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Military Command in the Digitally Revolutionised Battlespace

War's highest solution must be evolved from the eye and brain and soul of a single man... Nothing but genius, the demon in man, can answer the riddles of war...

—Winston S. Churchill¹

Introduction

In centuries gone by, tigers ruled the jungle; today it is the 'mouse' which wears the crown and canons the cyberspace. Mao's dictum, "Power flows from the barrel of the gun," is passé; instead, power pours from the clicks of the mouse in bits and bytes; later, when optical and quantum computing augur presence, it will be in 'photons' and 'qubit' respectively; or still later, in 'cogs' of, yet to philosophically expound, cognitive computing.

The cyber canvas is wide, the pieces galore, and the moves astoundingly complex and varied, wreaking checks, striving for checkmate. The most significant paradigm shift that has occurred is the transition of Information Communication Technology (ICT) from a support function to the core of military affairs, control of the economy and critical national endeavour. Likewise, the pertinent example in warfare is the change from force multiplier, to weapons of mass



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Key Points

1. Clausewitz in his classic work 'On War' reserved the accolade of 'Military Genius' (Commander/General) for those 'Bold Generals' who excelled in their command. As against the 'Bold General' of 'On War', Sun Tzu's General relies more on caution and measured calculation. Feris and Handel, on the other hand, replaced the Clausewitzian General's by 'Calculating Generals/Commanders' by utilising the difference between the two theorists.
2. Military Command however, will have to adapt itself with the introduction of AI and Networks and digitisation of the battlespace as postulated in the Revolution of Military Affairs literature.
3. In future battlefield, Commanders are likely to have several advantages by the adoption of AI and Networks in the fast paced operations of digital battle arena over those Commanders who retain dependency on existing manual systems.
4. Decentralisation of the command in such a scenario will become the norm and there will be a shift from the Command and Control (C2) to consultation and coordination.
5. Though military organisations would always retain an element of hierarchy with someone who has the ultimate command responsibility. However, future of Military Command is likely to reside in the creation of hybrid organisational structures which utilise elements of both hierarchies and networks.

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disruption leading to widespread and split-second destruction of the opponent's sinews of power. As militaries, governance, businesses and infrastructures take to the networks, so do hackers, crackers, criminals and terrorists. As the cost of bandwidth and hardware plummets, so does the comparative ease and techniques by which technologies can be sabotaged. The wrestle between technology and antitechnology, between 'counter' and 'counter-counter' continues. What was once old becomes new again. New causes, challenges, motivations, ideas and capabilities are surfacing along with new technologies—so are new victims that bear impinged targeting.

The subject of military command has of late become interesting because, indirectly, the Revolution in Military Affairs challenges the existential role of the individual human commander. A study of military history, of biographies, autobiographies and accounts of winning generals reveals certain similarities. It is the total person that leads armies to victory. It is the total impact of the winning general's mind, emotions, physical and spiritual being upon his soldiers, officers, superiors, peers and the enemy that result in victory. Successful battlefield generals make use of their total genius and not just their intellect to win battles and campaigns. We shall therefore, discuss in this article the fate of the general in the evolving future digitised battlefield as against the genius (general) perceived by Clausewitz in his theory.

Attributes of a General

In his classic work, 'On War', Clausewitz wrote a short yet very discerning and insightful chapter entitled, 'On Military Genius'². He defines courage, the presence of mind, the strength of will, ambition, strong character, grasp of topography and statesmanship as qualities necessary for a military genius. Clausewitz wrote that genius refers to a very highly developed mental aptitude for a particular occupation. For him, all the gifts of mind and temperament taken together and in combination constitute the essence of a military genius. For Clausewitz, military genius did not consist of a single appropriate gift, for instance, courage. Genius consists of a harmonious combination of elements, in which one or the other ability may dominate, but none may be in conflict with the rest³.

Military history is replete with the descriptions of exceptional generals/commanders. Some of them namely, Napoleon, Alexander the Great and Field Marshall Slim, have been credited with displaying the various qualities required to succeed in the art of command. Napoleon himself declared: "Read and meditate upon the wars of the greatest captains." He continued: "This is the only means of rightly learning the science of war."⁴ It is because war is a human endeavour, involving the realm of chance, uncertainty, danger and physical exertion, and is the contact point between the military instrument and policy that Clausewitz reserved the accolade of 'military genius' for those who, like the above, excel in the art of command within such an environment⁵. As against the 'Bold General' in 'On War', Chinese strategic thinker Sun Tzu's Commander relies less on intuition and more on caution and measured calculation⁶. Sun Tzu's General seeks to acquire and utilise knowledge as the basis for his actions. This difference between the two theorists is utilised by Ferris and Handel on their call for replacement of 'Clausewitzian Generals' by 'Calculating Generals/Commanders'⁷.

