# Networking not 'the Network': the Key to Information Age Warfare

**By Wing Commander (Ret'd) Stew Edmondson**

Following the lead of the United States, the UK Armed Forces are harnessing information technologies through a concept called Network Enabled Capability (NEC). There is no empirical proof that the quality of military judgement has improved with the spread of networked computing and information systems. Nevertheless, we are encouraged to trust that decision making will somehow be 'better' in the NEC future. At best this paper will argue that investments in network infrastructure will provide improved Network Enabled *Capacity*. The provision of improved interconnectedness and sharing of information may provide the potential to make improvements in the cognitive domain. However, the main thesis presented in the paper is that the nirvana of making 'better' decisions cannot be extrapolated directly from improvements made in the network infrastructure and information levels. It will be argued that this is a fallacy based on the adoption of a technological rather than a constructivist view of information. Moreover, that it fails to take proper account of the actual cognitive processes associated with decision making. It is posited that exploiting social networks could provide the key to improving cognitive performance and to making 'better' decisions in the future; thus emphasising the importance of networking, rather than 'the network' in Information Age warfare.

*"War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty"*[1]

**Introduction**

The period covering the late twentieth century and early years of the twenty-first century is now commonly accepted as the 'Information Age'.[2] During this period we have been witnessing the rapid growth of post-industrial economies and increasing globalisation both driven by developments in information and communications technologies. Increasingly ubiquitous communications and pervasive computing have empowered post-modern societies and transformed industries. Questions about the impact of the 'Information Age' on warfare and about the effect of the underpinning technologies have spawned a plethora of works by military writers, academics and strategic scholars.

Network Centric Warfare (NCW) has been described as 'the way we will organize and fight in the Information Age'.[3] It envisages distributed forces capable of achieving and leveraging rapid decision superiority in order to deliver massed effects across the battle-space and thereby generate increased combat power.[4] Following the lead of the United States, the UK Armed Forces are also harnessing advances in information technologies through the adoption of a concept that has been labelled Network Enabled Capability (NEC).[5] It is claimed that NEC will 'allow us to prosecute the full range of contingent operations with greater awareness, confidence and control'.[6] In order words, the introduction of NEC is expected to disperse the uncertainty and 'fog' of war described in the opening quotation by Clausewitz.

It is axiomatic to state that decision making by military commanders is fundamental to the successful prosecution of warfare. Equally, it is self-evident that knowledge underpins successful decision making. Yet there is no broad-based empirical proof that the quality of military judgement has improved with the spread of networked computing and information systems. Nevertheless, we are encouraged to trust that decision making will somehow be 'better' in the NEC future.[7] However, there appears to have been little research into the cognitive dimension of NEC, to explore and challenge the notion that decision making will be 'better' in the future.

The Joint Higher Level Operational Concept (Jt HLOC) is the Ministry of Defence's (MOD) capstone document for articulating ideas about the future operational level of warfare. The Jt HLOC identifies that a future chaotic, non-linear, battle-space and the emerging information environment will threaten traditional mechanistic command behaviours. Commentators have also noted that the abundance of readily available information can become confusing and act as a distraction. Undoubtedly, information systems can be helpful to an extent; however, they are fundamentally blunt tools when it comes to appreciating critical nuanced contexts and to applying military judgement. Furthermore, information management techniques

have not yet advanced sufficiently to meaningfully assist in extracting meaning from the available information. Therefore, this suggests that there is no direct linkage between information related technological advances and improvements in the cognitive processes of military command.

Advocates of NEC assert that it has the potential to completely revolutionise the conduct of warfare.[8] Yet the constraints of Defence funding have led the MOD to focus on the development of capabilities that are seen as 'key enablers', rather than making a more substantial, transformational, investment. These key enablers have been defined as sensors (ISR platforms), communications assets and precision strike capabilities. At best these investments in the physical level of network components can only improve inter-connectedness. Hence, they can only provide Network Enabled *Capacity*. The crucial point being that to leverage these improvements into decisive capability requires concomitant improvements in the cognitive dimension of decision making. Without these cognitive improvements, we shall just have an improved network without an enhanced exploitation capability. While the 'network' allows connections to be made, it is people who create the actual connections and thereby exploit the interconnectivity.

