Evaluation and Certification of the Nordic Battlegroup

ERIK LINDBERG

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Abstract

To fulfill the obligations as an EU Battlegroup Framework Nation, the Swedish Armed Forces are to certify that the Nordic Battlegroup (NBG) meet the regulated standards and criteria.

In September 2005 the operations research project FÖRVÄRMD (FÖRbandsVÄRDering Metod och Data) was initiated in order to analyze and recommend suitable methods for the evaluation and certification of the Nordic Battlegroup.

This Base data report is the final report of the FÖRVÄRMD project, presenting its findings and conclusions from the period September to December 2005.

The report is aimed for decision makers within the Armed Forces that constitutes the Nordic Battlegroup (Sweden, Finland, Norway, Estonia). The report is also aimed for those responsible for planning and conducting the evalution and certification of military units to international pools of forces.

Keywords
Certification, Evaluation, Nordic Battlegroup, EU BG, OCC E&F, NATO, Pool of Forces

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Evaluering och certifiering av NBG

Sammanfattning

Denna underlagsrapport är resultatet av OA-projektet FÖRVÄRMD (FÖRbandsVÄRDering Metod och Data) som genomfördes under hösten 2005 på uppdrag av Försvarsmakten. Syftet var att utreda och föreslå lämpliga metoder för validering och certifiering av Nordic Battlegroup enligt EUs kriterier.

Rapportens innehåll riktar sig främst till beslutsfattare och handläggare inom berörda försvarsmakter, men även till övriga intressenter inom området validering och certifiering av förband till internationella styrkeregister.

Nyckelord

Certifiering, Validering, Evaluering, NBG, EU BG, OCC E&F, Nato, Internationella styrkeregister

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Cover photo: A Swedish Armed Forces air assault soldier during the final Army Exercise 2005 at Kvarn, Östergötland, Sweden. The soldier is equipped with simulation material both on himself and his AK5 weapon. These connect to the Combat Training Centre (STA), where the soldier's position can be tracked as well as his actions.

Photo: Swedish Army Combat Training Centre.

Executive Summary

The Nordic Battlegroup (NBG) is one of the EU battlegroups (BG). The BGs are a part of EU's rapid response elements. A BG is based on a combined arms, battalion sized force and reinforced with Combat Support and Combat Service Support elements. A BG is associated with a (F)HQ[1] and pre-identified operational and strategic enablers, this constellation is known as a battlegroup package (BG package).

The NBG is scheduled to be on stand-by from 2008-01-01 to 2008-07-01. Sweden is the NBG's Framework Nation and Finland, Norway and Estonia contributes with units as illustrated in figure 1 below. UK supports the NBG development and the UK OHQ (Operations Headquarter) is scheduled to be the first choice as OHQ for the NBG package.

To fulfill Sweden's obligations as an EU Battlegroup (EU BG) Framework Nation according to the regulating document *EU BG Training and Certification* (Reference A), the Swedish Armed Forces are to certify that the BG package[2] meet the standards and criteria stated in *Standards and Criteria for EU BG* (Reference B).

The NBG package must be certified to meet the EU BG standards and criteria no later than November 30 2007. EU recommends that the BG certification procedure should be, if possible, analogous with the Nato Response Force (NRF) certification procedure and practical methods.

The importance of NBG evaluation and certification should not be underestimated or taken lightly since the purpose is to ensure that the safety and lives of the NBG war-fighters will not be subject to any unnecessary risks.

In September-05 the operations research project FÖRVÄRMD[3] was initiated in order to analyze and suggest suitable practical methods for the certification process.

The analysis methodology used is based on literature reviews and a mix of interviews, workshops and a seminar with relevant stakeholders from the Swedish Armed Forces, from the political level and from subject matter experts.

As a result of the findings we suggest that the NBG certification procedure is divided into the following evaluation procedures:

1) *NBG Preparation & Planning evaluation* - Addresses the evaluation of planning and preparation issues like readiness, availability, deployability etc.
2) *NBG War-fighting evaluation* - Addresses combat proficiency and Force Effectiveness evaluation, i.e. the war-fighting ability of the NBG package to fulfill the specific tasks in its mission spectrum.
3) *Technical evaluation* - Addresses technical interoperability and operational performance.

A good strategy to implement these three procedures is to:

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[1] Force Headquarter.

2 A BG package consists of a (F)HQ, a BG and associated pre-identified operational and strategic enablers, such as strategic lift and logistics.

[3] FÖRbandVÄRdering Metod Data (Military Unit Evaluation, Methods and Data).

1) Use the fact that the OCC E&F[4] and the NRF PC/ECC[5] approaches are supplementary. Develop a mix of the best parts for the Preparation & Planning evaluation.
2) Develop a NBG JMETL[6], if possible use the NRF JMETL as a starting point. Then use the NBG JMETL, the NRF ETC[7] and the NTL[8] to develop warfighting requirements.
3) Ensure that the technical certification processes in use in the Armed Forces, will be incorporated in the NBG certification procedure. An important first step is to document these processes to to find the gaps where necessary certification is missing.

To achieve the objectives of NBG certification we suggest that a core working group is established. The core working group will be responsible for the development of the three evaluation procedures. Each procedure will be developed by a sub-working group with representatives in the core group to ensure that the different procedures harmonize.

An action plan is suggested in order to assure a successful implementation of the certification procedure.

[4] Operational Capabilities Concept Evaluation & Feedback Programme.

[5] Nato Response Force Permanent Criteria/Evolutionary Capability Criteria.

[6] Joint Mission Essential Task List.

[7] Nato Response Force Evolutionary Training Criteria.

[8] Nato Task List.

Table of Contents

1. References

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C. 10501/04 *EU Battlegroups Concept*

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2. Glossary of terms

ACO	Allied Command Operations
AFS	ACO Force Standards
AHP	Analytic Hierarchy Process
Battlegroup	A BG is based on a combined arms, battalion sized force and reinforced with Combat Support and Combat Service Support elements. A BG must be associated with a (F)HQ and pre-identified operational and strategic enablers.
BG	EU Battlegroup
BG package	A BG package consists of a (F)HQ, a BG and associated pre-identified operational and strategic enablers, such as strategic lift and logistics.
CIS	Combat Information System
CJSOR	Combined Joint Statement Of Requirements
CMO	Crisis Management Operation
CS	Combat Support
CSS	Combat Service Support
CONOPS	Concept of Operations
CPX	Command Post Exercise
EUFOR	EU FORCE
EU RC	EU Requirements Catalogue
(F)HQ	Force Headquarter
Framework Nation	A member state or a group of member states that has volunteered to, and that the Council has agreed, should have specific responsibilities in an operation over which EU exercises political control.
IO	International Organization
JDLM	Joint Deployment Logistics Model

JMETL	Joint Mission Essential Task List
JOA	Joint Operations Area
LIVEX	Live Exercise
LTA	Swedish Army C2 Training System
MARTA	Military Analysis method for Reliable Tactical Assessment
M&S	Modeling & Simulation
MS	Member state
NBG	The Nordic Battle Group (NBG) is one of the EU BGs and is formed by contributions from Sweden, Finland, Estonia and Norway. Sweden holds the position as Framework Nation.
NGO	Non-governmental Organization
NRF	The Nato Response Force
NRF ECC	NRF Evolutionary Capability Criteria
NRF ETC	NRF Evolutionary Training Criteria
NRF PC	NRF Permanent Criteria
OCC	Operational Capabilities Concept
OCC E&F	OCC Evaluation & Feedback Programme
OCC ETC	OCC Evaluators Training Course
OHQ	Operations Headquarter
OPEVAL	Operational Evaluation
OPLANS	Operation Plans
OT&E	Operational Testing & Evaluation
RoE	Rules of Engagement
RSOI	Reception Staging, Onward Movement and Integration
STA	Swedish Army Combat Training System

3. Introduction

3.1. Scope of the project

To fulfill Sweden's obligations as an EU Battlegroup (EU BG) Framework Nation according to the regulating document *EU BG Training and Certification* (Reference A), the Swedish Armed Forces are to certify that the Nordic Battlegroup (NBG) meet the standards and criteria stated in *Standards and Criteria for EU BG* (Reference B). In September 2005 the operations research project FÖRVÄRMD[9] was initiated in order to analyze and suggest suitable practical methods for the certification process.

