ICCRTS 122
UK 01

2004 Command and Control Research and Technology Symposium

The Power of Information Age Concepts and Technologies

Title of Paper

Commanding Mission Groups

A speculative model

Name of Author

Lt Col Merfyn Lloyd OBE

Point of Contact:

Merfyn Lloyd

Organization:
Defence Science and Technology Laboratory

Complete Address:
Room N131
Dstl Malvern,
St Andrews Rd,
Malvern,
Worcestershire
WR14 3PS
United Kingdom

Contacts:
Tel: +44 1684 771472
Fax: +44 1684 771436

e-mail:
malloyd@dstl.gov.uk

This paper is the 1st in a set of 13 presented to the 9th ICCRTS by staff of the Defence Scientific and Technical Laboratory (Dstl) and QinetiQ plc, relating to 'command in the network enabled era'. The papers are based on research undertaken for the United Kingdom Ministry of Defence's 'Network Enabled Capability' programme and, unless otherwise stated, are covered in whole or in part by Crown Copyright.

Document Identifier: DSTL/HB11138

Commanding Mission Groups

A Speculative Model[1]

Lt Col Merfyn Lloyd OBE

Room N131
Dstl Malvern,
St Andrews Rd,
Malvern,
Worcestershire
WR14 3PS
United Kingdom

This paper is the 1st in a set of 13 presented to the 9th ICCRTS by staff of the Defence Scientific and Technical Laboratory (Dstl) and QinetiQ plc, relating to 'command in the network enabled era', based on research undertaken for the United Kingdom Ministry of Defence's 'Network Enabled Capability' programme.

ABSTRACT

The development of a conceptual framework for Networked Enabled Capability (NEC), based on the doctrinal emphasis on the need for high levels of agility in the future force, suggests that a review of command processes is necessary if the full benefits of NEC are to realised. Central to improving operational effectiveness is the ability to deliver effects throughout the battlespace by 'agile mission grouping'; the dynamic creation and configuration of task orientated mission groups that share understanding and that employ and co-ordinate available assets to deliver the desired effect. To move beyond the initial state of NEC, new frameworks and processes are needed that take account of emerging concepts and doctrine, and the NEC themes. The command model developed here requires a high level of shared understanding, based on shared Situational Awareness and Command Intent, within and between mission groups, with an inbuilt awareness of the need to adjust rapidly to changing circumstances. The command model is supported by a command management function which, as described here, meets the requirement of the doctrinal High Level Operating Concept. These are expressed in the context of the resulting Capability Architecture which shows how mission groups might relate to each other in the transitional NEC state.

No new weapons can be introduced without changing conditions, and every change in condition will demand a modification in the application of the principles of war.

- Major General J F C Fuller, Armoured Warfare, 1943.

The command of troops in war is an art, a free creative activity based on character, ability and powers of intellect.

- HDV 100/1, *Truppenfuehrung*, 1962 (Troop leadership in the German Army).

Introduction

Recent work within the Defence Scientific and Technology Laboratory (Dstl) to develop the Network Enabled Capability (NEC) Conceptual Framework [1] considered the application of emerging concepts to military doctrine and operations in order to gain a better understanding of the NEC concepts and their implications. In addition, it was important for the credibility of NEC to find a readily recognisable and understandable way in which the concepts could be explained to a general audience. To do this, a number of 'use cases' or scenarios have been developed and initial work [2] identified how NEC might improve current processes; to do what is done now but more effectively. What has evolved is a methodology for creating simple models that allow users to think about key NEC aspects and requirements.

Central to the United Kingdom's thinking on NEC is the ability to deliver effects throughout the battlespace by the dynamic formation of mission groups (MGs), or 'agile mission grouping' [1], a key requirement of the Joint Doctrine and Concepts Centre (JDCC) High Level Operating Concept (HLOC) [3] in the conduct of effects based operations. Thus, an important next step in considering the use cases is to consider how MGs are formed, and how they might be commanded and used. In an earlier paper [4], the view was taken that a functionally orientated command structure might be more beneficial than the current environmental component structure in enabling the formation of joint tactical MGs and this needs to be carefully examined.

This paper builds on these ideas and those expressed the HLOC and NEC Conceptual Framework to develop a model for the command of MGs that can be applied in the use cases to identify new ways in which desired outcomes can be achieved.

Doctrinal Considerations.

The concepts and doctrine that provide the context for NEC are being developed by JDCC. Key amongst these is the HLOC which describes its conceptual head mark as:

> *'An ability to conduct effects based operations with highly responsive, well integrated and flexible joint force elements that have assured access to and unprecedented freedom of manoeuvre within the entire battlespace. Force elements will thrive upon tactical innovation, confident that the actions that they take will be intuitively consistent with strategic and operational objectives. The dominant characteristic of the future battlespace will be freedom of joint fire and manoeuvre'.*

Key to achieving this is the need for agility, characterised by four attributes:

- Responsiveness: Speed of reaction (to the unexpected).
- Robustness: Capable of multiple missions.

- Flexibility: Multiple paths to success (unpredictability).
- Adaptability: Learning and adapting (to the unexpected).

To support such operations, the Command Core Concept expressed in the HLOC reinforces the importance of Mission Command in the Information Age in order to deliver optimum tempo from the creativity and initiative of well-informed subordinate commanders. This will be underpinned by a network-wide expression of Command Intent and Shared Situational Awareness, together with an Adaptive Command and Control (C2) process that reduces the tension between freedom of action and alignment of strategic and operational goals; in short, an agile joint force empowered to exploit and create opportunities.

HLOC also describes, within the Inform Core Concept, the need for Decision Superiority generated by Shared Situational Awareness within and between mission-orientated groups based on a federated information architecture to enable collaborative processes within a single information domain. In developing the notion of such groups, HLOC distinguishes between dynamic communities capable of dispersed collaborative planning that form as needed, and pre-configured communities based on the need to provide a specific capability.

HLOC, thus, provides considerable high level context and guidance as to how future operations are to be conducted, including the requirement for and the nature of MGs and the way in which they might be commanded. This guidance is used to develop a command model for the use case studies.

