capitalise on air power's inherent agility to react and respond more quickly to contingencies than any other lever of national power. It must be capable of synchronising its activities and effects with those of the other four environments to generate momentum through tempo rather than mass. We simply must think integrated as opposed to purely joint. Situational understanding and decision superiority will remain our fundamental enablers. We must harness and continuously adapt our network architectures and processes to ensure that we have the right information at the right place at the right time to make the right decision to deliver the right effect to bring about the right outcome.[23]

Traditionally, Air Command has used a model of centralised control, decentralised execution. The increased volume and velocity of information and our growing ability to access it and contextualise it offers the promise of shared understanding. We cannot ignore the huge opportunities that this brings, not least of which is an ability to adopt a more flexible, adaptable and agile approach to Air Command and Control.[24] At the pinnacle is unified command which provides a single commander with the appropriate and necessary authorities to direct his assigned forces in pursuit of a common objective. Unified command ensures coherence of intent and unity of effort. Below this sits the centralised control level with which we are familiar. Centralised control is still the most appropriate model as it provides the continuum of the intent and unity of effort set by the command level. Centralised control allows us to allocate and apportion inevitably scarce air resources to best effect in pursuit of the common

objective. The greatest change occurs below the centralised control level where adaptive, rather than decentralised, execution will become the norm. It is here that the contemporary and future information environment allows Commanders to choose to centralise or decentralise execution authority according to the circumstances of the campaign.

A greater degree of decentralised execution will be possible when all coalition participants are adequately trained, comfortable with the concept of mission command, and technically able to plug into the command network. This allows certain command responsibilities, such as air-weapons release authority, to be delegated and enables tactical self-synchronisation. In this way the force can generate increased tempo and momentum through significantly reduced decision cycles. Decentralised execution may also be the only feasible option for complex, large-scale air campaigns with many assets in play. Crucially, decentralised execution allows an Air Commander to concentrate on command and avoid the distraction caused by a necessity to control. It should therefore remain the ideal.[25]

However, the future air command environment will also enable a greater degree of centralised execution to be undertaken if required. This may be more appropriate for small-scale missions, missions conducted by the highest-value assets or missions where the stakes are particularly high. It may also be appropriate where there is better situational understanding available in the Air Headquarters (or above) rather than in the cockpit or at the console. Importantly, we could use this construct if the participation of unfamiliar or less capable coalition partners means that it would be inappropriate or unwise to decentralise execution authority.[26]

These two recent examples illustrate both the strengths and weaknesses of centralised execution.

On 20 Oct 2011, Colonel Qaddafi, who had been holed up with his remaining loyalists in a makeshift command bunker in Sirte, tried to flee the city as rebel forces moved in. Up to a hundred vehicles prepared to leave, at their heart were five cars containing Qaddafi and key loyalists. Their plan was for his snipers and his few remaining heavy weapons to cover the departure and to use the ensuing confusion to mask the movement of the key cars. To add to the confusion the vehicles would split into a large and small convoy in the hope that any response would target the larger group. So the convoy took two routes, seventy-five vehicles in the main body took the main road out and the smaller package stuck to side roads before making a break for the desert roads heading south. Aerial surveillance detected this activity but only Senior Commanders had the intelligence (understanding) to know the importance of the smaller group. Therefore, only they could direct the correct response. Consequently, it was the Combined Air Operations Centre at Poggio Renatico in Italy which exercised the principle of centralised control to orchestrate the end-game. Firstly, they ordered a Reaper hellfire strike into the first vehicle in the smaller convoy. Simultaneously they ordered NATO AWACS to direct two French Mirage aircraft to proceed to Sirte. The Commander then passed his authority for the engagement to his CAOC staff and onwards to the French aircraft through the AWACs. The rest, as they say, is history.

However, centralised execution can, if not carefully employed, reduce tempo and have unfortunate operational implications. In October 2001, the operators of an armed Predator pinpointed the location of the supreme leader of the Taliban, Mullah Omar, in a convoy of cars fleeing Kabul. Neither the Predator controllers nor the Commander in-theatre could authorise a strike. Commander US Central Command (CENTCOM) in Tampa, Florida personally held the authority for such a strike. Consequently, the in-theatre commander contacted HQ CENTCOM for approval to conduct an attack. Such was the delay in developing the right level of understanding within CENTCOM HQ that by the time a strike was authorised Mullah Omar had long since escaped to safety.[27]

These examples clearly demonstrate that commanders must exercise discretion when applying this new model. Considerations will include; the nature of the conflict; the military and political appetite for risk; the scale and complexity of the air operation; the number, type and capability of the participants and the level of communication connectivity required. The guiding principle is that we should direct execution authority to the point at which the best level of understanding is available. This may be in the cockpit or at the console (decentralised execution) or at the Air Headquarters, or above (centralised execution). Clearly, the principles of unity of command and the ethos of mission command will endure as the cornerstones of Air Command and Control. However, we should use a model of unified command, centralised control and adaptive execution as the basis for our approach to Air Command and Control in the information age.[28]

