

Operational Assessment of a NATO Response Force

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ABSTRACT

(NATO) Network Enabled Capabilities are buzz words in NATO and member nations. The Command and Control Centre of Excellence has participated in the assessment of the NATO Network Enabled Capabilities of the NATO Response Force 4 and 5. The Centre conducted the assessment of NRF 9 and 10 on behalf of Supreme Allied Commander Transformation (SACT) located in Norfolk, VA, USA. Based on the definitions of the NATO NEC Maturity Levels, the Centre has been requested to provide an insight in the level of NNEC maturity. Key actors in this maturity are the technical, knowledge and social network. The most important input for assessments are the interviews with Commanders or their senior staff. An important observation is that NNEC does not live at the tactical and operational level. Moreover, when NNEC is identified as an important capability, only the technical domain is recognized; the knowledge and social network are hardly identified as separate key players. Another important, but not unexpected observation is that improving the NATO Network Enabled Capability is a slow process. Enforcers for the implementation of NNEC are the Leadership and the (senior) staff; they must encourage organisations to change. But organisations are reluctant to do so. Moreover, the initial hype about Network Enable Capabilities is fading. The initial promises are not being materialized. Strong leadership is required to make sure that the implementation of NNEC does not come to a stand still and regains momentum.

1.0 INTRODUCTION

1.1 The Command and Control Centre of Excellence

In 2002 at the Prague summit it was decided to reorganize the NATO Command Structure. It was also decided that NATO should make more use of the knowledge that is available in the NATO nations. The final decision on the new structure was approved in the NATO document MC 324/1. This document for the first time referred to national or multi-national funded Centres of Excellence (CoE) or knowledge centres, and the Supreme Allied Commander for Transformation (SACT) was assigned to coordinate all CoE efforts within NATO. The Netherlands offered to host, as Framework Nation, the Command and Control Centre of Excellence (C2CoE). In June 2007, the Memoranda of Understanding with the Sponsoring Nations Belgium, Germany, The Netherlands, Norway, Slovakia, Spain, Turkey and SACT have been signed. The United States will join shortly. In total the Centre has 22 people from all services. The C2CoE is managed by a Steering Board with members from all Sponsoring Nations. This Board decides on all relevant issues like budget and Program of Work. As the Centre does not have all

knowledge in house, close relations with other knowledge sources (e.g. RTA, NC3A, R&D Centres, Network Centric Operational Industry Consortium (NCOIC)) are important. The mission of the C2CoE is: “To support SACT in his efforts to transform NATO by providing subject matter expertise on all aspects of the Command and Control process” [C2CoE Functional MoU dd 7 June 2007].

1.2 Definition for Command and Control

With NC3A, following working definition for Command and Control (C2) has been agreed upon and used by the C2CoE: “The exercise of authority and direction by a properly designated commander over assigned forces performed through an arrangement of personnel, equipment, communications, facilities and procedures in the accomplishment of a mission” [C2CoE Operational MoU dd 7 June 2007]. C2 enablers are personnel, equipment, communications, facilities and procedures employed by a commander in planning, directing, coordinating and controlling forces and operations in the accomplishment of the mission. C2 is the art to use these enablers to accomplish the mission.

2.0 NATO NETWORK ENABLED CAPABILITIES

2.1 Definition of NATO Network Enabled Capability

The NATO approved definition of NATO Networked Enabled Capability (NNEC) is:

“The NATO Networked Enabled Capability is the alliance cognitive and technical ability to federate the various components of the operational environment from the strategic level (including NATO HQ) down to the tactical level, through a networking and information infrastructure” [MCM-0032-2006 dated 19 April 2006].

Consequently resides in NNEC a coherent approach to the development of technical and operational interoperability standards and targets for adaptation. NNEC also aims to align national NEC related programs and not only technical interoperability but also operational interoperability, like training, doctrine, etc.

2.2 NNEC value chain

The tenet is that a robustly networked force will improve information sharing and collaboration, which enhances the quality of information and shared situational awareness. This enables further collaboration and self-synchronization and improves sustainability and speed of command; ultimately resulting in increased mission effectiveness (see figure 1) [Source OSD]

However networking is not the goal of NNEC; to improve Command and Control and ultimately to enhance military capabilities is the objective. NNEC is a mindset and mutual trust, horizontally and vertically, is of the utmost importance to be able to achieve a (socially and technically) networked force.