Use Case Development

Initially, 5 warfighting and 2 peace support operation use cases were selected, amongst which was one on Urban Operations based on the need to clear and maintain a Main Supply Route (MSR) through hostile urban area in order to support operations elsewhere. These have now been extended to 18 to cover a greater spectrum of operations. The methodology used in this in initial assessment is described in the NEC Outline Concept: Part 5 - Military Operations [2].

There are 2 key elements in this method, the first of which is the identification of a 'Military Measure of Effectiveness' (MMOE), that is, the criterion by which the higher military commander would judge successful completion of the operation. This is important in order that operational success is determined in the context of the higher commander's plan and not in its own right. For example, when considering the Urban Operations use case, the MMOE applied was the 'ability for convoys to transit the MSR at any time without loss', this being the requirement of the higher commander. From this, subordinate MMOEs were derived and used in combination with a set of NEC metrics to measure the potential benefits that NEC might provide in conducting the operation in comparison to the baseline case.

The second is the development of an Information View that shows the desired informational relationships between all of the entities participating in the use case, irrespective of current information systems and connectivity. This view is important because it highlights the need for many of the entities, particularly at the joint tactical level, to co-ordinate their activities across traditional command boundaries (and in a

way not matched by current communications system lay-downs), and facilitating this is an important step in developing NEC.

The UK identifies 3 stages of NEC development, initial, transitional and mature [1] [10], as providing an evolutionary path to achieving the benefits of NEC. The essential character of this first stage of the use case analysis, which considers the initial NEC state, is that of one seeking to improve on current process. Completing the initial state analysis confirms, unsurprisingly, that the key to improving current process is to enhance our ability to share information. The next stage considers the transitional NEC state, which is characterised by major organisational change and the integration of systems to give greatly improved shared understanding. This, in turn, provides the basis for collaborative working and the initial impetus for the dynamic formation of mission groups, themselves characteristics of the mature NEC state. In these later NEC states, new processes are required that take advantage of the NEC themes [2] [10], such as shared understanding and dynamic collaborative interworking. The remainder of this paper discusses what such new processes and underlying architectures might be, based on emerging concepts and doctrine.

A Use Case Example

The Urban Operations use case example is used to illustrate aspects of the discussion that follows. It is shown diagrammatically in Figure 1 below.

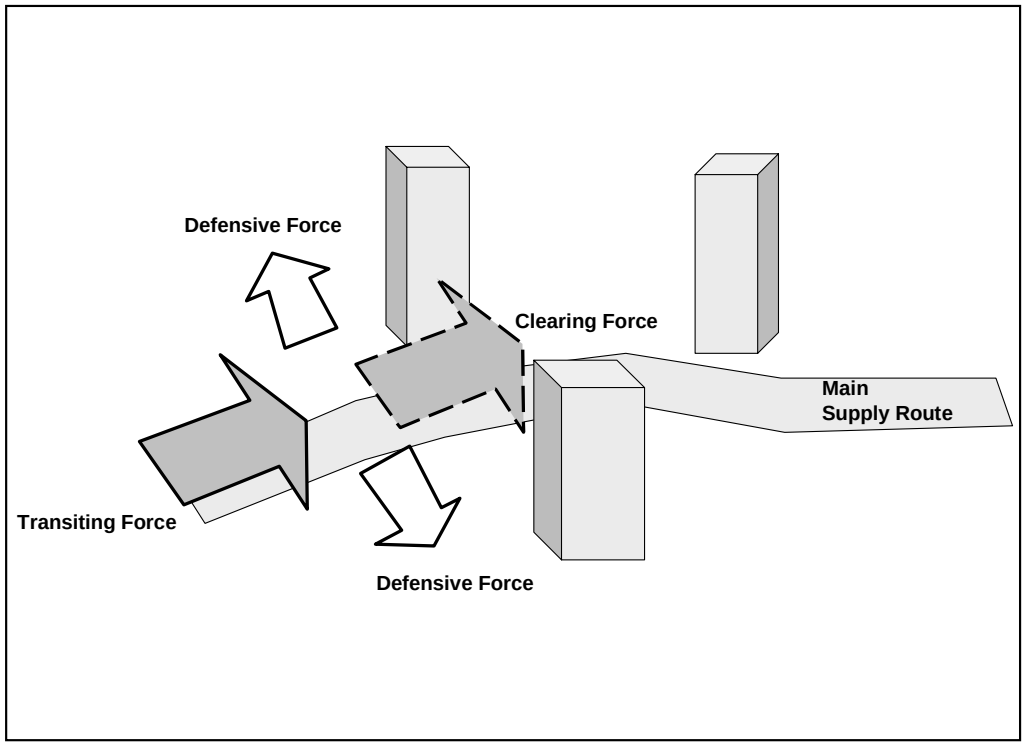


Figure 1. Urban Operations Use Case Scenario

In this initial state view, the outline Blue Force organisation is composed of an armoured brigade supported by Force assets. The brigade provides a Clearing Force to fight and seize the route and a Defensive Force to consolidate and hold the route

open. The Transiting Force is a supply convoy from Division with an escort provided by the brigade. The whole operation is supported by brigade and divisional assets including artillery, Close Air Support (CAS) and Attack Helicopter (AH) AH 64-D, in addition to ISTAR assets that include ASTOR[2] and Unmanned Aerial Vehicles (UAVs), for example, WATCHKEEPER.

Figure 2 below shows the related synchronisation matrix for the major capability elements of the force. This illustrates the procedural, linear sequencing necessary to command and control the operation if all the requisite information is to be gathered and processed, plans developed, orders issued, assets deployed, the enemy engaged and the operation co-ordinated.

