

EVOLVING COMMAND & CONTROL
THE CHALLENGE FOR SMALLER DEFENCE FORCES

By

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ABSTRACT

The New Zealand Defence Force (NZDF) is a small but professional force which is extremely proud of its history of commitment to global security and participation in recent coalition operations. NZ sees itself as an independent but reliable ally, prepared to commit forces within the limits of its size and budget.

The NZDF recognizes the need to develop a modern, joint command and control system (JCCS), to allow the efficient employment of NZDF assets. Interoperability with allied C2 systems is essential, as most operational scenarios involve the commitment of NZDF elements as part of a coalition force.

Small nations such as New Zealand wishing to participate in coalition operations will recognize the importance of interoperability, especially in terms of C2 systems. But how are they to determine their requirements and plan expenditure on new C2 programs in this era of rapidly evolving C2 technology and philosophy? Is network centric warfare attainable, or is it just for the major nations.

This paper discusses the challenges facing smaller defence forces as they respond to the rapidly evolving C2 environment and describes how the NZDF is seeking to modernize its C2 systems, within the constraints of limited resources and a unique national identity.

BACKGROUND

Open press reports¹ indicate that the US Navy has budgeted over US\$2.5B for IT-21 related programs in the Future Years Defense Program to implement a networked information management strategy across the fleet. This is just a small part of the overall naval Transformation Strategy, likely to cost in excess of US\$40B over the same period. At the same time, the US Army has earmarked over US\$1B for the WIN-T program² to develop and field its' tactical information network.

In comparison, the New Zealand Defence Force (NZDF) has a total annual budget of NZ\$1.9b (around US\$1.25b)³, with provision in the NZ Long Term Development Plan to spend NZ\$30m (around US\$20m) to meet their requirement for a new joint command and control system.

The NZDF is a small but very professional force which is extremely proud of its history of commitment to global security and participation in the majority of recent conflicts and peace support operations. New Zealand sees itself as an independent but reliable ally, prepared to commit forces within the limits of its small size and budget.

The NZDF recognizes the need to develop a modern joint command and control system (JCCS), covering the strategic to tactical levels, which will permit the efficient employment of NZDF assets. Interoperability with allied command & control systems is essential, as it is recognized that the most likely scenario involves the allocation of NZDF elements as part of a coalition force under operational control of an allied force commander.

Booz Allen Hamilton (Australia) has just completed a project definition study into the requirements for the JCCS on behalf of the NZDF and Ministry of Defence..

¹ Cebrowski, AK, & Garstka, JJ "Network Centric Warfare: Its Origin and Future" in *Naval Institute Proceedings*, Jan 98.

² US Army Transformation Roadmap, page 9-5.

³ For FY 2003/4, from: <http://www.nzdf.mil.nz/corporate/defence-expenditure.html>

The Challenge

Small nations such as New Zealand may wish to participate in coalition operations and recognize the importance of interoperability, especially in terms of their C2 systems. Is it realistic to pursue the network centric warfare concept, or is this beyond the financial reach of small forces, and only applicable to the most powerful nations. ***So, just how are they to determine their requirements and plan expenditure on new C2 programs?***

If the NZDF wishes to maintain a modern naval capacity, they can acquire a state of the art FFG (but perhaps only one or two). And they can acquire small numbers of modern armoured vehicles, or aircraft. They can train on these, and deploy small but capable groups. This gives them a credible slice of capability within the constraints of their size and budget. But does this approach work with command and control - is there such a thing as a minimalist level of capability or 'slice' of command and control?

AIM

The aim of this paper is to examine the challenges facing smaller defence forces as they seek to keep pace with and benefit from the rapidly evolving command and control environment.

The paper will review the command and control requirements of the NZDF and discuss the relevance of the recent developments in command and control philosophy. The paper will then discuss the general findings of the project definition study conducted by Booz Allen, and how a tailored C2 system for the NZDF has been defined.