Courage with its components of boldness, determination and indifference to physical exertion and suffering, stands out among the qualities of military genius that Clausewitz describes. It deserves more attention and yet must not overshadow the other six qualities. Senior officers must make a conscious effort to cultivate in themselves all the physical and moral aspects of courage. Courage is the first ingredient of a military genius. The last quality that Clausewitz ascribes to the man of military genius is the thorough grasp of national policy necessary to bring a campaign or war to a successful conclusion. The commander must be a statesman at the level where strategy and policy coalesce. The military genius must be aware of the entire political situation and know how much he can achieve with the means at his disposal. Clausewitz further writes that the mind that is most likely to display the qualities of a military genius is inquiring rather than creative, comprehensive rather than specialised in approach and calm rather than excitable⁸. In conclusion, it appears that to be a military genius requires a man's total being and that a balanced interaction of body, emotions, mind and spirit are required. This demands disciplining and training all

of one's being throughout life to prepare oneself for the ultimate service.

When considering the fate of a general of the Clausewitzian era, it is not just a question of whether he has become relatively less effective than an information age variant. Ferris and Handel go as far as to suggest that in the age of information, many attributes of the military genius may become counterproductive to the exercise of effective command⁹.

Two developments in particular of the information age raise questions concerning who or what, should conduct command, and which form the command structures and ethos should take in the future. The first of these developments is the coming maturation of artificial intelligence (AI)¹⁰. The second feature of the information age that could challenge the role of the individual commander is the rise of the network structure. In view of the above, let us first review as to how the evolving digitised battlefield impacts warfare as a whole and, in particular, military generalship.

Digital Age Battlefield

The 21st-century strategic environment, which shapes national security in the information age, is dominated by critical new developments. These include the emergence of cyberspace as an operational environment for business, politics, warfare and the impact of digital convergence, in which essentially any form of information can be expressed digitally and then combined, changed and reused in ways the originator has no control and little or no awareness of. The physical infrastructure and the virtual aspect of the cyberspace domain will create a rapidly evolving operational environment with cyberspace infrastructure that is dynamically established, changed, moved and disestablished to suit the needs and desires of friendly, neutral and enemy participants in the area of responsibility.

The word domain has taken on a near theological significance in the defence circles of the English-knowing world; in our context, it is more synonymous with 'realm' or 'environment'. It is now recognised that dimensional expanse-wise, battlefield has become pentagonal, namely, land, sea, air, outer space, virtual or cyberspace. There are cyberattacks 'ahoy', the variety of weaponry overshoots count and the styles

rupture limits of propriety and ethics ad nauseam. They target national governments, militaries, critical infrastructures, economies and social edifice by disrupting or destroying networks, software, hardware, mobiles, user interfaces and even 'wetware'. Lawrence Freedman has identified in the Revolution in Military Affairs literature, a desire for victimless war, typified by the achievement of victory through disruption rather than destruction¹¹. Christopher Coker proclaims that the ultimate manifestation of post-modern war is 'humane warfare', in which the mission is to neutralise rather than kill¹². Evidently, these visions of future war do not fit well with the emphasis placed on violence and destruction in the Clausewitzian nature of warfare.

A review of the future battlefield indicates that the additional upgrading of the infrastructures has a glass ceiling—the decision-making process. The technological upgrading of the platforms, weapon systems and command and control (C2) systems that link together the technologies on the battlefield eventually depends on the decisions to be executed. The man in the loop, as talented and competent as he may be, is restricted by his ability to handle the flood of incoming information and the decision-making time intervals on the modern battlefield. This leads us to the conclusion that the next revolution in the world of warfare will involve the decision-making process, namely—a command revolution. Just as the infrastructures had undergone a technological process, the command process is also expected to undergo modernisation through algorithms, automatic scripts, bots and automated assistants. As computer-based decision-making is introduced into an increasing number of human activities, it is unlikely that the art of command will escape this intrusion. However, it is certain that the commanders will still continue to lead men in circumstances of extreme danger and varied strategic circumstances. These considerations should dictate how contemporary technologies (AI and Networks) are integrated into the art of command.