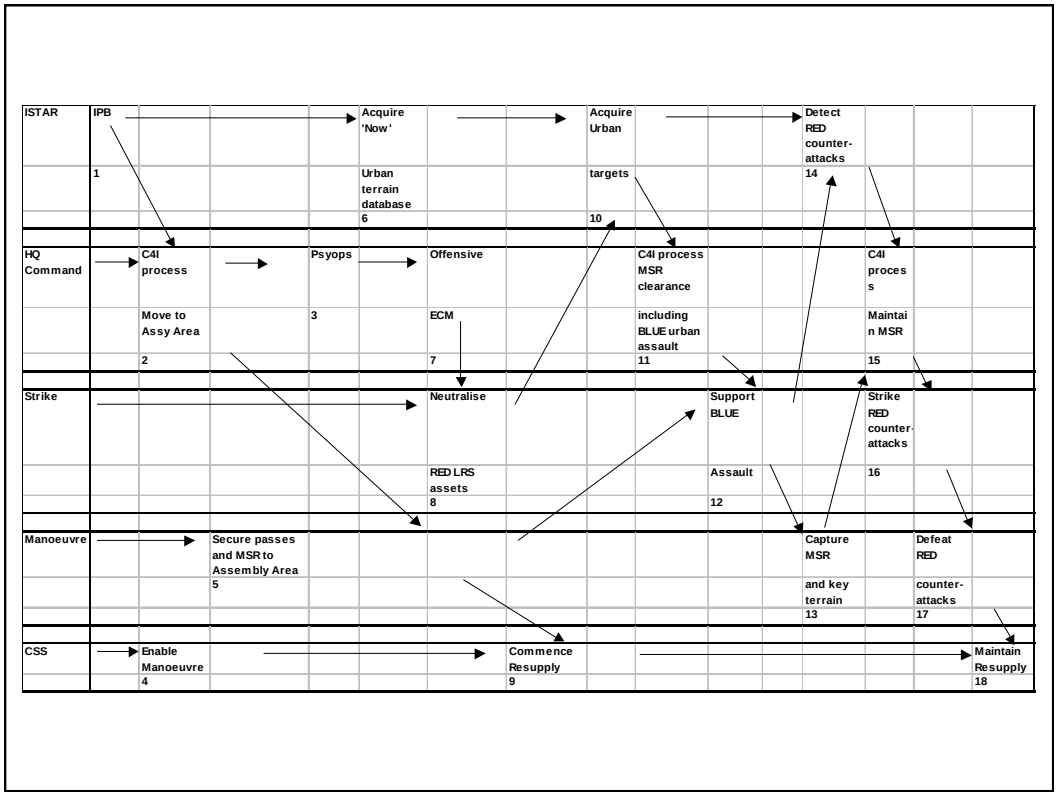


Figure 2. Synchronisation Matrix.

Anything that can be done in the short to medium term to improve conventional information sharing, shown in Figure 3 below, will have a benefit by improving the overall Situational Awareness of the participants[3]. Nonetheless the process will remain essentially a linear one and the highly levels of agility sought after by HLOC will not be obtained until much more dynamic processes are in place in the medium to long term that allow the development of Shared Understanding[4].

[2] Airborne STand Off Radar.
[3] An example of such an improvement is the provision of Blue Force Tracking technology to British Forces in the Iraqi War 2003.
[4] Also known as 'Shared Situational Awareness'.

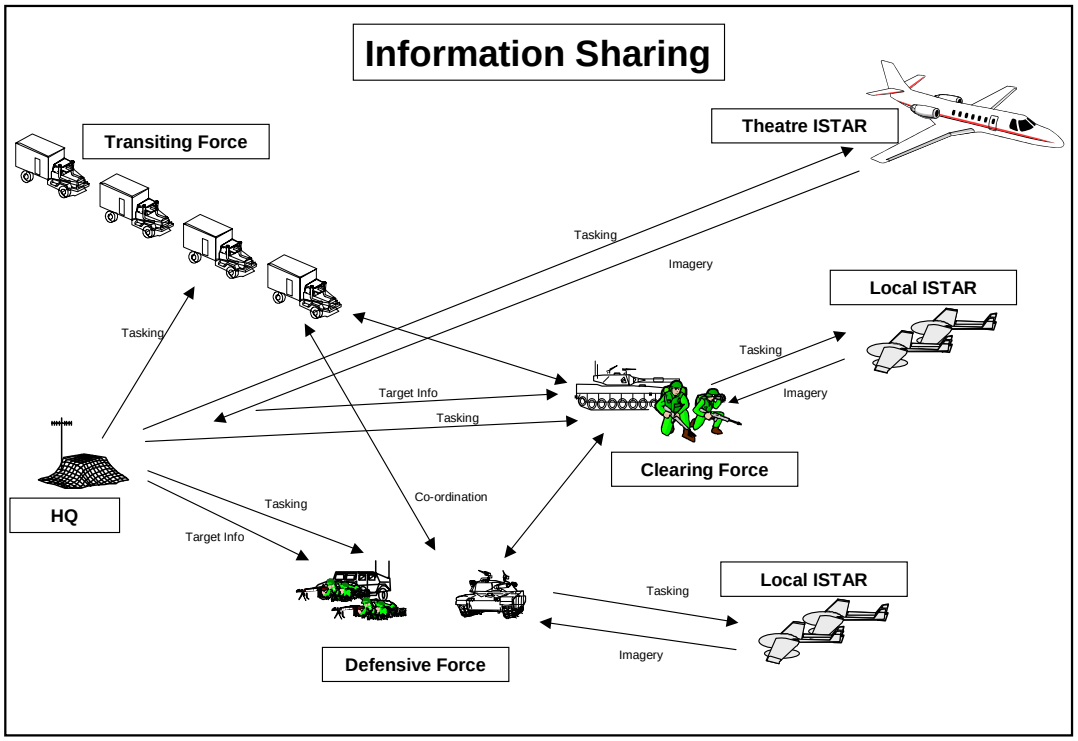


Figure 3. Information Sharing.

Shared Understanding and Command Intent

Shared Understanding is more than the aggregated or collective Situational Awareness of individuals[5]. It incorporates the notion that the Situational Awareness of the individuals participating in an operation is understood in the context of each other's roles and tasks in that operation; that is, the views held by an individual are recognised and understood by everyone else in an MG and allow each to draw the detailed information he needs to prosecute his part of the battle[6]. Implicitly, Shared Understanding incorporates the Command Intent pertinent to the operation so that everyone in an MG not only understands, for example, the geo-spatial element[7], but also understands what it means in the context of what is trying to be achieved. Since Shared Understanding has a predictive element in respect of Red, White and Blue forces, the commander can anticipate what may happen, and be able to recognise and be ready to exploit an opportunity. Likewise, it allows him to recognise when events are not happening as anticipated and to make the adjustments necessary. Thus, Shared Understanding has two principal elements: the gathering, maintenance and presentation of information, and the development of a shared understanding of the situation based on Command Intent.