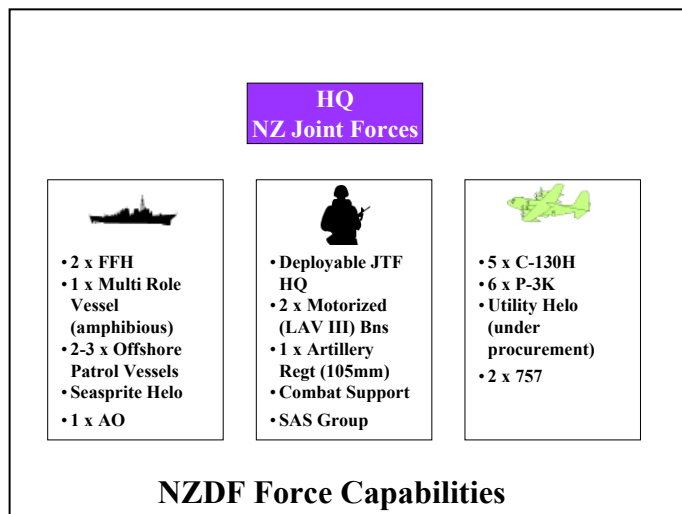
Although this paper primarily discusses recent experience in New Zealand, the challenges, lessons and suggested responses may be equally applicable to other small, professional defence forces. This paper should therefore be relevant to those who seek to assist small defence forces develop national command and control solutions, and those who may be seeking to tailor extant US systems for implementation by smaller forces.

THE NEW ZEALAND DEFENCE FORCE

The New Zealand Defence Force (NZDF) is an extremely tough, well-trained and professional organization. Although small in size, it maintains highly capable force elements which may be committed to operations in support of national interests.

The New Zealand Defence Force comprises some 9,000 regular force and 2,500 territorial force (reservist) personnel and 1,900 civilian staff across the Navy, Army and Air Force.

Although its geographical location means that New Zealand is unlikely to be threatened by direct invasion, successive New Zealand governments have stressed the need to:



“maintain a modern, efficient and high quality defence force”⁴. In addition to the traditional roles of homeland defence and security of regional interests, the role of the Defence Force is to provide the government with a range of options to contribute to regional and global security:

“New Zealand will make as full a contribution to such actions as is reasonably possible. We will continue to base our global engagement on active support for, and participation in, UN and appropriate multi-national peace support operations”⁵.

Operational Deployments

This policy has resulted in a virtually continuous overseas operational commitment of NZDF forces in various theatres since the end of the Second World War. The current status of commitments⁶ (as at March 2004) is:

Operational Commitment	Description
Afghanistan	Commitment of air movements specialists and a regional reconstruction team.
Bosnia	Initial contribution in 1992 of an infantry company group (under UK command), now reduced to a small team on sector HQ.
Cambodia	Commitment of engineers to the UN De-mining team ongoing since 1993.
East Timor	Initial contribution of a battalion group in Sep 1999. Now reduced to small teams in UNMISSET HQ and training roles.
Iraq	Commitment of an engineer group (under UK command) for humanitarian and reconstruction tasks in southern Iraq since Sep 2003.
Kosovo	Contribution of military observers since 1999.
Middle East	Commitment of UN Observer team since 1954.
Mozambique	Commitment of engineers to the UN De-mining team ongoing since 1993.
Sinai	Initial contribution in 1982 of a helicopter detachment to the MFO, now consists of HQ and logistic staff.
Sierra Leone	Commitment of UN Observer team since 1999.
Solomon Islands	Contribution of a company group, with helicopter support since July 2003.

The NZ government acknowledges that it is unlikely, other than for local resource protection or disaster relief, that NZ would deploy forces on its own. Rather *“it is likely that any overseas deployment of elements of the NZDF will be part of an international contingent”⁷.*

⁴ NZ Government Defence Statement “A Modern, Sustainable Defence Force matched to New Zealand’s Needs” dated 8 May 2001, page 4. ,

⁵ NZ Government “The Government’s Defence Policy Framework”, June 2000, page 4

⁶ Drawn from NZDF website <http://www.nzdf.mil.nz/at-a-glance/current-missions.html>

The NZ JCCS Program

The acquisition of a modern, joint command and control system (JCCS) is a major element of the current modernization program for the NZDF, and funds⁸ have been earmarked within the Long Term Development Program.

The JCCS will be focused at the level of the Headquarters Joint Forces New Zealand (HQ JFNZ), which has the role of command of all assigned NZ force elements on operational or designated training activities. National command will be exercised through the HQ JFNZ to the deployed task headquarters or national command element. In some instances, HQ JFNZ will use the JCCS to exercise direct tactical level command and control over NZ assets.

“The JCCS will provide the means by which commanders at strategic, operational, and tactical levels execute command and control (C2) of the NZDF forces singly, jointly, within a combined force, and within a coalition environment. It will ensure a sustainable C2 interoperability framework, including relevant non-defence organisations.”