Digital Age Commander

Revolution in Military Affairs has brought contemporary changes, as witnessed in the 1991 Gulf War, which presents mind-boggling challenges to commanders—notably those of the coordination and synchronisation of what

amounts to huge and perplexingly complex machines – albeit that their solution is, in character, Newtonian – more formulaic and mechanistic than conceptual. The overall challenge for commanders here was and is to keep pace with (and where possible, to keep ahead of) the development of warfare. A pertinent defining feature of cyberspace is the ever continuing expansion, modification, alteration and techno-modernisation of media, hardware, software, applications, protocols and so forth. The technology integrates a number of artefacts, for example, sensors, transmissions, processors and controllers ‘sufficient to generate a virtual interactive experience accessible regardless of a geographic location¹³’. Further, the ‘intelligent machine’ shaped and embodied by AI, virtual reality, cybernetics and electromagnetic networking is destined to outmatch the human intellect and would ultimately dominate the battlefield and make it galactic in all its manifestations. Therefore, it is time to look at the future battle commander in the evolving digital battlefield.

AI and Command

There are a number of reasons to suggest why conducting command with AI may confer some advantage. The first and most obvious is the requirement of speed in decision-making relative to the enemy. Of course, a decision has to be correct as well as quick. As the battlespace becomes a place of greater lethality, getting your blow in first could confer a distinct advantage. This is certainly the perspective taken by James Hazlett, who asserts that success or failure in a future war will be determined by who gets inside the enemy’s decision-making cycle first¹⁴. The US Army’s Mobile Strike Force has reported a significant increase in operational tempo for a digitised force¹⁵. ‘Joint Vision 2010’ asserts that increased operational tempo and greater force integration will probably create a more stressful and faster-moving decision-making environment¹⁶. Clearly, computers have the ability to process certain forms of information much more quickly than humans, and although one may shy away from the prospect of giving command authority to a computer, the danger exists that the enemy may not. This latter point can be termed the ‘digital imperative’, namely that there is pressure to employ AI in command for fear that the enemy may do so whilst you do not. In such a scenario, a force under human command could have a much slower decision-making

cycle relative to the one under the command of AI. In this respect, the existence of an intelligent enemy may, in this case, provide the impetus for a radical change in the information age. Besides above, a digital age commander will have several other advantages over a Clausewitzian commander such as:

- He will not be emotional or susceptible to psychological pressure.
- Can plan several options and in a much shorter time frame.
- Can carry out a comprehensive study and analyse past commanders, equipment and technologies.
- He will not suffer from ill health or fatigue on the battlefield.
- Will have greater familiarity with the regularly updated terrain for its better application with the help of satellites and other reconnaissance assets and,
- Will have a particular advantage of moral courage to bear the responsibility of the command and the computer will not suffer from the opposite human failings of overconfidence.

On the other hand, if we accept that warfare will continue to be characterised by Clausewitz’s climate of war and men on the scene with guns, their human attributes and considerations will remain crucial to the successful conduct of command. In such a scenario, an AI commander will be found lacking in the following aspects:

- Lack of emotion and the attendant empathy will prevent the commander from being able to motivate the men it commands. Soldiers can never trust the decisions taken by a computer (central processing unit) that can never share their same sense of humanity.
- Computer (AI) cannot match the face-to-face interaction of a commander with his troops/command. The men gain confidence from their commander when visited by him in the battlefield and their morale rises.
- It is questionable whether an AI commander could appreciate and understand his subordinate’s personalities.
- Security and well-being of a commander is an important consideration. Concerns that highly

worry the designers of digitised forces are issues related to the security and integrity of the information system.

- Lastly, it would seem ill-judged to place the burden of command on machines which can and do crash at times or can produce catastrophic failures due to a few lines of incorrect codes.

We can, therefore, see that there are clearly a number of reasons to suggest that AI rather than humans could conduct certain aspects of command more effectively. Yet understandably, the prospect of handing the command of our armed forces over to computer software programs may seem like a fanciful, alien and uncomfortable thought. However, as Van Creveld notes, some decision-making has already been automated. War by its nature is an act in the service of policy¹⁷. It is this most basic of considerations that raises the first doubts concerning the role AI can play in the art of command. One possible method of keeping an AI commander operating within a political framework is through detailed and extensive rules of engagement.

As warfare in the information age comes to rely more directly upon information, as it takes place in an increasingly extended battlespace and as the tempo of operations increases significantly, it may be time to spread the automation of decision-making further up the levels of war. At the very least, AI may have to play a role as an aide to a human commander¹⁸.

Networks and Command

Further, generalship by the individual is challenged by another element of the information age: the network. In order to perform proficiently, a command process has to adapt to changed circumstances. Napoleon's command system and the organisation of his forces, particularly the corps system, was an adaptation to the level of information available, and to the size and dispersal of the forces, he commanded¹⁹. Analysts regard the rise of the network as a direct challenge to the relative efficacy of the hierarchical command structure. At the forefront of this discourse are Arquilla and Ronfeldt. Arquilla postulates that "the information age implies generalship by the many, the decentralisation of authority"²⁰. Arquilla does temper this thought

somewhat by noting that military organisations will always retain an element of hierarchy with someone who has ultimate command responsibility.