The importance of NBG evaluation and certification should not be underestimated or taken lightly since the purpose is to ensure that the safety and lives of the NBG war-fighters will not be subject to any unnecessary risks.

3.2. Limitations to the study

There are several Nato restricted documents (not released to Partners) of interest when studying the concept of evaluation and certification. Since these documents were not available for Partners within the time constraints of this study, further analysis may be needed if/when additional documents are released.

Examples of such documents are:

- ACO Force Standards and similar linked documents. (Vol. IV Standards for Maritime Forces was released 2005-09-23.)
- Initial draft of the Joint Mission Essential Tasks List (JMETL) for the NRF.
- 2108.07/SH/J5/J9/NRF CG/04 - 100534, NRF 1&2 Certification, March 2004.

The financial estimates of the different possible certification approaches are not included in this report. There are two reasons for this. Firstly, this report investigates the possibilities in a general sense which makes it difficult to estimate the financial aspects. Secondly, the financial constraints for the certification process are not known yet. Hence, the financial aspects will be analyzed at a later stage when the detailed certification plan is to be developed.

3.3. Aim of the report

This is the final report of the FÖRVÄRMD project, presenting its findings and conclusions for the period September to December 2005.

[9] FÖRbandVÄRdering Metod Data (Military Unit Evaluation, Methods and Data).

4. Background

This section forms the background for the analysis, by describing the EU BG certification requirements. It also describes briefly the EU and Nato rapid response elements and the existing evaluation processes in the Swedish Armed Forces. The findings are then used for the problem definition in the following section.

4.1. The Rapid Response Elements

In this sub-section the EU Battle Group (EU BG) and the Nordic Battlegroup (NBG) are briefly described and a comparison of the mission spectrum between the EU BG and the Nato Response Force (NRF) is presented.

4.1.1. The EU BG and the Nordic Battle Group

The NBG is one of the EU BGs. The BGs are a part of EU's rapid response elements. A BG is based on a combined arms, battalion sized force and reinforced with Combat Support and Combat Service Support elements. A BG is associated with a (F)HQ[10] and pre-identified operational and strategic enablers, this constellation is known as a BG package.

The NBG is scheduled to be on stand-by from 2008-01-01 to 2008-07-01. Sweden is the NBG's Framework Nation and Finland, Norway and Estonia contributes with units as illustrated in figure 1 below. UK supports the NBG development and the UK OHQ (Operations Headquarter) is scheduled to be the first choice as OHQ for the NBG package.

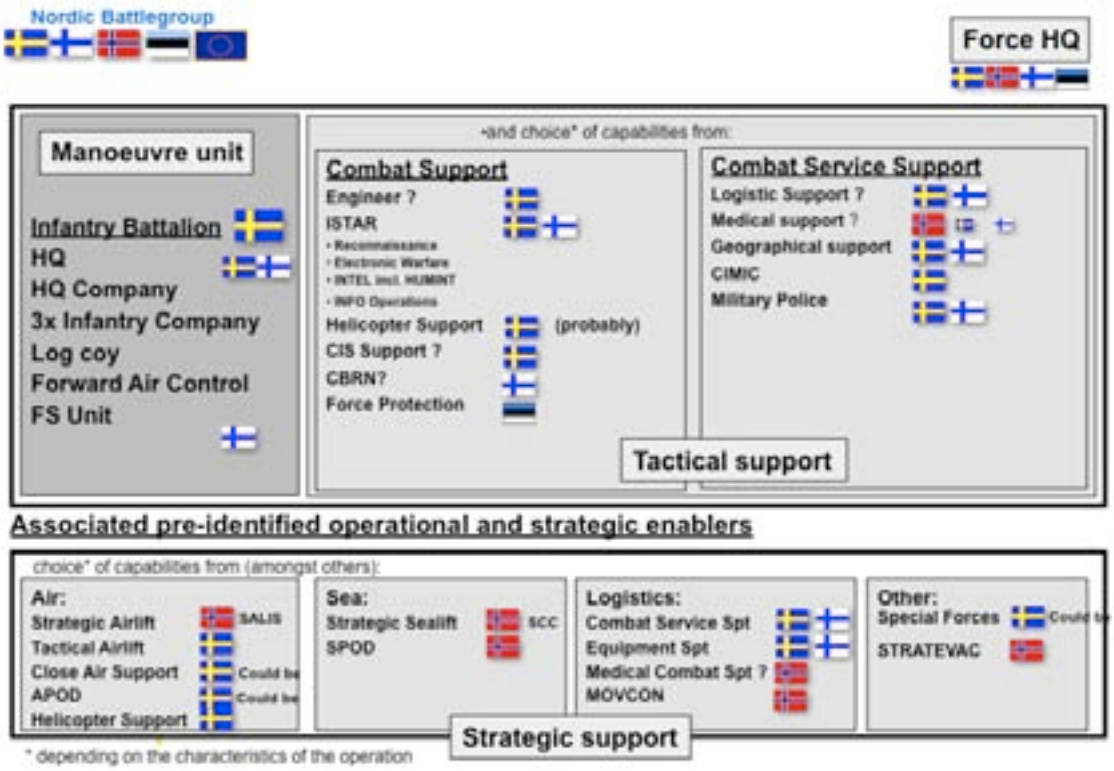

Figure 1. The Nordic Battle Group.

[10] Force Headquarter.

The Nato Response Force (NRF) is another rapid response element under development in Europe. There are differences in size between the an EU BG the NRF, since the NRF encompasses 22 000 troops and the EU BG only about 1 500 troops, not including the associated air and maritime assets. But there are also many similarities since several EU member states may commit their assets and capabilities to both the BG and the NRF. As an example of the similarities, the EU BG and the NRF respective mission spectrum (Reference H and B) are compared in the table below. The table shows that of the five mission types for the NRF, four are analogous to the EU BG.

NRF Missions	EU BG Missions
Non-combatant Evacuation Operations (NEO)	Evacuation Operations in a non-permissive environment, including Non-combatant Evacuation Operations (NEO)
Support to Consequence Management (CBRN events or humanitarian crisis situation).	Assistance to Humanitarian Operations (HA), including Disaster Relief and assistance to Migratory movements to safe areas.
Crisis Response Operations, including Peacekeeping.	Separation of Parties by Force (SOPF) operations, including crisis management, peacemaking and Securing Lines of Communication (LOCs)
Embargo operations.	Conflict Prevention (CP) operations, including Preventive Deployment, Joint Disarmament Operations, Embargo Operations
Support to Counter Terrorism (CT) operations.	

4.2. EU BG Certification

The concept of certification plays an important role in the forming of the EU rapid response capability. The *EU BG Concept* (Reference C) states the purpose of EU BG certification and the member states' responsibilities in the following way:

> "Certification of formed elements is required, in order to guarantee that the defined standards are being met. The certification remains a national responsibility of the contributing Member States, who should undertake this certification according to fixed EU-agreed procedures (...)."