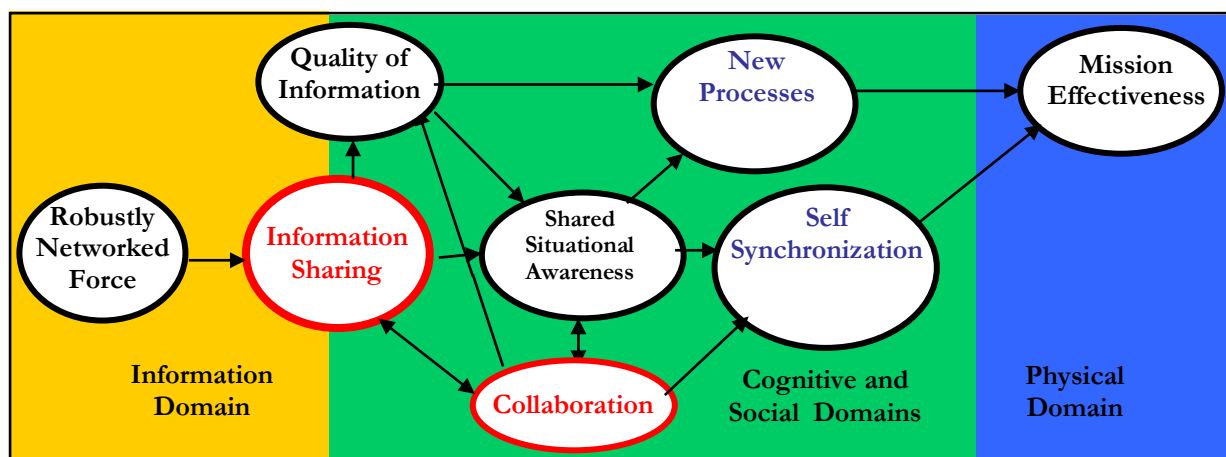


Figure 1: NEC value chain (Figure 1)

2.3 NNEC Maturity

In NATO, 5 NNEC Maturity Levels (NML's) are recognized: Stand-alone, De-conflict, Coordinate, Collaborate and Coherent [NNEC Feasibility Study Vol. 1]. The NML indicates the ripeness of the Headquarters, Command or NRF. Doctrine, Organisation, Training, Material, Leadership, Personnel, Facilities and Interoperability (DOTMLPF&I) are variables or Lines of Development (LoD) recognized by NATO used to measure the NML. Superimposing the maturity levels on the LoD creates the Maturity Level Matrix. The matrix is still under development but it is anticipated that for each field of the matrix a practical and understandable applicable description is needed. Whether this will in the end result in a real reproducible measurement system or in a kind of structured "Language" that enables comparison, remains a question.

3. NML CHARACTERISTICS

For the following discussion it is important to note that the characteristics of the NML's have *not* yet been approved by NATO. They are still being developed by a team with representatives of HQ SACT (lead), NATO HQ, SHAPE, NC3A, RTA and C2CoE and the NATO nations. Though the characteristics are still under construction they are used by the C2CoE because we have to move forward.

3.1 NATO NEC Maturity Levels

The NNEC Maturity Levels were developed based on the Capability Maturity Model (CMM) developed by Carnegie Mellon University and refined to be applicable to a NATO force, in this case the NATO Response Force. NML is a layered framework providing a progression of measures of NNEC capability achievement needed to engage in continuous transformational improvement. The levels defined in the NML are based on the "Transformational Maturity Levels" developed by Allied Command Transformation and the *draft* characteristics [NRF 10 Assessment report] are shown below.

3.1.1 NML 1 – Stand Alone.

This level of maturity is not addressed as all NATO nations and forces currently exceed this maturity level. At present this level is not further defined. However, some team members feel that further refining is necessary.