Furthermore, all too often particular emphasis on the need for increased tempo of decision making, rather than focussing on the quality, appropriateness and context of the decision. The MOD investment strategy, produced for the 2004 Spending Review, goes even further by stating that:

*"NEC will enable all three Services to operate efficiently and effectively together…..by having a clear picture of the battle-space our forces will have the ability to respond quickly and decisively, delivering the same military effect with fewer combat platforms".*[9]

Thus NEC is seen as a means of achieving input efficiencies. Clearly this line of reasoning may have been deployed in order to justify investment in NEC; nevertheless, it takes a rather narrow view of military effectiveness. It also infers that there is a direct link between providing improved situational awareness – 'a clear picture' – and delivering decisive military effect. However, as Gray observes, while 'better' information is always nice to have it cannot be translated into a magical military sword.[10] Moreover, research has shown that more information is not better if you already have what you think that you need.[11] This idea is supported by Malcolm Gladwell in his work on the power of 'thinking without thinking'.[12] He has shown that conclusions reached within minutes are often as good as those reached through careful research and deliberation. He describes such fast and frugal thinking as 'thin-slicing' and considers this it is based upon the subtle, or even unconscious, rapid screening of information to identify key elements. Therefore, this all undermines one of the key notions of NEC – that 'improved' information can be translated directly into 'better' military effect. Consequently, this leads to the deduction that the ardent pursuit of information superiority may be unnecessary, as it fails to take

full account of the apparently limited inputs required by commanders in order to make decisions.

There is a consensus that the complexity, uncertainty and its multi-dimensionally nature mean that war is fundamentally different to other human endeavours. Yet this seems to have been largely overlooked by JSP 777. It is inferred that information superiority will generate not only quicker, but 'better' decisions. The NEC Benefits Chain has shared situational awareness, leading to shared understanding and then 'better' decisions, underpinned by a digitized, connected, network.[13] It is not completely clear whether 'better' means 'improved', in comparison to pre-Information Age decisions, or whether it means 'better' relative to an adversary's decisions. Nevertheless, some commentators envisage decision superiority, which is defined our decisions being superior relative to the enemy's, as some sort of 'high peak' of digitization. This appears to be a reductionist perspective, which vastly oversimplifies the complex nature of warfare and, especially, underplays the critical importance of the cognitive dimension – of how commanders think and their actual decision making performance.

That is not to say that the provision of improved interconnectedness and sharing of information will not provide the *potential* to make improvements in the cognitive domain. However, the nirvana of making 'better' decisions cannot be automatically extrapolated from improvements in the network infrastructure and information levels. Warfare is too richly textured and too multi-dimensional, to be reduced to decisive resolution by information superiority. This is because providing better connectivity and managing information – the elements of information superiority – are plainly not the same as strengthening cognition. It seems that too greater focus is placed on the more tangible aspects (of the network) without paying sufficient attention to the cognitive aspects.

It is possible to produce a simple typology to conceptualise the relationship between data, information and knowledge. In such a typology, data is defined as a set of discrete, objective, facts about events. When data is organised, patterned, grouped and categorised i.e. given context, it becomes information and when information is contextualised, that is to say when it is given meaning and put into productive use, it becomes knowledge. Generally, we tend to have a technology orientated outlook of information. This view is based on the information theories developed by Shannon in the late 1940s. He considered communications to be a linear process in which the sender constructs a message, which is then coded and transmitted over a channel. At the receiver there is a decoder which reverses the coding process and changes the message into some form suitable for input to the receiver. This approach has a sound mathematical basis and focuses on the amount of information i.e. the number of 'bits' that are moved over the channel. This approach has been widely used in communications engineering and information technology; it has many strengths,

especially in determining channel capacity and, through the introduction of information entropy, as a measure of uncertainty. However, this systematic approach is actually inadequate for understanding the full richness of information. This is because Shannon's work has a fundamental weakness; it ignores issues associated with meaning and interpretation. When using this information theory approach it is assumed that the message *is* the communication and the possibility of unintended consequences arising from differing interpretations (between sender and receiver) are not considered.