<http://www.Defence.govt.nz/industry/jccs.shtml>

The JCCS is intended to also provide command and control functionality down to the tactical level. For naval and air assets, this is a relatively straightforward assignment – for the land elements this can be more of a challenge. The operational deployments described in the table above vary in size from an augmented battalion group (nearly 1000 personnel) to a 2-man demining team. Regardless of the size of the force, the required JCCS functionality is essentially the same.

The JCCS must not only provide an effective means of command and control within the New Zealand national command chain, but it must also permit interoperability with likely allied forces, for as has already been stated, the NZDF will rarely operate alone; it will almost always deploy as part of a larger allied or United Nations force. New Zealand functional requirements must therefore be addressed alongside interoperability constraints.

The JCCS project definition study resulted in a statement of user requirements and a draft architecture which the NZDF can use as a basis for contracting. A key element of the proposed JCCS is the sharing of information, and the generation of a common operating picture, across those nodes which are to receive JCCS functionality.

New Zealand has long been an active participant in various multinational fora, including the ABCA⁹ and the CCEB¹⁰. The NZDF has also been active in the JWID¹¹ program. NZDF commanders and staff are therefore very aware of recent developments in command and control and the prominence of the network centric warfare philosophy. They have seen capabilities and technologies demonstrated and they have been briefed in those standardization fora on allied plans for implementation. And as members of recent operational coalitions, they have seen evidence of the effectiveness of these new concepts being put into action, albeit still in embryonic stages.

Expressed in its simplest terms, the NZDF warfighters know about NCW, know that it offers great benefits in terms of optimizing force capability, and want to implement the philosophy in

⁷ *op cit.* NZ Government Defence Statement of 8 May 2001, page 5.

⁸ The published LTDP allocation for the JCCS is approximately NZ\$30m (approx US\$20m)

⁹ America-Britain-Canada-Australia Armies Standardization program. NZ has Observer nation status.

¹⁰ Combined Communications & Electronics Board. NZ is a full member, along with the USA, UK, Canada and Australia.

¹¹ Joint Warfighter Interoperability Program.

the new JCCS solution. But they also know that they face great challenges in acquiring such a capability within their very limited budget.

The NZDF is not in a unique situation. Many smaller allied forces will face the same challenges in the quest for modernized command and control systems and a NCW capability.

NETWORK CENTRIC WARFARE

It is not necessary in this paper to describe NCW in detail. It can be assumed that interested readers are already familiar enough with the concept to relate to its application to smaller military forces. However it may be worth just repeating the basic tenets of NCW to set the scene for the subsequent discussion:

The tenets of NCW, as expressed by the US Department of Defense¹², are:

- ▶ A robustly networked force improves information sharing;
- ▶ Information sharing enhances the quality of information and shared situational awareness;
- ▶ Shared situational awareness enables collaboration and self-synchronization, and enhances sustainability and speed of command;
- ▶ These in turn dramatically increase mission effectiveness.

The immediate problem for other nations, such as New Zealand, is that these often seem to apply primarily to US forces and, more significantly, US budgets.

Although the US report cited above discusses interoperability in some depth, a reader could be excused for believing that the primary focus is on interoperability between the various elements of the US Armed Services. Nonetheless, the report does recognize the role and importance of allied contributions and coalition operations. It effectively invites allied nations to join the NCW family. It states:

“Realization of the full potential of Network Centric Warfare requires not only technological improvements, but the continued evolution of organizations and doctrine and the development of relevant training that will enable U.S., Allied, and coalition forces to develop and sustain an asymmetric advantage in the information domain.”¹³

The Global Information Grid (GIG) is the operating environment and infrastructure that forms the information matrix necessary for the achievement of NCW. A stated function of the GIG is to facilitate coalition interoperability.¹⁴ This is to be achieved through architectures and defined interoperability standards. And, not unreasonably, the US will set those standards and ultimately determine access to the GIG.

“the GIG will help enable NCW by improving information sharing among all elements of a joint force, and with allied and coalition partners”.
DOD Report to Congress

¹² From “Network Centric Warfare”, Department of Defense Report to Congress, 27 July 2001, Executive Summary page i.

¹³ Ibid, Department of Defense Report to Congress, page 2-5.

¹⁴ Ibid, Department of Defense Report to Congress, page 9-4.