3.1.2 NML 2 – De-conflict.

This level of maturity is characterized as the state of military capability that exists prior to transformation to a net enabled force. In this maturity level, organisations avoid interference with one another and component commands are organized independently and may operate independently even though they share a common mission. Command structures are centralized and hierarchical with little or no allocation of decision rights to lower levels. In NML 2, collaboration and interaction between organisations and components are executed by liaison officers, supporting their parent headquarters facilitating information exchange. Operationally, actions are constrained by time and battle space to avoid adverse cross impacts among the participants and this affects planning and limits freedom of action. Technically, a force with this maturity level has CIS systems characterized by multiple incompatible applications and databases with limited interoperability which requires extensive human interaction. Situational awareness is achieved through multiple, independent recognized pictures (land, air and maritime) and uses multiple types of independent, single-domain networks. In essence, this force is a continuation of military capabilities present prior to transformation. While it can be very effective for military operations, the NML 2 force does not yet display the characteristics of a net enabled capability.

3.1.3 NML 3 – Coordinate.

This level of maturity is characterized by improvements of operational capabilities and effectiveness as a result of transformational efforts. In this maturity level, organisations cooperate including joint operational planning but execution is still conducted by component commands. Command structures are still centralized and hierarchical, but decision making rights are allocated to lower levels within a synchronized

plan. Component commands are horizontally linked and vertically synchronized. Collaboration is vertical within component commands and interaction between organisations is executed by commanders and supported by liaison officers. Operationally, actions are constrained by linked plans with frequent and ad hoc negotiations between commanders to expedite execution. Planning is distributed but linked with decentralized execution based on shared intent. Situational awareness is enhanced by a common operational picture (COP) which integrates all recognized pictures (land, air and maritime) as well as friendly force tracking. Technically, a force at NML 3 has deployed technology towards a single type of network for voice, data and video that enables interoperability between static, deployable and mobile networks but this technology is not yet fully implemented. CIS interoperability is achieved through the structured exchange of human interpretable data and interoperability between static, deployable and mobile networks using data links. CIS systems support interaction across national and NATO security domains. The implementation of interfaces and gateways eliminates air gaps between separate systems. In general, a force at this level of maturity is in transition to a net enabled capability. While not yet fully implemented, the transition has provided improvements in several areas. In this phase, doctrine, organisation and other lines of development will also transition to maximize these new net enabled capabilities.

3.1.4 NML 4 – Collaborate.

This level of maturity is characterized by continued transformational improvements especially in situational awareness and interoperability. Joint situational awareness is greatly improved as multiple independent sensors at all levels are integrated into a joint COP. A common unified infrastructure based on a single network will allow the seamless sharing of data and facilitate large scale advanced horizontal and vertical collaboration for planning and execution. Major organizational and process changes are evident in this level of maturity allowing vertical synchronization through collaboration and planning and horizontal synchronization through shared situational awareness and understanding of intent. Technically, a force at NML 4 uses advanced semantic interoperability as well as integrated registry and discovery services and all user services are accessible through generic portals or workspaces. In general, a force at this level of maturity has completed many aspects of the transformation to a net enabled capability.

3.1.5 NML 5 – Coherent.

This level of maturity is characterized by unprecedented mission effectiveness through seamless and transparent collaboration. Decision making and responses are extremely rapid and agile. Complete situational awareness is possible through a proliferation of sensors and there is extensive information sharing and continuous interaction between elements. A force at this level of maturity has transparent availability of information regardless of location, self-managing systems, intelligent agents and self-managing systems.

4. NNEC NETWORKS

The technical, knowledge and social network are considered three distinct networks of NATO Network Enabled Capability by the C2CoE. The material (including technology) and facilities make the technical network, knowledge network is created by doctrine, organisation and training; leadership and personnel form the social network. However, in reality it is not that simple as some LoD's affect several networks. E.g. personnel affects both the knowledge and social network, doctrine affects the knowledge and the technical network, etc.

If NNEC is discussed, than people tend to focus on the technical network. We noticed that almost every time we contact a Component Command to brief about NRF NNEC assessment effort, we were directed to the Communication Information Systems Division. However, even when the subject is discussed with the “insiders” much attention is given to the technical network. The term “network” sets people on the wrong foot and we would do all a favour if another word is to be found.