On the other hand, we can take 'social interaction through messages' as a definition of communications.[14] In this case a constructivist approach, developed primarily from anthropology, can be used as the model to consider information. Constructivism views all knowledge as 'constructed'. This is based on the notion that people use mental images and models, in other words frames of reference, in order to understand and make sense of the world. The constructivist approach argues that because of differing perceptions and their differing social experiences the way that each person constructs their representation's and achieves understanding is unique. Therefore, this infers that different people, especially from different cultural backgrounds, will create different models of reality. This explains why individuals can view the 'same' information, or situation, differently.[15] This is a fundamentally important point when considering NEC. Some commentators assert that 'in the twenty-first century, *information* can lose, and win wars all on its own'.[16] However, this is erroneous. It is actually the understanding and meaning drawn from information and the subsequent decisions made that make such a difference. In itself, information is a passive, neutral, entity. This point, about the criticality of understanding and meaning, is frequently ignored in NEC related literature. This is because the technological based interpretation of information tends to dominant, while the constructivist approach is largely overlooked.

Improving decision making capabilities in the context of enduring uncertainty, rather than attempting to attain certainty, should be given greater prominence. Air Chief Marshal Sir Brian Burridge has reflected about uncertainty in his powerful description of his experiences as the commander of British Forces in the 2003 Iraq War:

*"The battle-space is complex and ambiguous……it's rather like looking into a kaleidoscope and turning the end seeing the patterns merge and change. Our job was to stop the kaleidoscope turning so a single pattern emerged, bringing order to the maelstrom of ambiguity and complexity".*[17]

This metaphor, as ACM Burridge acknowledges,[18] draws on Kanter's concept of 'kaleidoscope thinking'. This is a way of finding pathways though chaos by looking at situations from different – 'shaken up' - perspectives in order to produce entirely new patterns. It is through the cognitive process of applying knowledge-based judgement that different patterns emerge from the

observed events in the battle-space.

In his recollection ACM Burridge also raises the issue of ambiguity. Ambiguity can be defined as situations where objectives, technology or experience are unclear. As solutions and problems can also be intertwined, this places a significant burden on decision makers. Given the adversarial nature of warfare and because time is often a critical factor, then it can be argued that a 'good enough' decision will often suffice and that 'better' is often the ruin of 'good enough'.[19] Rather than striving for 'better' decisions in the first place perhaps, given the nature of war, we should be settling for 'good enough' decisions? Exactly how decisions are made will be examined in the following sections, which will examine the cognitive processes of sense making and decision making.

Sense making has been described as turning circumstances into a situation that can be comprehended explicitly in words and so serves as a springboard into action.[20] Or to put it another way, 'it is knowing what's going on so you can figure out what to do'.[21] Therefore, sense making has an important place in the cognitive process by providing the decision maker with sufficient understanding and appreciation in order to make decisions. One piece of military based research has shown that a good sense making process actually proved to be more important for producing good decisions than the provision of high quality information (that proved to be of little value).[22]

There is also further empirical evidence to show the role that sense making plays in military success. Researchers examined one hundred and forty nine specific decision events associated with both military successes and failures. Their analysis showed that prior knowledge was relatively less influential than emotions, beliefs, cognitive factors and mental models (all components of sense making). When successful decision events were compared directly with unsuccessful ones, the key discriminating factors were 'did individuals develop appropriate situation awareness' and 'was sense made of the situation'.[23] Again this stresses the importance of cognition, relative to the information superiority focus prevalent in much of the current NEC thinking. Therefore, this links gaining understanding, by synthesising observed events, with previous experience in order make sense and to 'stop the kaleidoscope turning'.

The importance of experience to sense making has also been highlighted in research by Lipshitz and Saul on simulated sea combat by Israeli Defence Force gunboat commanders. They found that experts 'read' situations more accurately than novices. That is to say the experts were able to extract nuanced meaning that non-experts either overlooked or were unable to see.[24] Their findings led to the deduction that the experts were able to construct more complete and accurate mental models and, hence, make successful decisions. This notion has resonance with the approach practiced by Napoleon:

*"….before entering on an undertaking, I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in*

*circumstances unexpected by others; it is thought and meditation".*[25]

This leads onto two important deductions. The first being the importance of creating time to think through and to envisage how future courses of action are likely to unfold and, second, the importance of 'out thinking' the adversary, rather than 'out networking' them.

Classically, decision making is portrayed as a logical, step-by-step, process centred on choosing the best option (in terms of outcome) from a comprehensive set of potential alternatives. This is described as the Rational Choice Strategy (RCS) for decision making. RCS deals with complex problems by trying to decompose them into simpler ones; these decomposed elements are then analysed and the results 'pasted' together. By being explicit, articulate and systematic – so the orthodox view goes – decision makers are thinking in ways that deliver optimal solutions. Rational decision making methodologies are based on assumptions of clear, non-conflicting, objectives and of perfect knowledge of the problem.