THE APPLICABILITY OF NCW TO SMALLER DEFENCE FORCES

Should smaller defence forces such as the NZDF even seek to implement the platform modernization and comprehensive command and control systems with the cost and complexity required for network centric warfare? Is NCW even applicable to small defence forces? This must be the first issue to be considered.

The first tenet of NCW is “a robustly networked force”. Without this, all else is meaningless. For a smaller nation, this immediately raises two issues. First is the challenge of developing a defence force (or at least the deployable portion of it) which is internally networked. It has been argued¹⁵ that, “*a critical mass of the joint force must be robustly networked as the entry fee for NCW*”. The second issue is the problem of seamless networking across national boundaries, from the national contingent to the coalition force commander and headquarters, so that information generated within the contingent can be made available to the broader coalition and its commander, and the national contingent can draw on the information shared by the coalition headquarters.

A Networked Force

Whether a small nation like New Zealand can raise and sustain a networked defence force with the critical mass of networked capability is a highly debatable question. In New Zealand’s case, the JCCS will provide a comprehensive information sharing environment, and a common operating picture. However the depth to which JCCS functionality will be delivered (ie, the number of platforms and the tactical level) is not yet clear.

It has been suggested that there must be a fundamental shift in equipment procurement policy:

“In a network centric environment the primary consideration becomes acquiring ‘network ready platforms’ and ‘This shift in emphasis is of such fundamental importance that it needs to be mandated as acquisition policy in any armed force that is serious about exploiting NCW’¹⁶.

While these sentiments are undoubtedly valid, they do pose a significant problem for the smaller nations with limited budgets. Platforms tend to be retained for much longer than may be the case in the USA, or even the UK. The small fleet numbers are such that there is often no option of rolling upgrades with the older version being delegated to lower priority units. The costs involved in networking to that critical mass necessary to constitute a networked force, may just be too prohibitive. It is more likely that the networking will be prioritized, perhaps focusing on only command and reconnaissance elements.

It is likely that the JCCS will be capable of extension to the small number of New Zealand naval and air force platforms. The relatively larger number of land platforms and numerous intermediate land headquarters poses a much greater cost and risk challenge. Just developing an integration package across several variants of LAVs, for example, could consume a significant portion of the JCCS budget. The NZDF just does not have the quantities of vehicles to effectively amortize such developmental costs.

The JCCS distribution will depend primarily on unit and integration costs, and communications infrastructure capacities, and may not be resolved until the JCCS contract has been finalized. Whether the resulting force will constitute a “critical mass of a networked force” remains to be

¹⁵ *Ibid*, Executive Summary, page ii.

¹⁶ Potts, D & Thackray, J. “No Revolutions Please, We’re British” in *The Big Issue: Command and Combat in the Information Age*, Strategic & Combat Studies Institute, Number 45, page.40.

seen. At the very least, the New Zealand JCCS should be able to network from the HQ NZDF down to platform level in the navy and air force and to subunit level in the army. Inevitably, not all vehicles in a NZDF contingent will have access to, or be represented on, the JCCS network.

This will give the New Zealand government a range of contingent options to offer as part of a contribution to a coalition force.

Like other smaller nations such as Australia and Canada, New Zealand has, in recent operational theatres, offered national contingents based around naval assets (a frigate, possibly with replenishment support). On other occasions, a small number of aircraft (such as C-130 or P-3), have been provided. These deployed force elements have worked directly under operational control for mission tasking to an allied squadron or task group commander. JCCS, utilizing national strategic communications bearers, will provide the command and control link back to HQ JFNZ. A basic level of networking into the local coalition can be achieved through the installation of Link 11/16 and the use of standard message formats. The cost and technical difficulty of such integration efforts for a small number of aircraft or ships should be manageable for most forces.

Contribution of land force assets is invariably a much greater challenge.

In discussing the potential problems of working with coalitions with ‘less digitized contingents’, one school of thought ¹⁷ states that “*multinational forces below brigade level will be unable to generate the optempo required for warfighting*”. This reflects the reasonable assumption that a brigade has the organic capacity to benefit from digitization and can draw on the information available to it, assess it and respond within the bounds of the mission given by the coalition commander (ie, achieve self-synchronization). It implies independence and self-sustainment at the level of a national brigade size contingent.