4.1 Technical network

4.1.1 Interoperability

At present there are many issues with the technical network. E.g. interoperability between technical networks is problematic. Pulling non military organisations in the equation makes the situation even more challenging. One commander stated: "As soldiers we must start to realize that we will work for the civilians and that it is within our interest to bring them in from the start".

When these challenges are being discussed with specialists, they will tell you that technical solutions exist and that it will only be a matter of time before the technical network is up and running. Whether that is realistic is not for this discussion. It is interesting to note that notwithstanding the technical challenges, Headquarters are able to operate. This is primarily achieved by a highly developed social network. A staff that communicates well horizontally and vertically, will form, within constrains, an efficient HQ.

4.1.2 Equipment

In NATO the tendency exists to provide technical tools at the latest moment before an exercise or an operation. This has been expressed in the following quote: "Generally, there are too many tools and we can not apply them practically. The toolset is not very well integrated, operationally or technically. Before we put out tools we should provide people a boundary within which to use the tools. A Concept of Operations (CONOPS) is needed on how to integrate the tools but only after a decision on which tools are useful has been made". The lack of training and instruction lead to this quote: "Without proper instruction, the tool remains just another tool". Another quote: "Systems should be more user-friendly. There are just too many tools out there."

These quotes indicate clearly that implementation must be done more structured. Staffs are becoming frustrated with all the technology.

4.1.3 Relevance

Sometimes it is assumed that once the technical network is functioning, the other networks will become less important. However, in our opinion, the knowledge and social network will become even more important once the technical network is functioning. One cannot hide anymore behind the fact that something was not known because the technical network was down. If, as expected, people make less use of the conventional communication means like telephone or VTC, the context of the content of an e-mail or a chat message must be understood. We must understand how the other is thinking and consequently be familiar with the other as a person. Or, as a senior staff member participating in NRF 10 stated: "The emotional side of information can not be reflected by a digital data-stream".

Observations during NRF 4, 5, 9 and 10 has convinced us that the focus must be on the knowledge and social domain.

4.2 Knowledge network

4.2.1 Training and education

Training and education will enable personnel to understand each other and also to gain confidence in the work that they are supposed to do. Training provides the insight in how to use equipment and to digest information. Many participants in exercises state that they receive insufficient joint training. The component that participated in consecutive NRF certification exercises stated that this was very helpful as people now understood where it was all about. One of the Commanders expressed his frustration in the following statement: "It seems at times that there is an amazing amount of information available but the information may not be where you think it is or is so buried within the software applications that it is difficult to identify for actionable use."

4.2.2 Back seat driving

Technology, though not fully developed yet, provides the higher command the opportunity to act as big brother. Referring to his own staff, one of the commanders stated that: "staffs need to be educated to

operate at the operational level and not use the hundred miles long screw driver”. In other words, trust that the people will do their work and what they are trained to do. Of course there is always a fine line. Therefore it is important that all networks are well developed.

4.3 Social network

4.3.1 Culture

The social network is important as it ensures that people treat each other with respect. It also ensures that people understand the other person, that cultures are understood. Especially in NATO, which is a cultural melting pot this factor is very important. Non-native English speakers have to communicate with native English speakers which, sometimes is a challenge. Misunderstandings between speakers that consider themselves native English speakers occur also on a regular basis. Moreover, the cultural differences between the military services become more and more apparent. Add civilian organisations to the equation and the situation becomes even more complex.

4.3.2 Trust

A well developed social network results in the foundation of NNEC: Trust. NNEC hinges around trust: trust of the leadership in their subordinates, trust of the personnel in the equipment and the organisation, trust of the organisation and personnel in the leadership. But also trust in non-military organisations. At present “need to know” is the paradigm in the military. To gain full advantage of NNEC this has to change in “need to share”. This will and can however only occur if the other party is fully trusted. Mutual trust is also a prerequisite to bridge stovepipes and to share or give up power. Once people are willing to do this, a higher level of maturity can and will be achieved.