However, if it is accepted that warfare has a non-linear and unpredictable nature, then it follows that the utility of RCS is undermined as unique situations cannot be resolved through objective analysis.[26] Behavioural studies and research have shown that in reality decision making frequently does not conform to the neat processes of prescriptive decision theory. This is particularly true when decision making takes place in the context of uncertainty, within a complex environment and when there are time pressures. Therefore, this all suggests that, at best, decision making based on rational approaches may only have a limited applicability for military commanders. While the 'rational calculus' of Clausewitz, forms the traditional basis of a systematic military decision making process, as Handel observes, Clausewitz was also fully aware of the crucial importance of non-rational factors stating that '….war is an act of forces, the emotions cannot fail to be involved'.[27] Given the limitations of rational decision making models, then alternative approaches (by implication ones using less rational paradigms) are actually employed.

Klein declares that effective decision makers primarily employ a Recognition-Primed Decision (RPD) model which fuses two processes, first intuition to recognise key patterns that indicate the dynamics of a situation and second, imagination to evaluate potential courses of actions.[28] In other words, an intuitive decision maker takes the significant points from the decision situation and probes his memory for a contextual recollection. He then uses knowledge about the previously encountered situation to steer his actions in the current situation. As Napoleon has been quoted:

*"the knowledge of the higher conduct of war can only be acquired ……..by* ***one's own*** *[my emphasis] experience".*[29]

While this may have been true in the past when commanders enjoyed only very limited inter-connectivity, it undervalues how knowledge and experience can now be shared across networks and be used to improve decision making.

By leveraging cognitive resources from across networks, it is argued that thinking superior to one (albeit potentially talented) commander can be produced. In effect, networking can bring more 'brain power' to bear on a problem and this can create a decisive cognitive advantage.

To begin to discuss the importance of networking, it is worth considering the following declaration from Surowiecki:

*"Even if most of the people within a group are not especially well informed or rational, it can still reach a collectively wise decision".*[30]

In this assertion he is advocating that, despite individual shortcomings, when aggregated in the right way our collective wisdom – what can be described as the 'wisdom of crowds' - is often excellent. This perhaps appears, at face value, to be a surprising statement and one that runs counter to traditional notions of organisational hierarchies and the concomitant orthodoxy of military decision making.[31] To properly appreciate the usefulness of networks, we need to turn to mathematics and the study of Complexity Theory and Metcalfe's Law, which formally demonstrate that networks add value.[32] Further, if it is accepted that relationships are important for the acquisition of information and that the creation of knowledge is a social process, then networking can be considered as the means that these relationships are enacted and knowledge is created.

Ultimately, it is envisaged that NEC will enable the 'dynamic creation of mission groups enabled by distributed collaborative working'.[33] Nevertheless, even the most enthusiastic advocates acknowledge that it may be decades before network forms are adopted for *formal* organisational structures.[34] However, technological enabled *informal* (or social) networks are already being employed within the military to enhance individual's decision making skills. As we have seen, experience is key requirement for effective decision making. The importance of informal professional networks, in other words communities of practice, for pan-Defence knowledge exploitation is acknowledged in the MOD's Knowledge Strategy.[35] Communities of practice are types of informal network that can help personnel develop greater professional competence through the exchange of ideas between peers. One such manifestation of a community of practice is CompanyCommand.com.[36]

Originally an Internet based discussion forum, CommanyComand.com has developed into an effective professional forum for connecting past, present and future company commanders in the United States Army.[37] It aims to support officers facing professional challenges by providing a means of seeking advice from their peers who have been in similar situations. This type of peer-to-peer development challenges some traditional assumptions about development, especially the paradigm of drawing on the wisdom of anointed experts. However, it follows the core tenet of organisational learning, in that it enhances the ability to create. In particular, it allows officers to draw on knowledge that has grown out another individual's unique experience and it provides context

specific (rather than broadly applicable) advice. Furthermore, it is evident from the success of CompanyCommand.com that people have greater trust in and; therefore, are more receptive to, advice from their peers. This is because there is an emotional dimension to the support provided.