The Air Commander

He who wishes to be obeyed must know how to command.[29]

The success of adaptive Air Command will depend on preparing air commanders with a mature understanding of air and space power, and the circumstances of its employment. The analysis of command requirements and processes in the air estimate must be crystallised into an absolutely clear and unambiguous statement of Commander's intent. Developing Air Commanders at ease with the demands of information-dominated warfare and full-spectrum targeting may be difficult if their experience is rooted in a different paradigm of combat and decision-making. As we shift from control-based methods of air operation to a greater emphasis on command, we must ensure that our commanders have a fundamental understanding of national and multinational doctrine. Moreover, they will not only need to grasp developing technology, but more importantly, they will need to possess the mental dexterity and skill to exploit the information it delivers.[30]

Having established his Command and Control structures, mechanisms and processes a commander will use Mission Command to generate and control tempo. The three enabling attributes for successful mission command are understanding, intent and trust. Understanding underpins mission command and we have covered this aspect already. Intent takes this understanding and fuses it with the assignment of a mission and the articulation

of direction to subordinates. The assignment of a mission and articulation of direction sets the velocity vector against which the unit's speed and mass is applied. The third pillar is trust and this is arguably the hardest pillar to establish. Trust is required at every level of the force but it can be fragile. Firstly, we must earn it and then we must nurture and sustain it. Combined and joint education, training and dialogue are the key building blocks. And here, with little additional effort, we can help. Nelson Mandela famously said, '*If you talk to a man in a language he understands, that goes to his head. If you talk to him in his own language, that goes to his heart*.' As airmen, we use a language with which we are comfortable but which others find confusing. We have a duty and moral obligation to explain ourselves better; for instance, an Air Ops Directive is nothing more than a Fragmentary Order (FRAGO), and an Air Tasking Order (ATO) is but a set of mission type orders. If others understand us and we them, trust and respect will invariably follow.

Defining Mobility

Having set the velocity vector through commander's intent we need to look more closely at speed. Speed is about movement and mobility is an expression of how easy it is to move something.[31] Thus, mobility is one of the fundamental considerations of any strategist. Moreover, mobility and that much-used term – agility – go hand in hand. The definition of agility is the ability to move quickly and easily.[32]

There is a considerable library of literature dealing with air superiority, information superiority and decision dominance but less has been made of mobility superiority. However, I would argue it is an equally valid concept. In every case, it is important to understand the relative ability of opposing sides to move in time and space. Our aim should be to achieve mobility superiority by protecting our own mobility and by identifying ways to deny mobility to an opponent. If we are able to reduce our opponent's mobility relative to our own, we can partially mitigate a parity or inequality in mass. By fixing an opponent in time and space, we can create conditions where he has insufficient resources to concentrate his force quickly enough for the defence of an objective. In such circumstances, our mobility can quickly overwhelm him. Artful positioning of an attack can force the enemy to defend in more than one place. This will expose weaknesses and provide opportunities. Conversely, there may be times when we can gain positional advantage through the temporal sacrifice of space. On occasion, we should be prepared to cede time and space to allow windows of opportunity to open. Once open we need to be able to exploit them rapidly through agility and mobility. Thus the mobility of a unit is a deciding factor in its efficiency, and mobility is a high criterion by which to judge the merits (or demerits) of its operations.

Mobility, agility (mental and physical) and understanding allows us to adopt a manoeuvrist approach to operations.[33] Air Power is inherently manoeuvrist and highly mobile as a look at its basic qualities shows. The application of a manoeuvrist approach to air operations allows the employment of air power to achieve a position of decisive advantage by rapidly bringing a concentration of force to bear anywhere in the battlespace. Although we can undertake

manoeuvre operations alone, they are far more effective when we integrate and synchronise them fully with land, maritime, space and cyber activity. With careful joint and integrated planning the speed and precision provided by air systems can be linked to surface manoeuvre, fires and disruption activities thereby increasing the available combat power available to be employed against an enemy's weak point.

Conclusion

In conclusion, this article has attempted to shift our thinking from a focus on military mass towards the concept of military momentum. Mass will always be important, especially as it forms one element of the momentum equation, but we now need to view military velocity as an equally important consideration. Fundamental to this latter aspect is the identification and setting of the velocity vector against which military speed and mass are applied. And the key to setting the velocity vector lies in the art of command supported by the science of control. Investment here will pay rich dividends. We need to appreciate the linkages between mobility and speed – the more mobile and easy to move something, the quicker we can apply it to the problem. We need to raise our sights from situational awareness to situational understanding or from knowing that something is happening to knowing why something is happening – a focus on C4ISTAR will help but we need to take care to look across the spectrum and not be seduced into a myopic focus on collect. And finally, we need to integrate across all five environments to generate optimum momentum. We will only achieve this if every element of the military machine trusts and understands the others and the key to that particular puzzle lies in education and training.

Notes

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