5. NRF NNEC ASSESSMENT

5.1 Background

The C2CoE conducts the NNEC assessment of the NRF on behalf of HQ SACT. It must be emphasized that it is an assessment, not an evaluation or a certification. The C2CoE does not grade the NRF on pass or fail criteria.

The C2CoE has defined an assessment as: “The process of documenting evidence from collected data such as interviews, observation and questionnaires, in measurable terms”.

5.2 Assessment objectives

The C2CoE has been requested by SACT to conduct the NATO Response Force (NRF) NATO Network Enabled Capability (NNEC) assessment on behalf of HQ SACT. The assessment of NRF 9 and NRF 10 have been finalized; NRF 11 – 13 will be done in the near future. The assessment objectives are:

- a. to establish the NRF current NNEC level;
- b. to develop a support program to allow NATO to incorporate insights in immediately following NRF’s;
- c. to develop specific (long term) recommendations on areas in need of enhancement;
- d. to support HQ SACT with the development of a NNEC assessment tool that will support the Operational Commander.

5.3 NNEC Assessment reporting

The result of the NRF NNEC assessment is an initial assessment report, sent to the assessed entities with a request for comments. The final report is forwarded to the Strategic Commands, HQ SACT and SHAPE. HQ SACT will disseminate the reports over the NATO Nations. Based on this report the assessed Components are ideally debriefed and the upcoming rotation is briefed on the lessons identified. The tool that is mentioned in the final objective is still under development. The intention is that the Commander will be able to easily identify the weak and the strong points of his force.

6. METHODOLOGY

Most Components of the NRF rotate on a 6 month basis. Therefore a NRF certification exercise is held every 6 month. After the certification exercise the NRF has a 6 month stand by period in which elements of the Components are on a 5 days notice to move. The C2CoE has chosen to use the certification exercise for the assessment. The advantage is that during the certification exercise almost all Component Commands (Maritime, Air, Land, and Logistics) and the Deployed Joint Task Force Commander are deployed. The disadvantages are that during the certification exercise only the HQ staffs and not their subordinates are deployed. The assessment is a snapshot of the NATO NEC status of the NRF. The C2CoE Assessment team consists of Subject Matter Experts (SMEs) on Command and Control related issues, they are no Observer/Trainers, Mentors or Evaluators. This is important as they must obtain a special (trust) relationship with the assessed staff. The assessment is performed using the principles described in the *NATO Code of Best Practices for C2 Assessment* [NATO Code of Best Practice for C2 Assessment revised 2002]. Key elements of this approach include a briefing to the respective Commanders and their staffs, the identification of the scope of the assessment, the identification of the underlying theory, research questions and hypotheses, the development and execution of a data collection, and, an analysis plan. The C2CoE conducts a self-assessment, providing the staff the opportunity to give insight on their own limitations and strong points. The NRF assessment is also considered to be subjective and informal. A subjective assessment is a form of questioning which may have more than one correct answer (or more than one way of expressing the correct answer). Subjective questions also include extended-response questions and essays. The information used for the assessment is obtained from three sources: questionnaires, observations and interviews.

6.1 Questionnaires

Most information is obtained through questionnaires that we distribute at the beginning of the exercise (about 30 per command). The questionnaires for NRF 9 were developed by the Centre, for NRF 10 the Military Command Team Effectiveness Model has been used [Military Command Team Effectiveness: Model and instrument for assessment and Improvement].

6.2 Observations.

The C2CoE staff observes the exercise at the Deployed Joint Task Force (DJTF) and Component Commanders location. Observations made by observers are per definition subjective. To minimize bias, observations are collaborated as much as possible with HQ staff. Also it is generally accepted by the staff that we contact personnel that, although the questionnaires are anonymous, submitted questionnaires with unclear answers for informal interviews. Finally as we follow the full Battle Rhythm of the exercise we obtain data from chats with the participants. Observations during the event provide an insight into how much emphasis must be put on questionnaires, the formal and the informal interviews.