[5] 'Shared understanding: enabling each user to generate an understanding of the battlespace that is appropriate and adequate to their task and consistent with the understanding of other users. This understanding includes the interpretation of the situation and of Command Intent [1].
[6] For example, it will provide targeting information for Strike assets such as Close Air Support (CAS) and artillery as well the broader detailed information needed by an infantry company.
[7] Such as that provided by Blue Force Tracking.

Command Intent is used to describe a much richer concept of operations than the current 'commander's intent', resulting, as it does, from the integrated efforts of commanders and their staffs at different levels and from the incorporation of each commander's perspective into the whole. What emerges must become the Intent of the whole command. Importantly, this Intent will change over time; parts may remain extant throughout while other parts may change very rapidly as new situations occur. Events unfolding at the execution level must be able to influence the Command Intent as befits their criticality to the campaign plan. Command Intent, the plan and its execution are inextricably linked: they are driven by events[8] as opposed to procedures, are highly dynamic and must be capable of responding in a precise and timely, if not an anticipatory, way if they are not to diverge at the execution level [4]. The hallmark of the successful development and propagation of Command Intent is operational proactivity in achieving desired outcomes.

Command Intent describes the outcome a commander is expected to achieve in relation to the higher level endstate and, as described above, it will have a MMOE attached to it so that success or otherwise can be gauged. Command Intent will describe to the commander the rule set within which he has freedom to act, setting the bounds of Adaptive C2 described in HLOC[9], including proscribed actions in terms of effects[10]. An essential element will be the Synchronisation Reference Framework[11] within which the higher commander synchronises the effects he wants in order to achieve the desired outcome. This framework provides the commander at the lower level with reference points against which he can synchronise his own actions and is necessary to prevent asynchronicity between planning at the higher levels and execution at the lower levels. This is far from being prescriptive since NEC makes this a highly dynamic, responsive and continuous process so that Command Intent is always relevant and opportunistic. Thus the bounds set on a commander through Command Intent are inherently flexible, to be tightened and loosened as needed to maintain his synchronisation with other MGs and between the components of his MG. Command Intent may also specify the creation and maintenance of pre-configured MGs to provide specific effects as part of the higher plan.

The Decision Making Process

A commander, therefore, receives his tasking or mission as a specified outcome, together with the higher commander's MMOE and the constraints that surround it. The commander then selects the effect or effects that best achieve the desired outcome and configures MGs to deliver these effects. In the use case example, the desired outcome is 'to maintain supply' and the primary effect is 'to prevent the enemy disrupting the convoys'. The commander has two measures of the effectiveness of his plan: a comparison of desired and achieved outcomes and a comparison of planned and achieved effects. Both are important since an effect other than that planned may achieve the outcome and the commander must be able to recognise it, while conversely delivering the planned effect may not achieve the desired outcome.

[8] These events are not just a reaction to the enemy but the set of all events however and by whosoever caused. They include, therefore, events caused by the enemy, friendly forces and third parties.
[9] Which also argues for the separation of the command function from that of control.
[10] Comparable to the current Rules of Engagement.
[11] This is a generalisation of the current synchronisation matrix to accommodate effects based thinking.

The development of the plan and its execution in terms of the desired outcome, the effects needed to meet it and the MGs to deliver them is done by a process of Dynamic Collaborative Interworking (DCI), which brings together the planning and execution of an operation in a single interactive process. This process unites commanders and their forces and has two key elements. The first is the ability to constantly and accurately evaluate the effects and outcomes achieved against those planned and desired. The second is the ability to rapidly share the understanding derived from the first throughout the MG and between MGs so that all can maintain both their understanding of what is happening around them and their synchronicity. However, the extent to which an MG can re-synchronise in response to external events is clearly governed by the need to achieve its outcome in accordance with the Command Intent. Nonetheless, if an unexpected opportunity arises to achieve that outcome in a totally different way, then the process must be sufficiently agile to allow it. In response, the MG may have to 'mutate' by gaining or losing components, suggesting that in exceptional circumstances it could do so several times in the course of a task.