In CompanyComand.com we see information technology being used as a platform to facilitate networking, trust building and learning in order to develop improved decision making competencies. This informal network has grown organically and provides a vibrant illustration of how network enabled capability can be created. It offers a model of how for future, Information Age, military decision making can be augmented in order to improve cognitive performance.

**Conclusion**

The period of the late twentieth century and early years of the twenty-first century is now commonly accepted as the Information Age. Striking developments in information and communications technologies have enabled the rapid growth of post-industrial economies and have facilitated increasing globalisation. However, there are divergent opinions about the effect that the Information Age will have on the conduct of future warfare. Nevertheless, it is clear that the growing ubiquity of communications and the pervasiveness of digital information will present challenges for future, operational level, military commanders. In the UK, it is intended that NEC will enhance the efficient sharing and exploitation of information. This, in turn, it is expected will enable commanders to make 'better' decisions and thereby deliver decisive military effect. However, current investments in NEC are principally focussed on the physical infrastructure of the underlying networks. This will provide improved interconnectedness, which can be depicted as Network Enabled *Capacity*. Yet to leverage these improvements into decisive military capability requires accompanying improvements in the cognitive environment. While 'the network' allows connections to be made, it is people who exploit the connections. Attempting to acquire complete information about the future battle-space is a key notion associated with the underpinning philosophy of NEC. Yet this idea fails to take account of the actual cognitive processes associated with decision making. There is an expectation that NEC will, in some way, dissipate the 'fog of war' and thus reduce the chaotic aspects of warfare. This is an example of reductionism, as it fails to take account of the importance of interpreting and exploiting meaning from information. This is important because, in itself, information is a passive entity. It is actually the understanding gained from information, and the subsequent decisions made by commanders based on this understanding, which create decisive cognitive advantage. The crucial point about the criticality of understanding and meaning is frequently neglected by the advocates of NEC. This is because the technological based interpretation of information tends to be dominant, while the constructivist approach is largely overlooked. Put simply,

improving networks and managing information is not the same as strengthening cognition.

There is a persuasive argument that the human dimension and, especially the Clausewitzian concept of friction, will not be eliminated from warfare by better information-led technologies. The abundance of readily available information can also become confusing and act as a distraction. Moreover, research has demonstrated that battlefield commanders only use a very small amount of information to make decisions. Therefore, it is a corollary that the effort expended in collecting information is often out of all proportion to its usefulness. It is the effectiveness of commander's cognitive performance, rather than the ability to gain information superiority, that is critical to achieving decisive military advantage.

Successful commanders must also be able to make decisions despite the enduring uncertainty of warfare; this ability has been described as 'kaleidoscope' thinking. Classically, the decision making process has been viewed as rational practice centred on defining the problem and then choosing the optimal solution from a number of options. Here the logic of right brain thinking is dominant. However, in reality, intuition (which associated with the, less rational, left brain) based upon knowledge and experience, is actually central to the way experts make decisions. Experts predominantly employ a type of naturalistic decision making which is characterised by the use of experience in order to rapidly sift through their memory's searching for familiar patterns, rather than concentrating on choosing among options. They also tend to focus on 'satisficing', which is looking for a solution that works, rather than the optimal one. Here information-based reasoning is used to augment intuition.

Despite individual shortcomings, a group can produce collectively wise decisions. Rather than just relying on his own cognitive capabilities, both the experience and 'thinking power' available to a commander can be enhanced by exploiting networks. Relationships are important for the acquisition of understanding, as the creation of knowledge is a social process and trust is said to reduce the impedance of information flows across networks. Therefore, informal networking can be considered as the means that these relationships are enacted. In effect, networking allows the collective 'brain power' of a group to be brought to bear on a problem. It also enables learning through the transfer of experience. CompanyComand.com is an example of information technology being used as a platform to successfully facilitate networking in order to improved cognitive performance. This informal, social, network has grown organically and provides a vibrant illustration of how network enabled capability can be created.