4.2.1. The EU BG certification procedure and practical methods

Concerning the choice of certification procedures and methods the EU BG Concept (Reference C) states:

> "The EU BG seeks to be complementary with NATO (NRF) documents. Wherever possible and applicable, standards, practical methods and procedures (...) are analogous to those defined within NATO (NRF). This is of utmost importance as Member States may commit their assets and capabilities (...) to both the BG and the NRF."

The connection to NRF certification procedures is also stressed in *BG Training and Certification* (Reference A):

> "The certification procedure to be followed in order to guarantee that all committed BG packages meet the BG Standards & Criteria, will, where possible and applicable, be analogous with the NRF certification procedure."

The findings of this study are that there are no certification methods designated by the EU except for the recommendation to use, if possible, NRF methods and procedures.

4.2.2. The EU BG certification responsibilities

According to *BG Training and Certification* (Reference A) the following responsibilities applies to BG contributing countries concerning the three aspects: Training, Unit-level and BG Package Certification :

Training Requirements

According to *BG Training and Certification* (Reference A) the following responsibilities applies to BG contributing countries concerning the aspects of training:

> "Member States (MS) are free to shape BG package training according to their needs as long as it leeds to successful certification and fulfilling the BG Standards and Criteria."

Unit-level certification

According to *BG Training and Certification* (Reference A) the following responsibilities applies to BG contributing countries concerning the aspects of Unit-level Certification :

> "Before being added to a BG package, MS certify that their contribution meets the defined standards and criteria at unit-level."

BG package certification

According to *BG Training and Certification* (Reference A) the following responsibilities applies to BG contributing countries concerning the aspects of BG package Certification :

> "One month in advance of the stand-by period the BG contributing MS are to certify that their BG package meets the BG Standards & Criteria (...)."

The definitions above leaves room for interpretation. However, the study assumes that the certification of the NBG package is a responsibility of the Framework Nation (Sweden).

4.3. Standards and Criteria for EU Battlegroups

Concerning the EU BG standards, the EU BG Concept (Reference C) states:

> "Commonly defined and agreed, detailed military capability standards for BGs are a necessity. Wherever possible such standards should be the same as those required for similar formations assigned to the NATO Response Force."

This is further pronounced in the *Standards and Criteria for EU BG* (Reference B):

> "The defined standards and criteria should be complementary to NATO (NRF) documents, nevertheless taking into account the characteristics of the EU."
>
> "Whenever it is possible and applicable to do so, BG packages must be trained and able to meet the same standards and criteria for similar formations assigned to the NRF, whilst taking into account the characteristics of the EU to allow contributions from all MS."

Nevertheless, there are nine sections of standards, criteria and recommendations for EU BG described in the *Standards and Criteria for EU BG* (Reference B) in the following order:

1) Availability
2) Flexibility
3) Employability and deployability
4) Readiness
5) Connectivity
6) Sustainability
7) Survivability
8) Medical Force Protection
9) Interoperability

According to *Standards and Criteria for EU BG* (Reference B) the nine standards are to be measured through criteria and these criteria

> "are verifiable prior to stand-by phase and constitute a basis for national evaluation/certification".

The recommendations are understood as

> "items identified as recommendable though not verifiable."

As an illustrative example the definitions for Flexibility is used. *Standards and Criteria for EU BG* (Reference B) states the following standard for Flexibility:

> (...) the BG package should be trained and equipped to cope with the most demanding missions. It therefore must be organised and trained for high intensity combat at unit level, and is to possess the ability to adapt to any potential military task and associated risks within the framework of its agreed missions."

By the definition this standard is supposed to be measured through the following criteria:

> "The BG package elements must have the ability to adapt to any potential military task within the framework of its agreed missions, bearing in mind its limited size."

It is difficult to see how the standards in the example above are supposed to be measurable through the given criteria, since there are no measures attached to the standards. Evidently measures for e.g. "the ability to adapt" needs to be developed before the EU BG standards and criteria can be applied. This difficultly applies to almost all of the standards and criteria in the *Standards and Criteria for EU BG* (Reference B). More information on this subject can be found in section the analysis section below.

4.4. Evaluation Processes in the Swedish Armed Forces

In addition to the EU BG certification there are three other international evaluation processes in the Swedish Armed Forces of interest when developing the NBG certification. These are: OCC[11] evaluation, PfP PARP[12] evaluation and technical operational evaluation. The three processes are summarized in the table below and briefly described in the following sub-sections.

[11] Operational Capabilities Concept.

[12] Partnership for Peace Planning and Review Process.

	OCC E&F	PARP Evaluation	Operational Testing and Evaluation
Focus	Interoperability and capability	Technical and functional interoperability	To test systems in its operational environment
Requirement References	ACO Force Standards Nato Task List	Nato STANAGs and Doctrines	The process is not established yet in Sweden

In addition to the three processes, the Swedish Armed Forces conducts an annual evaluation process called KFV[13]. This process is not considered in this report because the process is being redesigned at the moment.

4.4.1. OCC E&F

According to the OCC E&F[14] Maritime Concept (Reference M), the OCC E&F Programme aims to improve, through evaluation and feedback, the level of interoperability and operational effectiveness of partner nations forces declared to the OCC Pool of Forces. The OCC E&F Programme is:

> "a structured process for critical examination of any activity and/or capability against appropriate defined NATO standards and criteria."

The process use two tiers where each tier consist of a self-evaluation procedure followed by a Nato evaluation procedure. The first tier of the E&F process focus on interoperability and safety. The second tier focus on "evaluating military capabilities" and for that reason it might be interesting as a model for a NBG certification process. Another reason is the statement in *Standards and Criteria for EU BG* (Reference B)

> "(...) BG packages must trained and able to meet the same standards and criteria for similar formations assigned to the NRF (...)"

This could mean that if the OCC E&F Programme was applied to the non-Nato units assigned to the NBG, then these units would be evaluated and certified to both the EU BG and the OCC Pool of Forces at the same time.

The programme and its connection to EU BG certification is further described in the Annexes.

4.4.2. PARP evaluation

According to the OCC E&F Concept (Reference E) the reporting of a unit in the PARP survey does not automatically enter the unit into the OCC Pool of Forces. For forces and capabilities offered by Partner Nations through PARP and also declared into the OCC Pool Of Forces, the PARP survey results may be used as an element of a Partner's OCC E&F Self-Evaluation. This will be done on a Partner's formal request and by providing detailed information on the unit's appropriate Partnership Goals (PG). The connection between the PARP survey and the NBG is the PG High Readiness Capability which states:

> "By the end of 2007, ensure that those high readiness joint force operational units and assets which could be made available on standby for, or to, international crisis response operations for short specified periods at five to ten days

[13] KrigsFörbandsVärdering - Military Unit Evaluation.

[14] Operational Capabilities Concept (OCC) Evaluation & Feedback.

> readiness to deploy, meet the appropriate standards and interoperability in use by the corresponding organization under whose auspices the operation (...) is being conducted."
>
> "If committed to an operation, or associated training and exercises, the assets covered under this Partnership Goal should be capable of meeting the Nato Response Force Standards (...)."

Hence, if military units belonging to the NBG are committed to an operation or exercises conducted by Nato by the end of 2007, they should be capable of meeting the Nato Response Force Standards (Reference H and I). This obviously harmonize with the *Standards and Criteria for EU BG* (Reference B) stating

> "(...) BG packages must trained and able to meet the same standards and criteria for similar formations assigned to the NRF (...)"