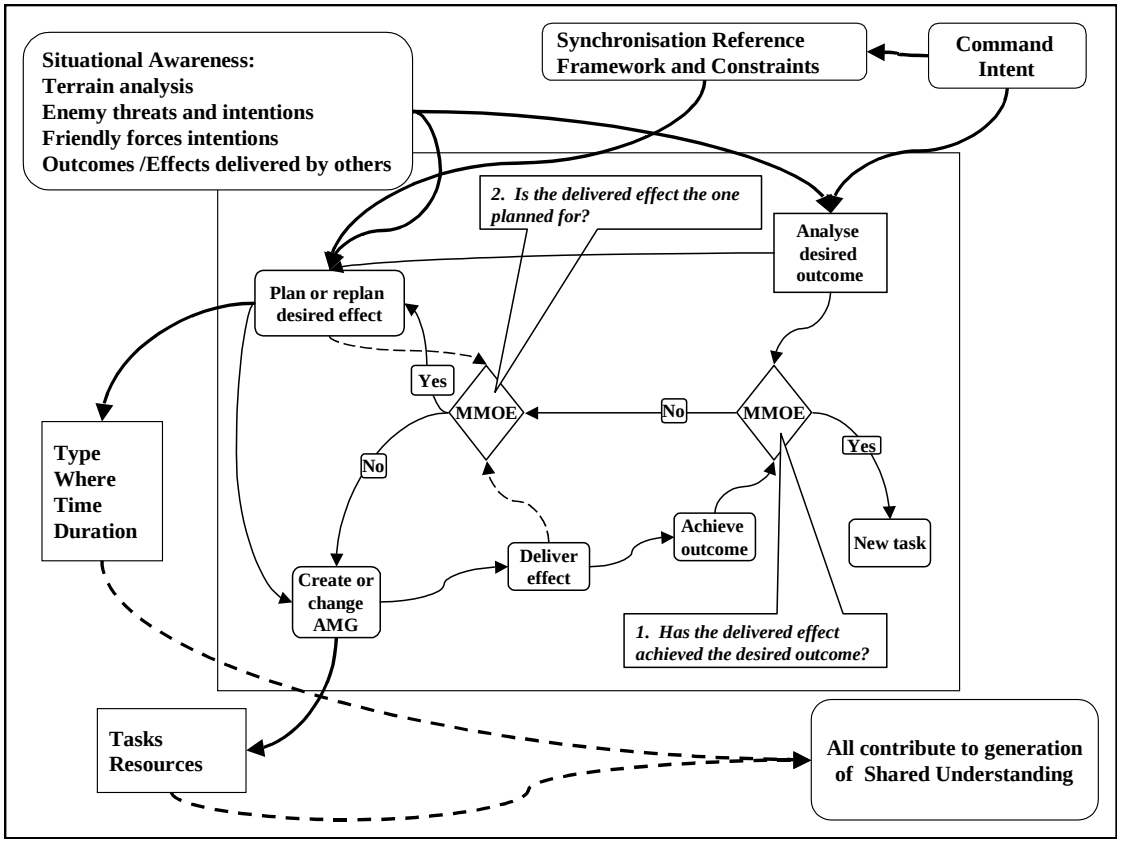


Figure 4. Dynamic Collaborative Interworking – outline process

Figure 4 attempts to capture this. The DCI process is shown in outline in the centre and the contributions by and to Shared Understanding and Command Intent are shown around the outside. NEC makes this highly dynamic[12] by facilitating the creation of Shared Understanding both within and between MGs. DCI moves away from the

[12] Compared with current process for examples of which see References 5 and 6.

rigid 2 dimensional hierarchical structure of current planning and control processes to a more agile 3 dimensional model where the processes that constitute DCI are shared vertically and horizontally. These process are those that maintain coherent Command Intent and contribute to Shared Understanding by relating outcomes to other outcomes, effects to other effects and the resources of one MG to those of others, together with an understanding of operational situation in time and space.

The commander needs to analyse the outcome he has to achieve and its MMOE. As he was a party to its determination through the collaborative and interactive nature of DCI, he understands why it has to be achieved but needs to relate it in detail to the situation in which he must bring it about. He needs to have a high level of Situational Awareness to do this, based on information that is focussed to his needs. This provides him with the geo-spatial context, detail of the enemy threats in terms of size, location, capability and intent. Similarly he will need to know the detail of friendly forces that affect him or could be available to him if needed and of neutral groups such as refugees. Determining the key effect and how to apply it will involve careful consideration of the outcome, the effect on the enemy he wants to achieve, the consequences of that effect on the enemy, himself, and others as well as the effects of terrain. Here, he will be guided by the requirements of the Synchronisation Reference Framework and the constraints given in the Command Intent but, again, as he is party to the higher level determinations and, in particular, the resources that are likely to be made available to him, he probably has a clear idea of what he would like to do. From this he is able to determine how this effect will be achieved and what resources he will have to use. Again, it is important to note that he is doing his planning directly and interactively with his subordinates and his staff. This is not planning by consensus but to get early 'situational immersion' in the operation so that problems can be resolved sooner rather than later. His direction, in the form of well developed Command Intent, flows both downwards to guide the operation and upwards to add to the Shared Understanding of higher command.

The emphasis on developing high levels of Situational Awareness and richness of Command Intent through the DCI process means that much of the understanding currently developed through the Estimate process and expressed in formal orders is already present. Minimal direction, such as that contained in the Command Intent, is needed, making it unnecessary to specify detailed control measures such as boundaries and co-ordination lines. This is not a recipe for chaos as the need to achieve specified outcomes focuses the actions of MG while leaving them free to exploit opportunities. The process of comparing desired and achieved outcomes means that the commander commands by exception, only intervening when he feels it necessary to do so in order to re-task the components under command.

In summary, DCI provides a useable model for the transitional NEC stage decision making process within which the three key elements of DCI are identified:

- Sharing of Command Intent,
- Shared Situational Awareness, and
- Collaborative planning (and re-planning).

Command Management

Command management is the means by which these command arrangements are established and maintained. These arrangements must reflect the principles of Mission Command and the need to allow elements of the MG to co-operate naturally and in a way which is related to events as they occur, especially in terms of synchronisation [4]. Command management allows the commander to create the command arrangements he requires to fight his MG. This therefore includes information management, configuring facilities and establishing services that enable the smooth and timely flow of information across the battlefield [9].

It is useful, therefore, to distinguish between *envisioning the operation* and *designing the organisation to carryout the operation.* Both are part of command and the former logically precedes the latter. However, the latter provides important constraints on the former and the operational concept will have to be modified if the commander cannot see how to build the organisation to make it happen.

There are a number of dimensions to organisational design and command arrangements. There are physical factors, such as the size of headquarters with associated implications of vulnerability, mobility and sustainability. There are human factors, such as the training and experience of subordinates. There is the factor of resource availability, given that assets and resources are likely to be stretched by high demand. Finally, and importantly, there are information management factors, in particular to the ability to achieve the aims of DCI in the face of practical constraints such as communications bandwidth and the need to maintain face-to-face interactions.

It is important to realise that the constraints on DCI have no direct impact on the operational concept but they do help determine the feasibility of the organisational design to support it. Feasibility includes the ability of sub-systems to carry out the tasks given them and the ability of the commander to intervene to exercise his command responsibilities, including monitoring and intervening.

The view taken in this paper is that command management and information management are not independent but critically linked[13]. If they are independent, then the 3 elements of DCI are construed as being global, to be accessed as required by all of the subsystems. Our understanding of communities [11], however, supports the case for linkage and, therefore, each of the DCI elements exhibits clustering which reflects the subsystems that are using and informing them. Flexibility in reconfiguring these clusters constitutes the commander's principal degree of freedom in ensuring that he has the command arrangements he wants. Command management represents the exercise of this freedom, configuring facilities and establishing information services that enable the smooth and timely flow of information across the battlespace.

This construct whereby there is linkage and clustering of systems and sub-systems requires that the relationships between them can be described in architectural terms. This has been done in terms of communities [11] and the following section explains how this reflects in the operational view.

[13] The other dimension of Command Management not discussed here is Battlespace Management.