**Notes**

[1] Clausewitz, Carl von, quoted in *Handel, Michael, Masters of War: Classical Strategic Thought* (London: Frank Cass, 2001), p.244.
[2] See for instance, Lonsdale, David, *The Nature of War in the Information Age: Clausewitzian Future* (London: Frank Cass, 2004), p.1 and Cares, Jeff, *Distributed Networked Operations*,

(Lincoln NE: iUniverse, 2005), pp.1-2.
[3] Alberts, David, Garstka, John and Stein, Frederick, *Network Centric Warfare: Developing and Leveraging Information Superiority* (Washington DC: Command and Control Research Program, 1999), p.2.
[4] *The Implementation of Network Centric Warfare*, Director of Force Transformation, Office of the Secretary of Defense, January 2005.
[5] NEC is about the "linking of sensors, decision makers and weapon systems so that information can be translated into synchronised and overwhelming rapid effects". The UK Joint High Level Operational Concept, p.3-3.
[6] *Delivering Security in a Changing World: Defence White Paper*, Ministry of Defence, December 2003, p.11.
[7] Joint Service Publication 777, Network Enabled Capability, Edition 1, p.8.
[8] See for instance Meiter, J, 'Network Enabled Capability: A Theory Desperately in Need of Doctrine', in *Defence Studies*, Volume 6 Number 2, June 06, p.189.
[9] Departmental Investment Strategy, Spending Review 2004, p.6.
[10] Gray, *Modern Strategy*, p.246.
[11] Jensen, Eva, 'Good Sense Making is More Important than Information for the Quality of Plans', paper presented at 11th ICCRTS (Coalition Command and Control in the Networked Era), 26-28 September, 2006.
[12] Gladwell, Malcolm, *Blink: The Power of Thinking Without Thinking*, (London: Allen Lane, 2005), pp.11-17.
[13] JSP 777, p.8.
[14] Fiske, John, *An Introduction to Communication Studies* (London: Routledge, 1990), p.2.
[15] This section draws on ideas by Quintas, Paul 'Theories of Communication' in *Managing Knowledge: Communication* (Milton Keynes: Open University, 2002), pp.11-23.
[16] McColl, John, 'Adapting Command Hierarchies', *RUSI Journal*, February 2004, p.54.
[17] Burridge, Sir Brian, 'Strategic Guidance and the Context for Air Power' *RUSI Journal*, June 2004.
[18] Reference to 'kaleidoscope thinking' is included in the transcript of ACM Burridge's Windsor Leadership Annual Lecture delivered on 19 November 2003. (Obtained through private correspondence with ACM Burridge).
[19] Schmitt, John, 'How We Decide' in *Marine Corps Gazette*, October 1995, p.17.
[20] Weick, Carl, Sutcliffe, Kathleen and Obstfeld, David 'Organizing and the Process of Sense making' in *Organization Science*, Volume 16, Number 4, July-August 2005, p.409.
[21] Unnamed USAF pilot quoted by Leedom, Dennis, *Final Report*, Sense Making Symposium (Washington, DC: CCRP, 2001), p.7.
[22] This conclusion was reached following a study carried out using SO3 level students at the Swedish National Defence College. See Jensent.
[23] Leedom, pp.5-6.
[24] Lipshitz, Raanan and Shaul, Orit, 'Schemata and Mental Models in Recognition-Primed Decision Making' in Zsambok, Caroline and Klien, Gary, (eds) *Naturalistic Decision Making*' (Mahwah, NJ: Erlbaum, 1997), pp.295-6.
[25] Quoted by Burridge. See lecture transcript.
[26] Handel, p.43.
[27] Quoted by Handel, p.398.
[28] Klein, *Sources of Power: How People Make Decisions*, pp.24-30.

[29] Lonsdale,'Strategy: The Challenge of Complexity', p.61.
[30] Surowiecki, James, *The Wisdom of Crowds: Why the Many are Smarter than the Few*, (London: Little, Brown: 2004), p.xv.
[31] This is a tradition with its origins in the 'qualities or traits' approach to leadership. See *Leadership in Defence*, pp.A13-16.
[32] See Moffat, James, *Complexity Theory and Network Centric Warfare*, (Washington DC: CCRP, 2003).
[33] JSP 777, p.10.
[34] Arquilla, John, and Ronfeldt, David, 'Looking Ahead: Preparing for Information-Age Conflict', p.455.
[35] Knowledge Strategy, DG Info/ CDMA/06-01-05-01, Version 4.1, 1 March 2004, p.5.
[36] Dixon, Nancy et al, *CompanyCommand: Unleashing the Power of the Army Profession* (West Point, NY, Center for Advancement of Leader Development, 2005).
[37] Company Command was included in the *Havard Business Review* list of Breakthrough Ideas for 2006, See 'Peer-to-Peer Development', *HBR*, Volume 84, Number 2, February 2006, pp.56-57.