There are several processes in the Swedish Armed Forces aimed at certifying military units according to Nato STANAGs and Nato Doctrines stated in the different PARP Partnership Goals. An example, relevant to the NBG, is the Partnership Goal which states that the Forward Air Controllers (FAC) are to be certified against STANAG 3797. Another relevant Partnership Goal is stating that it is essential that national land force units are trained in Allied Land Forces Tactical Doctrine (ATP-35(B)).

To the present date, this study has not been able to review any compilation of the on-going STANAG certification processes in the Armed Forces and the FMV[15]. To avoid possible redundancy with the NBG certification, we recommend that the STANAG certification processes in progress are listed and thoroughly documented as soon as possible.

4.4.3. OT&E and OPEVAL

In the thesis *OPEVAL - For the warfighters* (Reference P) Nilsson finds that Operational Testing and Evaluation (OT&E) and operational evaluation (OPEVAL) processes are internationally considered to be important aspects of the equipment procurement process. OT&E and OPEVAL are described in the following way:

> "The focus should be on mission-level evaluations, assessing the impact of the system under test in its operational environment and taking into consideration all the variables that can contribute to mission success or failure. "

In his findings Nilsson concludes that OPEVAL is not carried out in Sweden. The primary reason for this is the historical closeness between the organizations, the principle of self-support due to Sweden's limited economical means and the fact that Sweden is not a Nato member. One of Nilsson's main conclusion is that an organization needs to be established to perform credible OPEVALs similar to the kind the U.S. Armed Forces performs. The figure 2 below shows Nilsson's view on how a Swedish OT&E organization might look like.

[15] The Defense Procurement Agency.

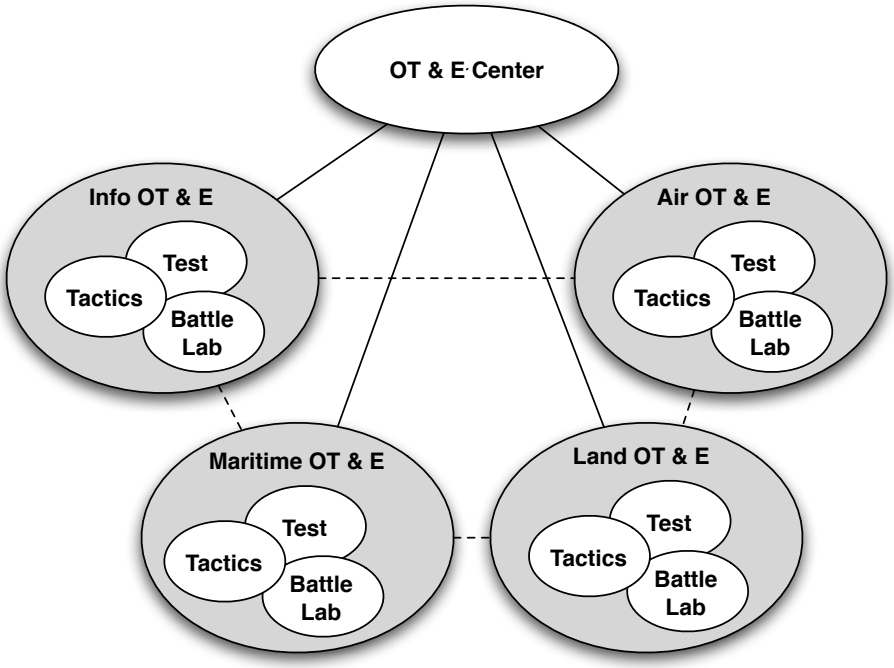

Figure 2. A possible OT&E organization lay-out.

Nilsson states that if the establishment of an OPEVAL process doesn't succeed, then Sweden will risk the safety and the lives of it's war-fighters in, for example, peace support operations since:

> "Whether you want it or not, an OPEVAL will be conducted, the only question is when. Unfortunately, it's more often than not done way too late by a pilot over enemy territory. This is what OT&E is all about – not sending our guys into harms way with gear or tactics that might or might not work. We were taught this lesson the hard way, in both Korea and in Vietnam."[16]

For the NBG certification we therefore recommend that OPEVALs will be conducted for munitions, essential equipment and systems assigned to the NBG package. This study will not examine this matter into further depth, since the development of this type of evaluation procedure is mainly a matter for the Defense Procurement Agency (FMV) and has already been studied profoundly by Nilsson.

4.2. Conclusions on NBG certification

The findings concerning NBG certification procedure and standards can be concluded as follows:

- Each member state has to certify that their contributions meet the defined standards and criteria at unit-level.
- It is fair to assume that it is the responsibility of the Framework Nation (Sweden) to certify that the BG package meets the BG Standards and Criteria.

16 Nilsson P. interview with Cusimano G. (National Test Pilot School California, USA).

- The NBG package are to be certified to meet the BG Standards and Criteria no later than November 30, 2007.
- Whenever it is possible and applicable "BG packages must be trained to meet the same standards and criteria for similar formations assigned to the NRF". Therefore it might be productive, when possible, to use the corresponding NRF standards as a basis when reworking the EU BG Standards and Criteria for the NBG.
- The NBG certification procedure should, if possible, be analogous with the NRF certification procedure and NRF practical methods.
- The EU BG standards and criteria (Reference B) are not stated in a format that immediately could be used for evaluation. Hence for the NBG, the standards and criteria needs to be reworked and measures and grading systems are to be developed.
- There is a connection between the PARP survey and the NBG through the Partnership Goal G0035, due to the fact that if military units included in the NBG are committed to an operation or exercise conducted by Nato, then by the end of 2007 they should be capable of meeting the Nato Response Force Standards .
- There are several certification processes in the Swedish Armed Forces already in use that is connected to the NBG certification. To avoid possible redundancy it is important to document these processes and try to make use of any work already done by incorporating these in the NBG certification process.
- OPEVALs need to be conducted for munitions, essential equipment and systems assigned to the NBG package. This will ensure that the safety and lives of the NBG war-fighters will not be subject to any unnecessary technical risks.

5. Problem definition

As mentioned above, the EU BG Concept (Reference C) defines the purpose of EU BG certification in the following way:

> "Certification of formed elements is required, in order to guarantee that the defined standards are being met."

When reflecting upon this statement it becomes obvious that the aim of a certification can not solely be to assure that "the defined standards are being met". In the report *Tankar om metoder för försvarsvärdering* (Reference N), Frelin identifies that the aim of military unit evaluation is to clarify:

- Under what conditions the unit is capable of accomplishing its objectives.
- The factors limiting the units level of performance.

The conclusion from this is that the aim must be related to the much more complex task of certifying the BG ability to fulfill relevant tasks and missions. Using the findings from the section above, the following research questions can be formulated.

1) What is NBG certification?
2) What kind of general and practical requirements must the certification procedure meet?
3) Are there different aspects of a certification procedure and does the different aspects need different methods and tools?
4) What practical methods and tools are best suited for the alternative aspects?
5) Are there any already existing methods and procedures that could be used as a foundation when developing the NBG certification procedure.

6. Methodology

The analysis methodology is based on literature reviews and a mix of interviews, workshops and a seminar with relevant stake-holders from the Swedish Armed Forces, from the political level and from subject matter experts. In order to analyze and find a suitable certification procedure the following analysis scheme has been applied:

1) Define the key concepts.
2) Define the key procedures of NBG certification.
3) Conduct a literature review to study the possibilities of using existing practical evaluation and certification methods as a foundation when developing a NBG certification procedure.
4) Use the findings of the literature review to generate alternative approaches for developing a NBG certification procedure.
5) Identify the requirements the certification procedure must meet.
6) Apply the identified requirements to evaluate the alternative approaches using the method Analytic Hierarchy Process (AHP).
7) Conclude the results of the evaluations.
8) Use the conclusions to identify recommendations for a strategy to develop a NBG certification procedure.