The Relationship of Mission Groups

The DCI process describes what a transitional /mature state command process might look like, but to give this effect in the battlespace requires a underlying conceptual architecture of how military (and, in the future, other) capabilities are related to each other in the battlespace. The current architecture of hardwired, environmentally based operational groupings is insufficiently flexible to meet the doctrinal need for highly agile forces delivering innovative solutions at the joint tactical level and neither can it support the requirements of DCI. A much more flexible architecture is needed that loosens the hardwired bonds inherent in current operational groupings and transcends these traditional boundaries.

Work with the initial state use cases showed the importance of both operational groupings themselves, particularly noticeable in the land domain, which combine to achieve an effect, and the informatic relationship between and within such groups. Earlier analysis [4] has shown that the components of the Defence Capability Framework (DCF) [7] provide a useful way of describing military capability whether at the macro operational level or the micro lower tactical levels. These capabilities or functions are generic to every force and can be grouped as either core capability or enablers as shown in Table 1 below.

Capability	**Explanation**	**Remarks**
Command	The command and management of forces under command.	Core Integrating Capability
Operate	The ability to fight the enemy by striking, manoeuvring or using other effects against him.	Core Fighting Capability
Inform	The collection and processing of the information needed to conduct operations.	Key Operating Enabler
Protect	The ability to protect the force from a wide range of hostile action and from the environment.	Key Operating Enabler
Sustain	The ability to sustain the force throughout the operation.	Key Operating Enabler
Project	The ability to project the force into the theatre of operations.	Key Deployment Enabler
Prepare	The ability to prepare for operations.	Key Deployment Enabler

Table 1. Defence Capability Framework.

Command is the core capability that brings all the others together and gives the force its purpose. Operate is divided into Strike, Manoeuvre and 'Other Effects' such as information and psychological operations and command of Special Forces. Prepare and Project are considered to be high level enablers that affect the deployment of the force into theatre. Consideration of the structure of deployed operational groups (DOGs), such as a carrier task group or a ground manoeuvre brigade shows that they contain all the elements of the DCF (less perhaps the key deployment enablers) to a greater or lesser extent. Thus, both the carrier task group and the ground manoeuvre brigade have strike elements (aircraft in the former and artillery in the latter), sustainability elements, protective elements (such as air defence and NBC defence), and so on. The DOGs provide a useful construct for considering future operational capability in that they will continue to exist for the foreseeable future with incremental improvement through the replacement or enhancement of platforms and systems. To exploit their potential, the common (DCF) elements in each must be related across DOGs by a capability architecture such that they can be shared, complemented, augmented or substituted as shown in Figure 5.

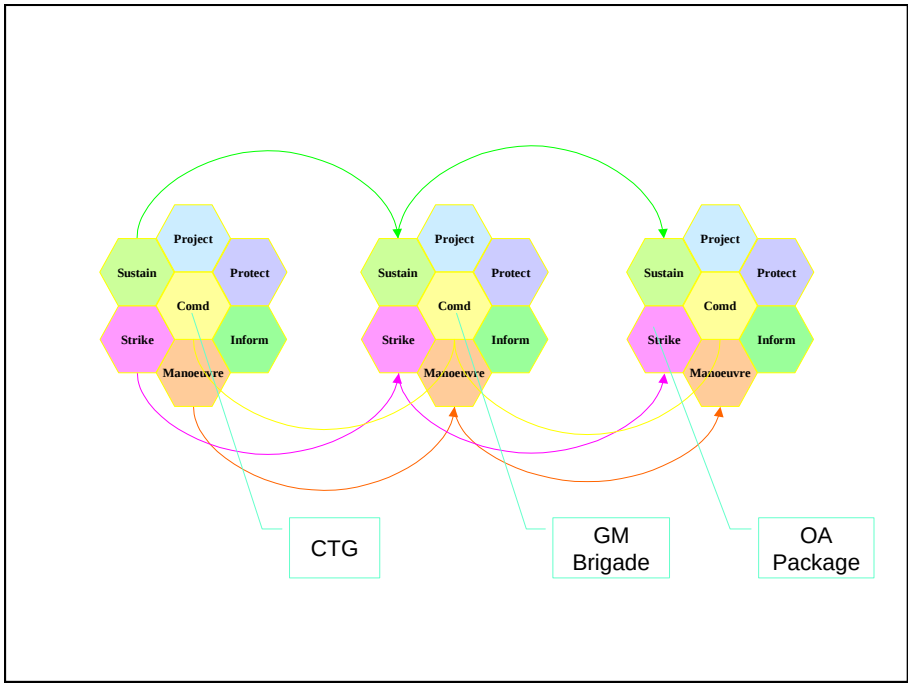


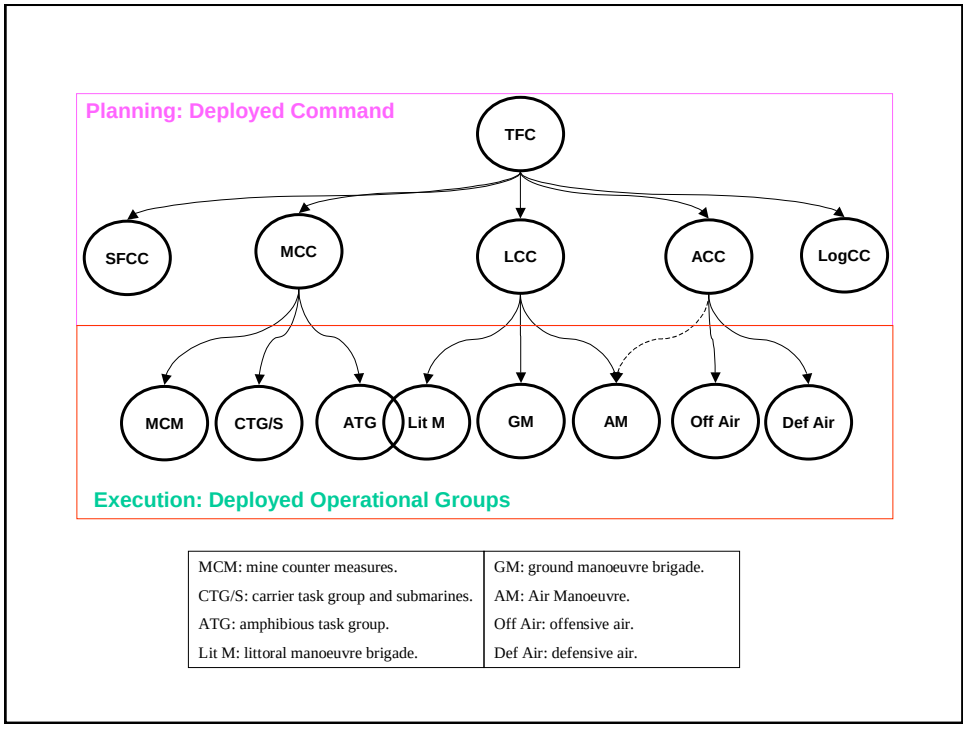
Figure 5. Relating common elements across deployed operational groups[14].