However many nations are unlikely to make contributions to coalitions or UN operations at this size. It would certainly be beyond the capacity of New Zealand and even Australia would find it a major challenge for other than the shortest of operations. It is more likely that contingents from these smaller nations will consist of battalion, or even smaller groups. To further complicate the situation, a quite traditional scenario would see a NZDF infantry company within an Australian battalion group, as a combined ANZAC¹⁸ force contribution. Can such small national forces be expected to conform to NCW expectations?

Small nations such as New Zealand also tend to have a different force structure to the traditional US Joint Task Force which is the focus of NCW thinking. Most significantly, they tend to lack either the organic fire support, or the access to joint fire assets. A NZDF infantry battalion would have limited ISR capacity and access to a single 6-gun 105mm artillery battery (coy). In this force structure, the NCW emphasis on sensor to shooter can seem somewhat superfluous. In the NZDF environment, the application of networking may have much greater immediate benefits in other areas, for example in collaborative planning and logistics. Scarce developmental effort and funding must be allocated accordingly.

The New Zealand JCCS project definition study suggests that it is quite probable that smaller nations can generate small elements of networked forces, for use either within national environments, or as contributions to a coalition or UN operation. It is equally probable that these

¹⁷ Blad, T & Potts, D. “Beyond Interoperability” in *The Big Issue: Command and Combat in the Information Age*, Strategic & Combat Studies Institute, Number 45, page 146.

¹⁸ The ANZAC (Australian New Zealand Army Corps) tradition dates back to 1915 in WWI, but has endured to the present day; more recent operations in Vietnam and East Timor have seen integrated Australian-New Zealand force structures.

small national contingents will not have the network capability considered necessary by US proponents of NCW. At least some portions of the contingent are likely to be constrained by traditional manual command and control methods.

Shared Information Across the National Boundaries

As has already been noted, the central requirement of networked operations is access to common information and a shared understanding of the commander's intent. Self-synchronization will only occur if the decision makers at each level are confident that they have access to the whole battlespace picture and that they can therefore take decisions consistent with what the joint force commander would expect. However can it be assumed that subordinate allied commanders will indeed have access to the total common picture? It is perhaps more likely that at least some elements of the picture will be retained within national security boundaries. In this event self-synchronization may not only be impractical, but actions by subordinate commanders may in fact run counter to what the commander requires.

It must also be recognized that in a coalition, national contingents must work to two masters – the designated coalition commander and their respective national command elements. Discussions of “self-synchronization” to maintain operational tempo rarely take account of the potential delay while a commander confers with his national authority to confirm that the new mission or orders are within the terms of their national rules of engagement or consistent with the political agenda of the contributing government. Such delays just do not exist within a single national force.

While seamless sharing of information across national boundaries may be technically feasible (assuming that the allied contingent is equipped to generate and receive that information) there is inevitably the question of national information release policies and restrictions. The impact of this on operational tempo within a coalition must not be ignored.

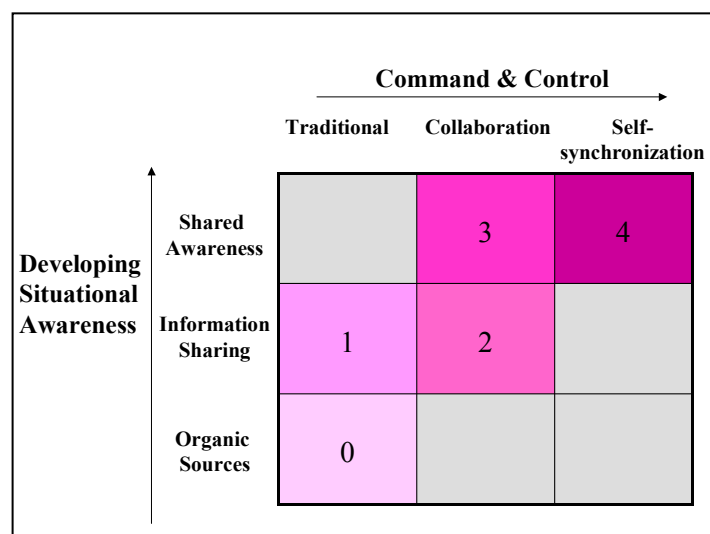
An Acceptable Level of Networking?

If it is unrealistic to expect smaller nations to achieve the level of networking and information exchange necessary to achieve true NCW-capacity as defined in the US context, then is it possible to identify and target a lower, but acceptable, level?