7. Analysis and findings

In this section the alternative approaches are identified, analyzed and graded.

7.1. Definitions of concepts and procedures

Before analyzing the alternatives a few key concepts and procedures are defined below.

7.1.1. Defining key concepts

As discussed in the Problem Definition section, the aim of BG certification is to certify the BG ability to fulfill relevant tasks or missions. Due to the fact that the concept of certification is not stated in the EU BG documents (Reference A , B and C), it is necessary to look elsewhere for a definition. Because of the analogy between EU BG certification and NRF certification the following Nato definition in *The Nato Evaluation Policy* (Reference D) can be used.

> "Certification is the procedure by which a military authority gives formal assurance that an HQ, force or unit scheduled to be, or already, under his command complies with the demands and requirements to fulfill a specific task or mission (...) Certification may be based on existing evaluation and on other available supporting information."

The *Nato Task List* (Reference K) defines the full hierarchy of concepts used for evaluation as stated below.

> "Evaluation. A structured process of the critical examination of either any activity and/or capability against defined standards and criteria."
>
> "Standards. A standard provides a way of expressing the acceptable proficiency that a military organization or force must perform a (J)MET[17] under a specified set of conditions. A standard consists of one or more measures for a task and a criterion for each measure."
>
> "Measure. Provides the basis for describing varying levels of task performance (i.e., Percent of Allied citizens and designated other nationals accounted for by name during evacuation)."
>
> "Criterion. The minimum acceptable level of performance associated with a particular measure of task performance (i.e., commander selects 85% as an acceptable level of performance for this task). It is often expressed as hours, days, percent, occurrences, minutes, miles, or some other command stated measure."
>
> "Conditions. Conditions are variables of the environment that affect the performance of tasks. Conditions are generally not under the commander's control (e.g., the condition of climate can be tropical, temperate, arid, or arctic). Some conditions are given to a commander (e.g., ROE provided to commander or the terrain in a joint operations area) others are not under friendly control (e.g., threat posture), and still others are not under anyone's control (e.g., the weather in a particular geographic area)."
>
> "Warfighting Requirements Include Tasks, Conditions, and Standards. An example of a warfighting requirement follows the syntax of "Perform this task, under

[17] (Joint) Mission Essential Task.

conditions of ..., to a standard of ..." For example, in the context of a Humanitarian Aid mission, distribute supplies for campaign and JOA (AO 4.5) under conditions of stormy weather (C 1.3.1.3) and contested intra-theatre lines of communication (C. 2.5.1.4) to a standard of 2,000,000 ton miles of cargo moved per day and four hours or less to locate a unit or major cargo upon status request."

In a comparison with *EU BG standards and criteria* (Reference B) it is evident that:

- Most of the criteria lacks enough detail. An example of this is the Language Criteria. This criteria doesn't define any language requirements for the units in the BG, i.e. the language to be used between units of different nationality in the Manoevre Unit, Combat Support Units, Combat Service Support Units and Operational and Strategic Enablers.
- There aren't any measures or conditions defined for EU BG.
- The EU BG criteria doesn't define any minimum acceptable level of performance.

It is therefore fair to conclude that the given EU BG Standards and Criteria needs further development before they can be utilized. This conclusion is in line with the findings in the Background section above. NBG Standards and Criteria should therefore be defined with the purpose of making the EU BG Standards and Criteria usable for evaluation. If possible, it will probably be efficient to use similar work done for the Nato/NRF, as a starting point. This would save unnecessary effort and at the same time be in line with the recommended analogy to the NRF.

As mentioned previously, studying the OCC E&F Programme is important to understand the concept of Nato evaluation and certification. According to the *OCC E&F Concept* (Reference E) the OCC E&F certification procedure consists of two tiers: evaluation followed by certification. The first tier has two steps. In step one, the interoperability is evaluated against standards and graded. In step two, the capability is evaluated against standards and graded. If the standards are being met, then in the second tier, the unit is being declared certified. The programme and its connection to EU BG certification is further described in the Annexes.

Analyzing the above findings gives the following definitions for NBG purposes:

- *NBG Evaluation* - A structured process of the critical examination of either any NBG activity and/or capability against defined NBG standards.
- *NBG Certification* - The procedure to evaluate and give formal assurance that the NBG complies with the demands and requirements to fulfill the specific tasks in its mission spectrum. In the first step the capability is evaluated against a set of standards. If the standards are met then, in the second step, the NBG package is formally declared certified. At the unit-level each member state are to certify their contribution. When unit-level certification is accomplished, the Framework Nation is responsible for certifying the NBG package.
- *NBG Standards* - A standard provides a way of expressing the acceptable proficiency that a military force must perform an mission essential task under a specified set of conditions. A standard consists of one or more measures for a task and a criterion for each measure.

- *NBG Measure.* Provides the basis for describing varying levels of task performance.
- *NBG Criterion.* The minimum acceptable level of performance associated with a particular measure of task performance.
- *NBG Conditions* - Conditions are variables of the environment that affect the performance of tasks.
- *NBG War-fighting Requirements* - War-fighting Requirements include Tasks, Conditions, and Standards. The War-fighting Requirements follows the syntax of "Perform this task, under conditions of ..., to a standard of ..."

7.1.2. Defining the key procedures

When the concept of NBG Certification has been defined, the next step of the analysis is to study and identify the different evaluation procedures that will constitute the NBG certification procedure.

In the previously mentioned report *Tankar om metoder för försvarsvärdering* (Reference N), Frelin lists the following aspects that need to be examined when evaluating military forces and units:

- Force Effectiveness - examines how the unit meets the objectives
- Readiness
- Force Protection
- Sustainability
- Flexibility
- Intelligence
- C2

When comparing this compilation to the *EU BG Standards and Criteria* (Reference B) all of the aspects Frelin identified are included, except for the aspect of Force Effectiveness. We therefore identify that, for NBG purposes, the aspect of Force Effectiveness should be added to the NBG requirements, but in order to be consistent with the term War-fighting Requirements defined in the previous section, the term War-fighting Evaluation will be used instead of Force Effectiveness Evaluation.

To meet the range of the requirements it is recommended to divide the evaluation procedures in two parts.

1) *NBG Preparation & Planning evaluation* - Addresses the evaluation of planning and preparation issues like readiness, availability, deployability etc.
2) *NBG War-fighting evaluation* - Addresses combat proficiency and Force Effectiveness evaluation, i.e. the war-fighting ability of the NBG package to fulfill the specific tasks in its mission spectrum

The reason for this division is the fundamental difference between war-fighting evaluation and the evaluation of preparation and planning matters. The different procedures will probably be carried out by different parts of the organization using different sets of evaluation tools and methods, see figure 3 below. The identification of suitable tools and methods is addressed in the following sections.

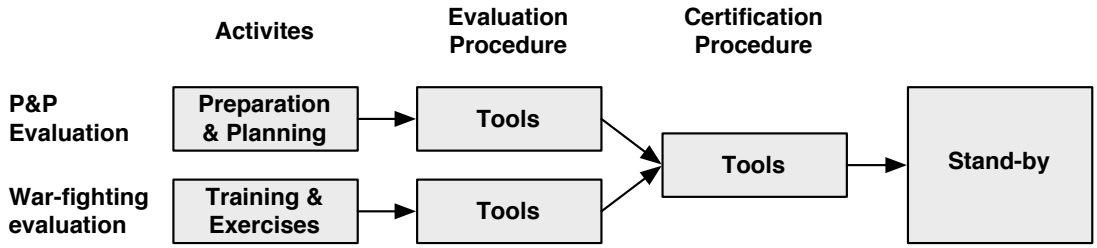

Figure 3. Evaluation and certification procedures.