It is also apparent from Table 1 that the key enabling DCFs must be responsive to the Operate capability and that in the separation of Operate into Manoeuvre (close combat operations) and Strike (depth and supporting operations), each must be responsive to the other. This might suggest that a functional architecture and command model is needed but to do so would merely be exchanging one set of stovepipes for another. To achieve the required high levels of agility it is necessary to have a hierarchy of a higher operational level for planning and directing operations and a lower level for executing them. This removes problems such as asynchronicity and allows MGs to be

[14] CTG: carrier task group. GM: ground manoeuvre. OA: offensive air.

either enduring or highly dynamic both in the manner in which they form and in the way they operate.

In this transitional view, it is envisioned that there will be a number of key nodes that sit astride the planning /execution boundary and provide the interface between a DOG and the higher planning level thorough which it derives the Command Intent and some Situational Awareness. Examples of such key nodes are Future Aircraft Carrier (CVF), Landing Platform Dock, brigade headquarters, E3D Sentinel aircraft.



MCM: mine counter measures.	GM: ground manoeuvre brigade.
CTG/S: carrier task group and submarines.	AM: Air Manoeuvre.
ATG: amphibious task group.	Off Air: offensive air.
Lit M: littoral manoeuvre brigade.	Def Air: defensive air.

Figure 6. A transitional NEC state command structure.

Such a transitional NEC state view is shown Figure 6. This alone is insufficient and, as indicated, linkages between like elements within mission groups are needed to enable them to share information and assets. These linkages, however, only become viable if they are able to provide a degree of responsiveness that is greater than that currently available to the MG through ownership or procedure. The enabling DCFs can be viewed as cross-cutting communities as shown in Figure 7 and a view taken that this linkage might be delivered as some form of ‘managed service’ with all that that implies, such as the associated quality of service. These ‘services’ have been termed ‘Responsive Support Components (RSCs)’.

One aspect considered essential for operational effectiveness is that the RSCs are not purely reactive working on a ‘publish and pull’ basis but are highly proactive in pushing information and services to the MG. This is only possible if there is a high level of understanding of Command Intent across the RSCs so that they can anticipate future needs on the basis that they know what the intent is and what the MGs are doing.

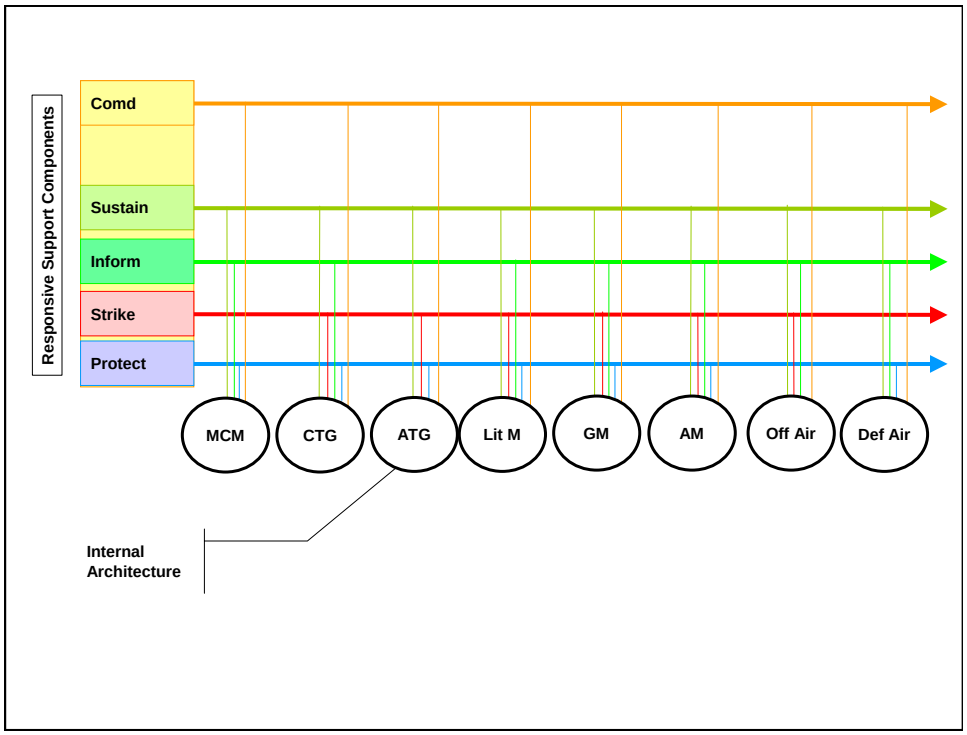


Figure 7. Cross-cutting enabling communities or 'services'.

For example, a GM brigade requiring additional support can access the Strike RSC and request support. The RSC knows what elements are available to support that request in other GM brigades and in other DOGs or MGs based on its knowledge of current and planned operations. It can then allocate or offer support options such as 'artillery support in 5 minutes or Close Air Support strike in 3minutes'. If necessary, the supported MG then links directly with the supporting element to exchange final target updates. Once the mission is complete, the supporting asset returns to the control of its parent MG. If the RSC can be proactive, then responsiveness is improved. From this example, the Strike RSC can offer support to the MG without waiting to be asked because it knows what is happening.

A key aspect of this transitional architecture, therefore, is that of cross RSC co-ordination driven by the Command Intent and the output of the planning domain, and it is not difficult to see that the RSC managers might be based on the current component command structure. It is emphasised that, conceptually, this is a transitional architecture and presents an evolutionary rather than a radical step to implementing NEC. Nonetheless, being based on emerging concepts and doctrine, it has merit in providing a goal to focus the development of organisations, processes, and equipment.