A Network Centric Maturity Model¹⁹ has been developed which relates NCW maturity to the level of shared situational awareness and the ability of the command and control system to utilize that shared awareness to achieve self-synchronization.

The model identifies five levels:

- ▶ **Level 0** represents the traditional platform-centric status.
- ▶ **Level 1** involves the ability to share information, which in turn provides enhanced situation awareness.



¹⁹ Alberts, DS. Garstka, JJ. Hayes, RE & Signori, DA. “Understanding Information Age Warfare”, CCRP, August 2001, page 241.

- ▶ **Level 2** involves the availability of collaborative planning to maximize the benefit of the enhanced situational awareness.
- ▶ **Level 3** involves richer information engage involving more modes and participants, reaching a true level of shared awareness.
- ▶ **Level 4** requires the integrated capability (including doctrine, training and processes) necessary to permit self-synchronization.

Although the model is primarily aimed at assessing progress towards to goal of true network centricity, it may also serve a useful role in setting targets for those defence forces aspiring to that goal, but recognizing that, for the foreseeable future, such goals are unattainable.

The functionality of the JCCS identified by the project definition study, and the interoperability levels proposed²⁰, the NZDF should attain at least Level 2. Progress to Level 3 will be dependent upon the proliferation of the JCCS across the land force elements which can be afforded within the allocated budget.

THE PURSUIT OF A MODERN (NCW CAPABLE) COMMAND & CONTROL SYSTEM

Regardless of whether a nation seeks to achieve full NCW capability in the short term, or perhaps settles for a lower level as an interim measure, it will face a number of challenges in pursuit of a modernized command and control system.

Requirements Determination

The first step undertaken by New Zealand in the JCCS program was the definition of functional requirements. Interoperability with allied forces was identified as an essential user requirement. If it is a core requirement (and for most this will be the case) how is interoperability to be achieved and maintained? As the major coalition partners, in particular the USA, evolve their national systems, smaller nations such as New Zealand will struggle to fund the changes to keep pace. The problem of budgeting for enhancement and maintenance of national C2 systems will be substantial for nations who have no way of predicting the evolutionary changes to be fielded by the USA. Will the US consider the impact of a proposed change on allies, or will fielding the most capable system (and hence giving the optimum advantage to the US warfighter) always be the prime determinant? There must also be some doubt as to whether the junior allies will be given access to the information they require to maintain interoperability.

As part of the requirements determination process for the JCCS, considerable effort was applied to the development and maintenance of a C4ISR architecture (in accordance with the DOD C4ISR Architecture Framework). This was a significant effort, which must be sustained throughout the acquisition process and the life of the JCCS. Is it reasonable to expect small nations to fund the analysis and administrative overheads implicit in current command and control strategies? These costs are substantial. Can this be justified given the size of the command and control budgets available to small defence forces? But if a C4ISR Architecture is not maintained, how is interoperability with potential allies to be assessed and maintained?

How much priority should be given to national operational requirements? If participation in a coalition is the most likely operational scenario, then is there any point in developing command

²⁰ JCCS Interoperability levels were identified using the LISI Model.

and control processes and applications for an independent national task force? The alternative, of total dependence, is likely to be unpalatable for most.

Should the command and control system seek to meet the needs of the whole national force, or should emphasis be given to those force elements earmarked for contribution to a coalition. This might save some resources, and allow limited resources to be focused where they will have the greatest operational impact. But is this realistic? The impact on force training, and the national ability to respond to an emergency other than a coalition commitment, will restrict this option.

Acquisition Strategy

Should the acquisition focus be on foreign ‘off the shelf’ or a national unique solution?

The ‘off the shelf’ solution may bring with it inherent interoperability advantages, especially if the selected solution is in use with a major ally. It should also offer lower developmental risks and costs, but has the inherent risk of delivering a solution optimized for the home nation rather than the client. And some degree of modification to suit unique national requirements will be almost inevitable, as will some integration into existing communications networks and national databases. Furthermore, if a ‘off the shelf’ solution is procured, the defence force may be tied to evolutionary developments dictated by the requirements of the major client of the supplier – inevitably a foreign defence force. The smaller defence force will either have to implement changes at the whim and pace of a foreign prime contractor, or it will rapidly face the prospect of maintaining an orphan solution.

Alternatively, if the NZDF develops a unique solution, it may achieve a solution optimized to meet its unique national requirements, but it faces the prospect of potentially greater costs and substantial risk. It will be responsible for upgrades and maintenance with no benefit of economies of scale. It will still be faced with the challenge of maintaining interoperability with allied systems, forced to bear the cost alone of developing interfaces or modifications as the allied systems evolve.