The next step is to analyze how the the different methods can be combined with the given EU BG Standards and Criteria. As a result of this analysis a list of combinations is compiled in the Annex A. The figure 4 below displays an over-view on how the different standards and criteria are divided between the two procedures.

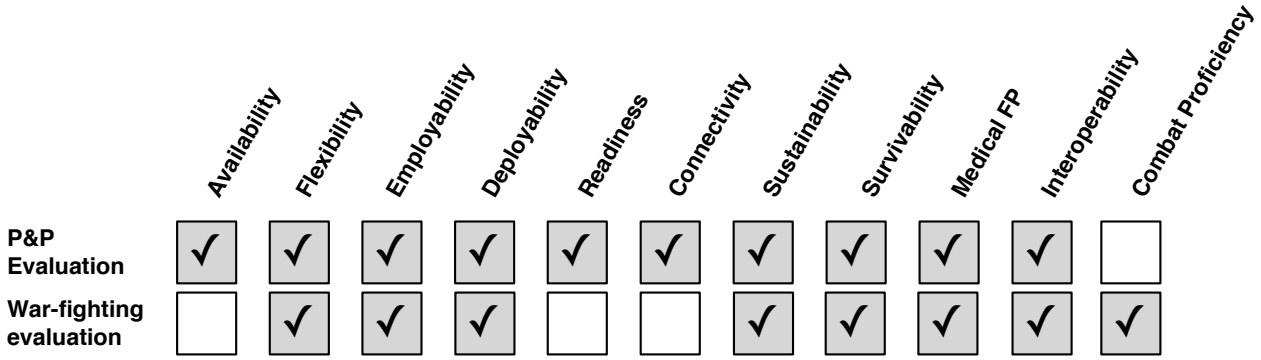

Figure 4. The standards and criteria are divided between the two procedures.

Although several of the standards and criteria are addressed in both procedures, they will be treated in completely different ways using separate tools depending of the evaluation objective, e.g. Interoperability needs to both be evaluated using checklists in the Preparation & Planning procedure and using LIVEXs in the War-fighting procedure. This subject is further analyzed in the Tools sections below.

Three different certification procedures were examined in the section Existing certification processes in the Swedish Armed Forces, above. These procedures can be supplemented by the two new procedures, as illustrated in the table below.

	PARP Evaluation	Operational Testing and Evaluation	OCC E&F	NBG Preparation and planning	NBG War-fighting
Focus	Technical and functional interoperability	To test systems in its operational environment	Interoperability and capability	Preparation and planning issues	Combat proficiency and Force Effectiveness
Requirement References	Nato STANAGs and Doctrines	The process is not established yet in Sweden	ACO Force Standards Nato Task List	NBG Standards and Criteria developed from EU BG Standards and Criteria	NBG Standards and Criteria developed from EU BG Standards and Criteria

7.2. Certification tools

By examining the NRF, necessary tools for certification one be identified. According to the NRF Certification System (Reference I), the NRF Commanders should have a variety of means and tools at their disposal to assess the readiness and overall certification standards for forces. These include: readiness reporting, the certification reporting system, observation of training, the conduct of readiness and other certification exercises at all subordinate echelons. The purposes of the certification report are:

- To provide the means to assess progress on the development of NRF HQs, forces and capabilities.
- To highlight attainment of capability criteria goals.
- To highlight shortfalls, where each report must include specific recommendations that address how shortfalls are to be corrected.

The EU BG concept does not include any tools for certification, except for the BG Questionnaire in Reference F. In this questionnaire, the Framework Nation can declare if there are any caveats and when and where the training events and the certification will take place. The reason for the lack of EU BG certification tools can probably be explained by the previously cited statement in the EU BG Concept (References A and C):

> "The certification procedure (...), will, where possible and applicable, be analogous with the NRF certification procedure."

For the NBG this causes a problem, since Sweden and Finland do not have access to the NRF tools. There are at least three possible solutions to this:

1) The NRF certification tools are to be released to Partners.
2) EU BG tools for certification are to be developed.
3) Interim certification tools are to be developed, by the NBG contributing countries, for the NBG exclusively.

Since this matter probably will not be settled within the time limits of this study, this report will consider the three solutions as being equally possible. Also, the report will focus on the different evaluation methods rather than on the certification methods, since the evaluation is a prerequisite for the certification. The development of an evaluation procedure will also probably take a greater effort than developing a certification procedure, since the first is a significantly more complex task.

7.3. Evaluation tools

In The Nato Code of Best Practice for C2 Assessment (Reference O) a list of examples of methods and tools for C2 assessment is presented, see the table below. This compilation has been used when selecting suitable tools and methods for the different NBG evaluation procedures. For a detailed explanation of the specific terms in the table, see Reference O.

	Data Generation	Data Collection	Data Organisation/ Relationship	"Solving"	Support
After Action Reviews and Historical Analysis		•	•		
Expert Elicitation		•			
Constructive and Virtual Simulations	•	•	•		
Exercises/Experiments	•		•		
Game Theory			•	•	
Army C2 Evaluation System (ACCES)		•	•		
Causal Mapping			•		
Multi-Criteria Decision Analysis (MCDA)			•	•	
Regression Analysis			•	•	
Bayesian Networks			•	•	
Mathematical Programming			•	•	
Heuristic Search				•	
Genetic Algorithms	•			•	
Project Management Tools					•
Data Analysis			•		
Geographical Information Systems		•			
Visualisation	•				•
Databases			•		•
Checklists		•			

7.3.3. Tools for NBG Preparation & Planning evaluation

The aim of the NBG Preparation & Planning procedure is to evaluate planning and preparation issues derived from the EU BG Standards and Criteria, e.g. Readiness or Deployability. These issues can usually not be examined through observing a LIVEX. As a result of discussions with subject matter experts the following methods were identified out of the COBP list as useful:

- Checklists for self-assessment
- Checklists for expert inspections
- Modeling and Simulation (M&S)
- War-Gaming

Note that regardless of the type of tools, they will all require the development of well-defined standards consisting of:

- Measures to describe varying levels of task performance
- Criteria to set the minimum acceptable level.

7.3.4. Tools for NBG War-fighting evaluation

The aim of the NBG war-fighting evaluation procedure is to evaluate the NBG package war-fighting capability across the entire (or selected parts of) the NBG mission spectrum. This procedure will employ operational evaluations during CPXs and LIVEXs. The EU BG concept does not describe or include any tools for war-fighting evaluation, neither does the NRF concept. The latter is probably caused by the fact that Nato has considered unit war-fighting evaluation to be a national matter.

As a result of discussions with subject matter experts, the following combination of tools from the COBP for C2 Assessment (Reference O) list is suggested for NBG purposes:

- After Action Review
- Multi-Criteria Decision Analysis (MCDA)
- Bayesian Networks
- Geographical Information Systems
- Visualization
- Databases
- Checklists

These tools are already used by the Swedish Army in the MARTA[18] and STA[19] concepts for LIVEX evaluation as viewed in the table below:

STA	MARTA
After Action Review	Checklists
Geographical Information Systems	Multi-Criteria Decision Analysis (MCDA)
Visualization	Bayesian Networks
Databases	Databases

It is therefore possible to conclude that the MARTA and STA concepts probably can be used as tools for NBG war-fighting evaluation.

Note that regardless of the type of tool, they will all need War-fighting Requirements that follows the syntax of "Perform this task, under conditions of ..., to a standard of ...".