Mission Group Command

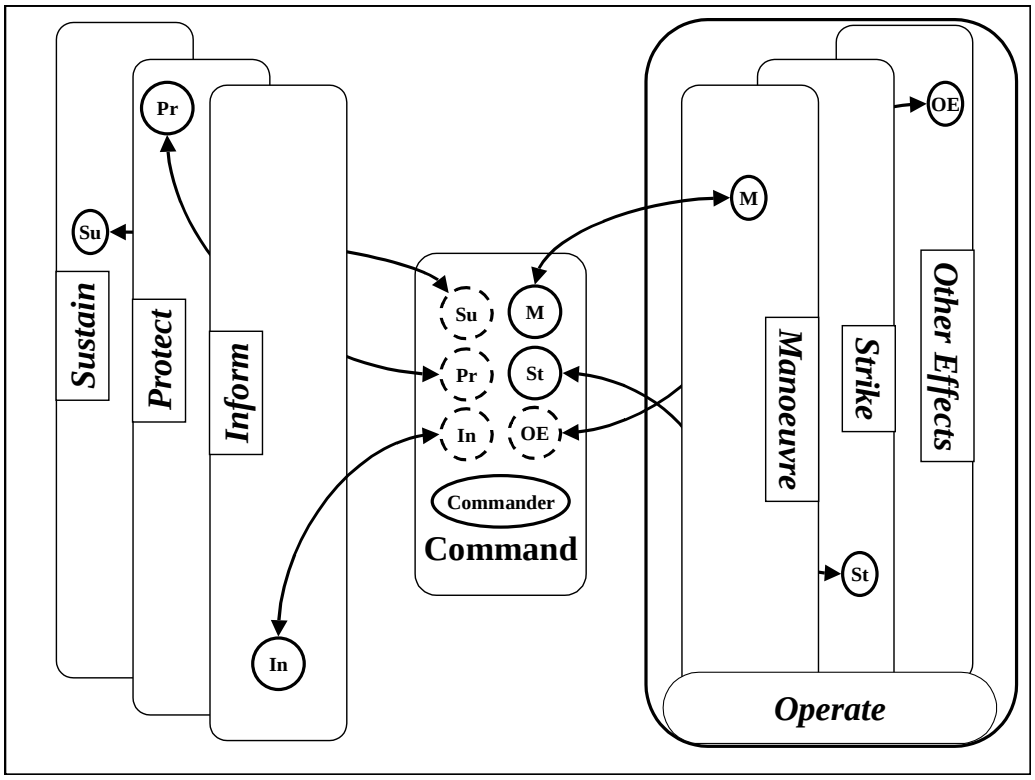


Figure 8. Virtual Command Structure

However high the quality of the interactions provided by DCI, the MG commander will still need to consider how best to use the resources and information he has and, undoubtedly, will develop further requirements for information. While there may be disadvantages from a human factors perspective, NEC provides the means to create virtual command structures through collaborative working. This does not mean that the enabling functions become impersonal providers on a 'take it or leave it' basis. On the contrary, if the commander's needs are to be met and the MG to retain its flexibility, then the links must be strong and personal through the insertion of a 'virtual' staff officer into the MG command structure, indicated in Figure 8 by the broken line. This 'virtual' staff officer has access to the full capability of his RSC and is able to tailor his support to meet the purpose of the MG[15]. He is integral to the MG commander's decision making process and is responsible to the commander for the delivery of his part in the operation. In the use case example, the MG commander has a virtual Inform staff officer who is his link into the Inform community. This officer is a member of his staff and is responsible for the delivery of the information the commander needs as and when required. The NEC benefit is that as he is also part of the Inform community[16], and has full access to information that could benefit the MG commander. Importantly, this is a two-way process and he is also responsible for ensuring that the information generated in the MG as the operation unfolds such as the

[15] It has the added advantage of reducing the physical size of the MG command post.
[16] For a definitive discussion on the relationships between function, capabilities and communities see Annex B to Reference 9.

detail captured by weapon systems and FIST[17] equipped soldiers goes back into the Inform process to improved Situational Awareness.

Application to Use Cases

To move beyond the initial state of NEC of doing things better and into the transitional state where we seek to do better things, the development of DCI as an effects based, NEC enabled decision making process is central to understanding how this might be achieved. Together with our understanding of command management and by having a capability framework that shows how the operational capabilities interact, it can be applied to the use cases to show how NEC might benefit operational effectiveness in the future.

A more detailed version of this model is being produced to support the development of a limited synthetic environment in which to explore the use cases, with the aim of identifying advantages and disadvantages associated with NEC and the metrics to support them. This will in turn suggest areas for experimentation and further study.

References:

1. NEC Outline Concept: Part 2 – Conceptual Framework, Dstl/IMD/SOS/500/2 Issue 3.0 dated May 2004.

2. NEC Outline Concept: Part 5 - Military Operations, Dstl/IMD/SOS/500/2 Issue 3.0 dated May 2004.

3. The UK Joint High Level Operational Concept (HLOC), JDCC/7/11/7/1 dated 23 Mar 2003.

4. 'Command Considerations for UK Network Enabled Forces - A Speculative View'. Lt Col M A Lloyd OBE, Dstl, UK. Published by CCRP in the proceedings of the 7th ICCRTS Conference Ottawa September 2002. http://www.dodccrp.org/Activities/Symposia/7thICCRTS/fore.htm

5. (British) Army Field Manual Volume 1 Part 8 Command and Staff Procedures Issue 1.4, December 2002 Chapter 5 'Decision Making'

6. (British Army) All Arms Tactical Aide Memoiré Issue 4 January 2002 Section 1 'Battle Planning – The Combat Estimate Process'

7. Joint Vision 2015, D/JDCC/7/11/1 dated 30 May 2001.

8. Understanding Information Age Warfare. Alberts, Gartska, Hayes and Signori, CCRP Publication August 2001.

9. Development of a Battlegroup model and use cases. G Markham and H Duncan, QinetiQ plc, May 2003.

10. Network Enabled Capability – an introduction. Version 1.1. MOD April 2004.

11. Communities and their contribution to agile mission grouping. Geoff Markham, QinetiQ plc, May 2004.

[17] Future Integrated Soldier Technology, the UK equivalent to the US Land Warrior programme.