Almost inevitably, most smaller nations will resort to a compromise: using a recognized systems integrator to integrate a range of ‘off the shelf’ applications selected to meet the majority of user requirements with a minimum of integration or modification.

Implementation

Perhaps the greatest challenge facing smaller nations will be determining the extent to which the new command and control capability will be rolled out across the force. Inevitably, this will be driven by cost, but the availability of bandwidth across the communications infrastructure, the costs of integration across multiple platforms and even issues such as training and technical skill demands will have an impact. It is quite likely that the decision will be taken to restrict the proliferation of the new system to meet the budget constraints, rather than any operational imperative.

Larger nations such as the USA or the UK may have the option of using formation-size groups as test-beds for NCW implementation. Smaller nations such as New Zealand are more likely to have only one joint headquarters, and perhaps a second deployable joint task group headquarters, and a small operational deployment or ready reaction force. In such cases, the decision to implement NCW, to whatever level of maturity is desired, is really an all or nothing choice.

THE NEW ZEALAND APPROACH

The NZDF has considered the issues discussed in this paper, and has developed a tailored approach towards the development of a new command and control system. The basis of this approach has been to focus on a cost effective solution targeted at the core user requirements, recognizing that not every desirable attribute will be achievable.

The project definition study resulted in a Statement of Functional Requirements, JCCS architecture and proposed acquisition strategy. In order to rationalize the cost of this initial assessment, it was determined that only the following architecture products would be produced initially:

- ▶ AV-1 – Overview & Summary Information
- ▶ AV-2 – Integrated Dictionary
- ▶ OV-1 – High Level Operational Concept
- ▶ OV-2 – Operational Node Connectivity Description
- ▶ OV-3 – Operational Information Exchange Matrix
- ▶ OV-4 – Command Relationship Chart
- ▶ OV-5 – Activity Model

It was determined that this was the minimum number of products necessary to define the proposed capability of the JCCS to permit endorsement by the senior NZDF leadership and to form the basis for the subsequent development of the Function and Performance Specification (FPS) for contracting purposes. The following additional architectural products are to be developed as part of the FPS process:

- ▶ SV-1: System Interface Description,
- ▶ SV-2: System Communications Description,
- ▶ SV-4: Systems Functionality Description,
- ▶ SV-5: Operational Activity to System Function Traceability Matrix,
- ▶ SV-7 System Performance Parameters Matrix, and
- ▶ TV-1 Technical Architecture Profile

Although this architectural suite comprises only a portion of the C4ISR Architecture Framework, the effort is substantial and represents a significant financial commitment on the part of the NZDF. It is, however, the minimum necessary to proceed to contract and to facilitate interoperability.

At the time of writing, the NZDF was preparing to proceed to the acquisition phases of the JCCS project, so any detailed discussion of requirements would be inappropriate at this point. Nonetheless, it can be stated that the NZDF has endorsed a pragmatic set of requirements which will give the NZDF a truly joint command and control capability, providing shared information and enhanced situational awareness through a common operating picture across those NZDF force elements which are nodes on the JCCS system. Collaborative planning and optimization in the use of available resources will be major benefits. The system design also allows for the

evolutionary growth of both its functionality and number and distribution of nodes. As additional funding becomes available, functionality may be added and the spread of JCCS expanded.

The JCCS program will initially achieve Level 2 of the Network Centric Maturity Model, for NZ national task groups and for likely force contributions to coalition operations. True NCW will not be achieved, and self-synchronization will remain a goal on the distant horizon.

CONCLUSION

The New Zealand Joint Command and Control System project could be considered a model for small nations seeking to modernize their command and control systems and to take advantage of the current emphasis on networked operations.

The JCCS will not deliver a true NCW capability to the NZDF, but it will substantially enhance its ability to effectively command and control its forces. NZDF assets with access to the JCCS will share information and situational awareness, and will be able to collaborate on the planning and execution of missions.

It will also enable NZDF users to link with allies and coalition partners and (to the extent allowed by security constraints) exchange information and situational awareness. While no coalition force can realistically expect to achieve the cohesion and tempo of a networked national force, the JCCS will provide the NZDF with a pragmatic and workable means of participating in coalition operations and engaging across whatever network capabilities are available.