7.4. Conclusion of findings of literature review

This section concludes the findings of the literature review in the Annexes. The aim was to examine existing methods that might function as a possible starting point for further work.

The review found that the NRF Standards and Criteria (Reference I) consists of Permanent Criteria (PC), Evolutionary Capability Criteria (ECC) and Evolutionary Training Criteria (ETC).

When comparing the structure of the NRF PC and ECC to the EU BG Standards and Criteria (Reference B) in the table below, it is easy to see the previously mentioned analogy between the EU BG standards and criteria and the corresponding for NRF.

18 Military Analysis method for Reliable Tactical Assessment.

19 StridsTräningsAnläggning (Swedish Army Combat Training Center).

NRF PC and ECC	EU BG Standards

• Readiness
  • Employability
  • Assured availability
  • Multi-nationality
  • Interoperability
  • Language
• Sustainability
  • Logistics
  • Medical Protection
• Capability in terms of CJSOR
  • Operations
  • Flexibility
  • Survivability and force protection (S&FP)
• Deployability
  • Pre-Deployment
  • Deployment
  • RSOI
  • Mobility
• C2 Capability
  • CIS
	• Availability
	• Flexibility
	• Employability and deployability
	• Readiness
	• Connectivity
	• Sustainability
	• Survivability
	• Medical Force Protection
	• Interoperability

The review concluded that the PCC and ECC might be valuable to use as a foundation when developing checklists for the evaluation of Planning & Preparation.

The NRF Evolutionary Training Criteria (ETC) are used for Combat Proficiency evaluation. The review identified that these are not detailed enough, since they do not include the necessary war-fighting requirements to be able to evaluate combat proficiency: tasks, criteria, conditions and measures. One of the reasons behind this lack of detail, is the fact that the NRF Commander is expected to produce more detailed training objectives, using the Joint Mission Essential Task List (JMETL) for the NRF. A JMETL is a list of joint mission-essential-tasks identified from the Nato Task List (Reference K) by the commander to accomplish his peacetime mission or an assigned operational mission. It includes associated tasks, conditions, and standards and requires the identification of supporting tasks. The JMETL identifies the mission requirements and forms the foundation for determining the training requirements for the mission, see figure 5 below.

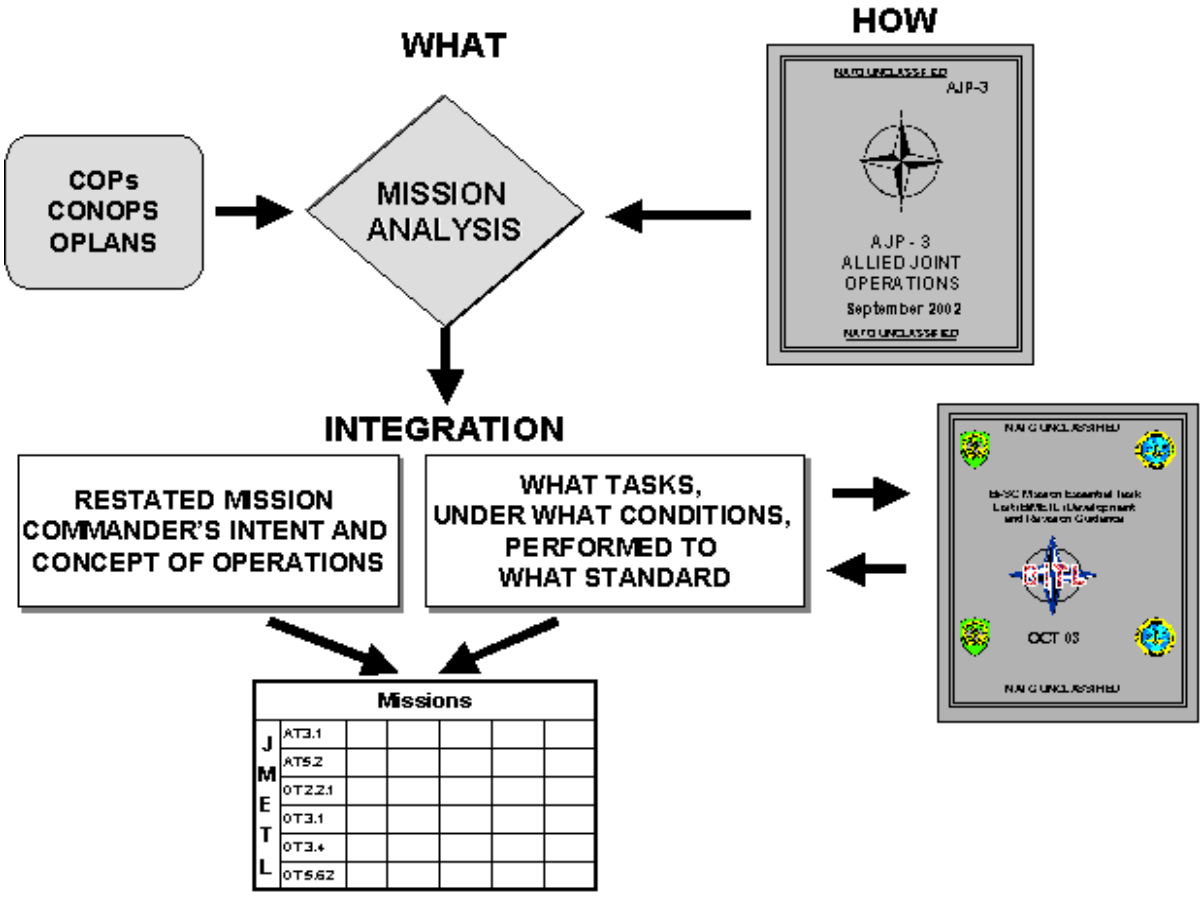

Figure 5. The JMETL definition process (Reference K).

Based on the JMET, the NATO commanders are to assess their staffs' and units' ability to perform their missions. This assessment will compare the actual level of proficiency against the required standards defined in the JMET, and will determine the training requirements necessary to achieve and sustain desired levels of proficiency for each Joint Mission-Essential Task. The training requirements are to be translated and consolidated into training objectives, which describe the desired outcome of a training activity for a training audience, and the measures for evaluating the performance outcome. The JMETL approach ensures that selected training objectives will mirror the operational reality. No training should be programmed, planned or conducted without clear definition of training objectives to be achieved. This is called the Joint Training System and is illustrated in figure 6 below.