6.3 Interviews

Dialogues or formal interviews with key personnel, like Senior Mentor, Commander, Deputy Commander, Chief of Staff, Chief Operations, Information Manager are used to obtain insights from these people and their views. These interviews are crucial as this way of collecting data is more flexible and allows collecting more subjective opinions about where the strong and the weak points are of the NRF or Component Command and discuss possible solutions. Most of the people interviewed agreed that the transcript could be used in the assessment report. Our experience is that Commanders and other key personnel are available for interviews at unpredictable moments so the assessor must be ready for them at any time.

7. ASSESSMENT TOOLING

It would be ideal to have an “automated” tool for the assessment of the NATO Maturity Level. Insert the findings, especially the filled out questionnaires, at one end and at the other end the level as the outcome.

The two tools available were data collectors, databases. One tool based on an EXCEL spread sheet and the other is a commercial tool. However the manipulation of the data still had to be done by people. We do not think that it will be easy to develop a simple toolbox. Observations by people and the interviews provide many insights that put the questionnaires in context. Both tools have been tested during the assessments.

7.1 EXCEL Spread sheet.

The questionnaire used is based on the CTEF model. The lay out of the EXCEL tool was identical to this model. The tool is set up by one of the members of the C2CoE. It is strait forward (figure 2). The output only provides input for the assessment; it is an information database and not an assessment tool.

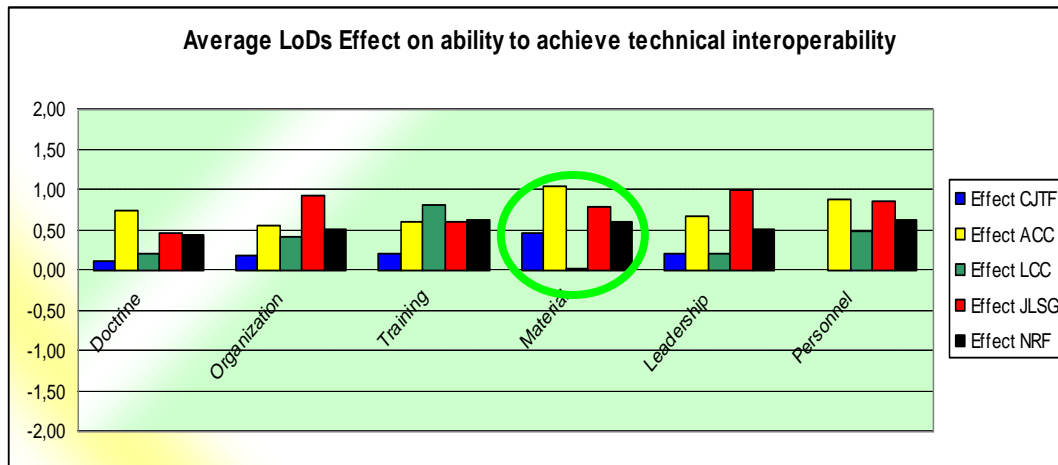


Figure 2: Average LoD effect on ability to achieve technical Interoperability

EXCEL provides the opportunity to translate the information into graphics, and those are always easier to understand than figures. In this example the Air Component used the Bi-SC AIS core and functional services. Other Components had to interface through gateways with national C2 systems. The variety of systems used by the Components prevented a flawless stream of information and caused many frustrations.

7.2 Commercial Assessment tool

The second tool used is a commercial tool, the Network Centric Analysis Tool (NCAT). This tool is still under development and therefore it could not be used to its full extend. Once completely developed it should be possible to establish the Maturity Level easily. This than will provide the Commander insights as to where the weakness and strength of his force is through the snapshot concept.

7.2.1 The Maturity Level Snapshot Concept:

Overall, achievement of NNEC maturity as measured by the lines of development for a NRF is determined by direct observation, interviews with leaders and questionnaires. As the criteria defined in NML are not yet agreed or approved within NATO, the NML observations depicted in Figures 3 and 4 are examples. The snapshot is based on a brief period in an exercise environment and is an approximation of NNEC capability achievement that would be expected if the NRF was deployed for operations. The ratings shown in the following figures are in no way to be construed as an evaluation of operational capability or as a “grade” for the NRF.