Taken as a whole, Arquilla and Ronfeldt's ideas are best summed up by their notion that 'cyberwar', a form of warfare which centres around the battle for information, dictates a shift from 'C2' to 'consultation and coordination'²¹. With these thoughts in mind, the future of the military command organisation may reside in the creation of hybrid organisational structures, which utilise elements of both hierarchies and networks. A virtual dimension has emerged that requires reconciliation with the physical and cognitive dimensions for commanders to define and operate in their respective operational environments. The virtual dimension allows combatants to traverse the physical and cognitive dimensions in time and space, to yield direct and indirect approaches to obtain a military advantage. The combination of these three dimensions provides the lens through which an operational environment is understood and the security-related behaviour of both humans and their machines is influenced.

Since all these challenges require the conventional combat commander to jettison some old and often deeply held tenets, it is perhaps worth recalling Basil Liddell Hart's view that "the only thing harder than getting a new idea into the military mind is to get an old one cut."

Conclusion

The asymmetric challenges posed to modern armed forces commanders, by opposing commanders who refuse to engage them in modern, conventional warfare, but instead choose a non traditional style of warfare, are largely of a different sort—challenges that are not primarily overcome with the tools of modernity—more advanced technology, firepower, lethality, speed, stealth, digitisation, logistics, network-centric warfare or hi-tech 'shock and awe'. Much of this ideological struggle is carried out in the virtual domain of cyberspace. Time is a key—sometimes the only key resource and one which our opponents are likely to hold in far greater quantity than we do. The nature and characteristics of these operations point towards the roles in which military commanders may expect to find themselves and the

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competencies they require. Particularly striking is the far greater diversity of roles than is demanded by combat operations alone. Technological (AI) and organisational (networks) developments of the information age, as well as the character of future war, suggest that command, as it is practised today, may have to adapt. Certainly, the digital imperative could lead to an increased use of AI as a significant aide to the human commander.²²

However, despite these upcoming developments, the command will still retain many of its essential attributes from the past. Warfare and, therefore, command will continue to essentially remain a mix of human and political activities. In this context, the presence of humans in the art of command, and in particular, the requirements for leadership and strategic judgment, will ensure that the future will not be without great individual commander.

Notes

1. Winston S. Churchill, quoted in M. Carver, "Montgomery," in John Keegan, ed., *Churchill's Generals*, (London: Weidenfeld & Nicolson, 1991), p. 148.
2. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret, (Princeton, New Jersey: Princeton University Press, 1976), p. 100.
3. Ibid., p. 100.
4. Quoted in David G. Chandler, *The Campaigns of Napoleon*, p. 139.
5. Michael Handel, *Masters of War*, p. 153.
6. Ibid., p. 167.
7. John Ferris and Michael Handel, "Clausewitz, Intelligence, Uncertainty and the Art of Command," p. 45.
8. Clausewitz, n. p, p. 112.
9. Ferris and Handel, 'Clausewitz, Intelligence, Uncertainty and the Art of Command, pp. 44-5.
10. Michael Gruber, "In Search of the Electronic Brain," *Wired*, May 05, 1997, p. 144.
11. David Freedman, *Information Warfare*, p. 6.
12. Christopher Coker, "Post-modern War," p. 14.
13. Charles A. Beard, "Time, Technology, and the Creative Spirit in Political Science," *American Political Science Review*. vol. 1, no. 5, February 1927, quoted in Wikipedia, <[http://en.wikipedia.org/wiki/ Technological_determinism](http://en.wikipedia.org/wiki/Technological_determinism), accessed on September 13, 2012.
14. James Hazlett, "Just-in-Time Warfare," p. 116.
15. Col. Rolland A. Dessert, Jr, "Mobile Strike Force: An Experiment in Future Battle Command," *Military Review* vol. 76, no. 4, 1996, p. 35. Blaker also concludes that RMA operational theory results in a higher tempo. See James Blaker, *Understanding the Revolution in Military Affairs*, p. 23.
16. See Joint Chiefs of Staff, 'Joint Vision 2010', p. 41.
17. Van Creveld, *Command in War*, pp. 186-7.
18. Holden Reid, 'Enduring Patterns in Modern Warfare', p. 28 and Vegetius, *Vegetius*, p. 80.
19. Van Creveld, *Command in War*, p. 72.
20. Quoted in Ashley Craddock, 'Netwar and Peace in the Global Village', p. 226.
21. John Arquilla and David Ronfeldt, "Cyberwar is Coming," p. 45.
22. See FM 100-6, pp. 1-5.

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