7.2.2 Slider Bar Chart:

The example slider bar chart (figure 3) reflects the maturity level observed for the component indicated along the lines of development. In this chart, the vertical line on NML 3 indicates the target level of

maturity and the slider depicts the observed maturity characteristics for each line of development. Where the slider is to the left of the vertical line, NNEC observed achievement is less than the target. In those lines of development where the slider bar is to the right of the vertical line, NNEC observed achievement exceeds the target.

7.2.3 Maturity Level Spider Chart:

The spider chart shown in Figure 4 reflects the same data as shown in the slider bar chart that precedes it. In this example chart, the target level of maturity is defined by the solid black line at NML 3 and the observed maturity level for each line of development is shown by the coloured line. Where the coloured line is inside the black line, NNEC observed achievement is less than the target. In those lines of development where the coloured line is outside the black line, NNEC observed achievement exceeds the target.

7.2.4 Maturity Snapshot of NRF CJTF

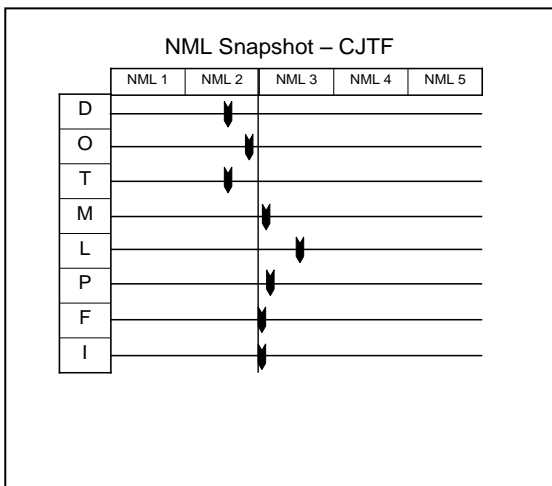


Figure 3: Slider Bar Chart

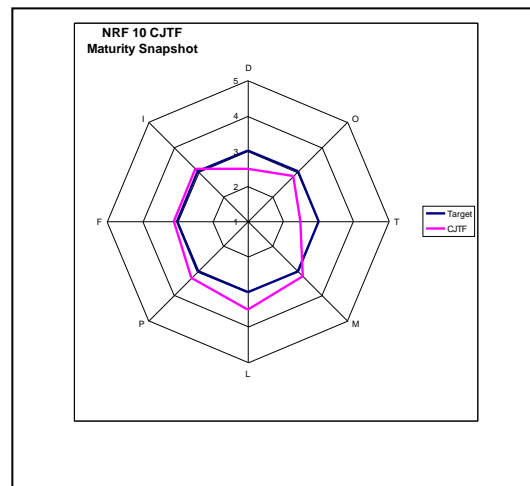


Figure 4: Spider Chart

8. FINDINGS AND RECOMMENDATIONS

It is not possible to discuss extensively the findings of the NRF assessments as they are classified. However some general observations can be made based on the NRF 9 and 10 assessments [NRF 9 and NRF 10 assessment reports].

8.1 General

The most important finding is that at the operational and tactical level, and these are the war fighters, the people are not aware of NATO Network Enabled Capability. According to the received comments from the operational and tactical community, NNEC is too conceptual and too scientific. That the Social network is a part of NNEC was for many an eye opener. It is recommended to make NNEC Concepts more visible and of more practical value in ACO. A program is required to familiarize the people with the intentions of NNEC.

8.2 Technical network

8.2.1 Interoperability

There are still problems to federate the technical network from the strategic level down to the tactical level. Information Security restrictions preclude that Communication Information Systems are being

connected. These constraints have organizational impact on Components headquarters as they are responsible to disseminate the information to the lower and higher echelon.

8.2.2 Quick wins

The development of the Technical network will continue. It is fair to state that nations are working hard to solve the interoperability issue. Quick wins can be achieved in the Knowledge and Social networks.

8.3 Knowledge network

8.3.1 Doctrine.

The danger is that doctrine becomes a dogma, and this should be prevented at all cost. Doctrine must be used as guidance and should exploit new possibilities. This provides flexibility to the Commanders.

8.3.2 Training

The number of Command and Control supporting systems increases per NRF rotation. But the required integration, accreditation and (user and staff) training cannot keep up with this tempo. In NATO's Comprehensive Approach the involvement of non-NATO actors is increasing and therefore the technical interoperability is even a bigger issue.

8.3.3 Organisations

Organisations are adapted to the technical and doctrinal shortcomings. Extra personnel are required to create work-arounds technical shortcomings. Liaison officers (LNO) are used to overcome the deficiency of knowledge of the other headquarters. This increases the size of staffs. However on the other hand staffs must be kept as small as possible. Otherwise the staffs lose the required agility and flexibility.

8.3.4 Liaison Officers

The LNO's must be familiar with the receiving organisation and vice versa. He must have the right rank and experience and this must be coordinated between the Components. On the other hand must be ensured that LNO's are used correctly and fully integrated in the hosting organization.

The LNO Concept should be reviewed for efficiency and effectiveness in a NNEC environment.

8.3.5 Information Management

In a NNEC environment Information Management (IM) becomes of the utmost importance. A sound IM plan should support the current staff structure. This plan must include assignment of responsibilities for information management to devoted individuals within the staff and include a training plan that will increase the information management capabilities.

8.3.6 Web pages

To facilitate information exchange between headquarters web pages are used. However, each headquarter designs its own page. Therefore it is hard to find information. Moreover, most web pages use very expensive bandwidth. The format of the Web pages must be standardized throughout the NRF and maybe throughout NATO. Headquarters must have a monitor function that controls all aspects of information published on the WISE pages.

8.4 Social network

Networking the force is not (only) about technology. The social network is more and more recognized to be the most important network as key NNEC-enabler. Although new systems and functionalities are made available to the units in a rapid tempo, the commanders stated over and over again that those will never replace face-to-face meetings and plain voice communications. One commander said this as follows: "VTC is better than telephone, but it is the second best option. Face to face is still best". At present however, only the commanders meet on a regular basis. To achieve a higher level of maturity, this must be expanded to the whole staff. This can be achieved through joint training. This will also create trust.

8.4.1 Leadership

To enforce the implementation of the NNEC principles, the leadership, this is the commander plus his senior staff, are essential actors. They must force the people to work differently, to use the equipment to the maximum extend and enforce training and education to ensure that the knowledge and social network are developed.

8.4.2 Training and Education

Training and education of personnel is of the utmost importance. Too often people are sent to another HQ at short notice with the task to augment the staff. People need to train with the same people and equipment they will conduct an operation with. This provides them the confidence to discuss issues with their peers in the staff.

8.4.3 Informal information processing

In the social network much informal information is being processed. The Information Management plan and the people, especially the leadership, must consider the ways that informal information makes its way into the formal information network and how it can be leveraged.

9. CONCLUSION

In this paper a pragmatic approach is used to put emphasize on challenges in the field of NNEC. In NATO the technical network or interoperability between all levels of command will not be ideal in the near future. People ensure that the degraded technical environment does not cause mission failure, but that a Command or Headquarter can operate successfully. This is guaranteed by the social and the knowledge network. At present most operational people in the field consider the present NNEC approach too theoretical, too conceptual. This is also caused by the fact that NNEC is discussed in small working groups, at high level and in scientific groups. There are too many groups working the same subject. Only NML's are being discussed in 4 or 5 groups in NATO without coordination or close cooperation. The NNEC principles must be brought to the working floor level. The principles of NNEC should be included in NATO exercises. The initial hype of NNEC is diminishing and the war fighter must be convinced again about the positive effect of NNEC. If he or she does not get the answer on the question "what is in it for me" the smooth implementation of the NNEC will become an uphill battle. The momentum has to be regained.

[1] [C2CoE Functional Memorandum of Understanding 7 June 2007]

[2] [C2CoE Operational Memorandum of Understanding 7 June 2007]

[3] [NATO Code of Best Practice for C2 Assessment revised 2002]

[4] [Military Command Team Effectiveness: Model and instrument for assessment and Improvement; NATO RTO technical report AC/323(HFM-087)TP/59, April, 2005]

[5] [NRF 10 Assessment report]

[6] [NRF 9 assessment report]