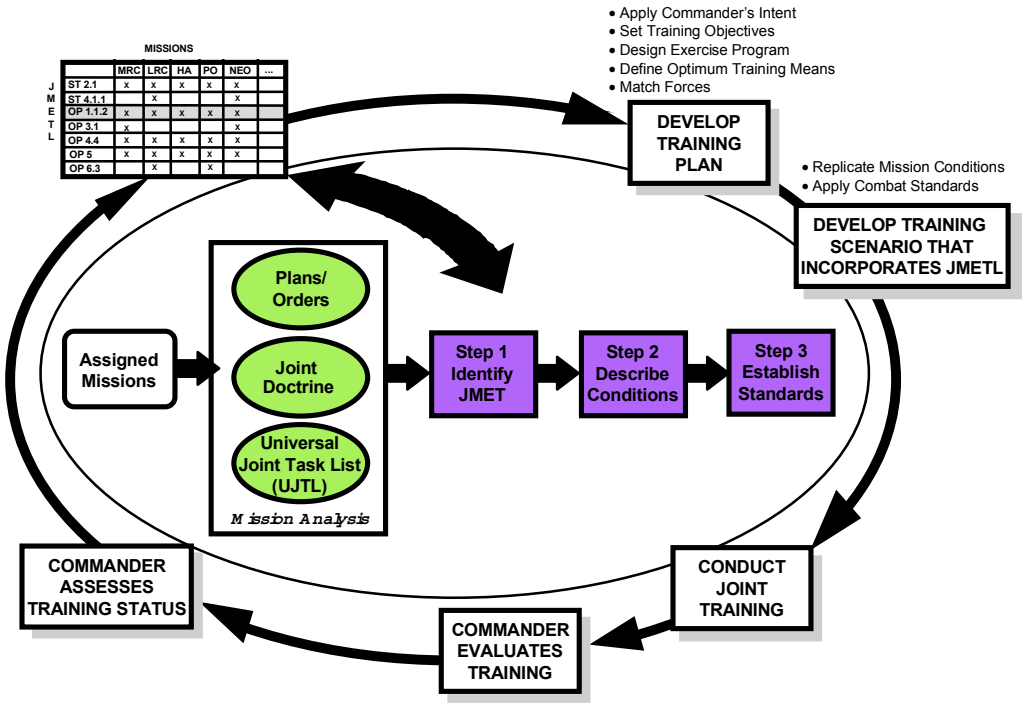

Figure 6. Joint Training System (Reference G).

The review found that the JMETL approach can be useful for the NBG. The development of the NBG will probably benefit from the strong linkage between mission planning and mission training. Due to this, the review concluded that the NRF JMETL will be of interest for NBG certification, since it might function as a foundation for developing a corresponding JMETL for the NBG. Unfortunately NRF JMETL is not released to Partners and consequently, if the NBG is to develop a NBG JMETL it has to be done without utilizing previous work carried out in this area.

In addition to the NRF JMETL, the ETC are based on ACO Force Standards. These are Nato Restricted and today, only the ACO Maritime Force Standards (Reference L) are released to Partners. It is reasonable to assume that the different volumes of the ACO Force Standards (Land, Air, Maritime) have corresponding levels of detail. By analyzing the Maritime Standards the review found that they lacked the level of detail needed for war-fighting evaluation since they do not include the necessary war-fighting requirements, to be able to evaluate combat proficiency: tasks, criteria, conditions and measures. Hence, the ACO Force Standards for Land and Air Forces probably also lack the needed level of detail. One way to overcome this problem might be to use checklists developed in the OCC E&F Programme mentioned previously. It is nevertheless difficult to assess the probability for success with this method, since this study has not been able to examine any such checklists for Land or Air Forces.

The literature review also found another possible benefit of the OCC E&F Programme. The OCC E&F evaluation process uses trained evaluators graduated from an OCC Evaluators Training Course. One conclusion is that it would probably be useful, at least on a general level, to study the OCC Evaluators Training Course concept if it is decided to develop an evaluators training course for the NBG.

By the definition, Standards consists of Criteria and Measures. The development of the latter is therefore an important issue. In the NATO Code of Best Practice (COBP) for C2 Assessment

(Reference O) the concept of measures for C2 evaluation is studied in detail. The findings of this can probably, with some adjustments, be extended to the wider context of BG evaluation not just C2 evaluation. The COBP will therefore almost certainly be very useful when developing measures for the NBG evaluation.

7.5. Possible starting points for development of certification methods

The next step of the analysis is to use the findings of the literature review to generate alternative methods to be used for each aspect of NBG certification. The analysis above suggest the following possible approaches:

1. NBG Preparation & Planning Certification procedure
    - 1.1. The national approach - Use EU BG documents (References A, B, C and J) as a basis and develop a procedure tailored for the NBG, by adapting suitable national methods used in NBG contributing countries.
    - 1.2. The NRF PC/EC approach - Use the structure, i.e. the PC and EC, from NRF (References H and I) as a model and adjust it according to EU BG documents (References A, B, C and J).
    - 1.3. The OCC E&F approach - Use the method, standards and evaluators from the OCC E&F Programme (Reference E) to shape a certification programme adapted in accordance with the EU BG requirements.
2. NBG War-fighting evaluation procedure
    - 2.1. The national approach - Use EU BG documents (References A, B, C and J) as a basis and develop a procedure tailored for the NBG, by adapting suitable national methods used in NBG contributing countries.
    - 2.2. The NRF JMETL approach - Use the method from the NRF ETC (References H and I) and the NRF JMETL (References F, G and K) as a model and adapt it according to EU BG documents (References A, B, C and J).
    - 2.3. The OCC E&F approach - Use the method, standards and evaluators from the OCC E&F Programme (Reference E) to shape a certification programme adapted in accordance with the EU BG requirements.
    - 2.4. The NBG JMETL approach - Use References G and K to develop a JMETL for the NBG without aid from the NRF JMETL. This development will of course be done in accordance with the EU BG requirements.

The approaches for Preparation & Planning are summarized in the table below.

Alternative Approaches	Information basis	Evaluator Training Course	Examples of practical methods
1-1. National approach (P&P)	EU BG documents National methods	No	Checklist M&S War-gaming
1-2. NRF PC/ECC	EU BG NRF PC/ECC	Nato restricted	
1-3. OCC E&F (P&P)	EU BG AFS OCC Checklists	Yes	

The approaches for War-fighting evaluation are summarized in the table below.

Alternative Approaches	Information basis	Evaluator Training Course	Examples of practical methods
2-1. National approach (WF)	EU BG documents National methods	No	Operational evaluations: CPXs LIVEXs
2-2. NRF JMETL	EU BG NRF ETC AFS NRF JMETL	Nato Restricted	
2-3. OCC E&F (WF)	EU BG AFS OCC Checklists	Yes	
2-4. NBG JMETL	EU BG NTL	No	

7.6. Comparison requirements and criteria

The first step of the examination is to identify the requirements the Preparation & Planning procedure and the War-fighting evaluation procedure should meet.

The synthesis of the interviews and workshops held with subject matter experts and officers in the Swedish Armed Forces gave a list of 11 criteria that can be used for comparing the different certification approaches.

1) *Encompassing the EU BG requirements* - It is self-evident that the procedure must certify that the BG package meets the EU BG standards and criteria. The standards and criteria used should therefore encompass the EU BG Standards and Criteria on all aspects: Availability, Flexibility, Employability and deployability, Readiness, Connectivity, Sustainability, Survivability, Medical Force Protection, Interoperability
2) *Missions & Tasks* - The procedure should deliver results useful to the Force Commander and the BG Commander, i.e. allow easy and accurate perception

of under what conditions the NBG has the war-fighting ability to fulfill the specific tasks of its mission spectrum.

3) *Transparent and auditable grading* - The grading system should be transparent to all NBG contributing countries and EU/EUMS/EUMC, i.e. they should have access to: the grading scale and its criteria, the necessary information to understand how the evaluator's grade is related to the level of performance of the examined unit. The transparency will be enhanced if all NBG contributing countries will use the same grading system. The grading system should also be auditable: Firstly, it should be easy to trace how the evaluators have produced their gradings. Secondly, it should be easy to trace the requirements trail from the produced gradings to the original standards and criteria and other fundamental requirements.

4) *Compatible with the NBG exercise schedule* - The time required to evaluate the NBG package should harmonize with the NBG training and exercise limitations.

5) *Development time* - Some methods needs further work to develop measurable criteria, using the the original method as a starting point.

6) *Existing Tools for Certification* - Different types of tools will be needed for the certification, e.g.: readiness reporting system, certification reporting system, observation of training, databases, etc.

7) *Existing Tools for Evaluation* - Different types of tools will be needed for the evaluation. For Preparation & Planning evaluation tools like M&S, checklists and war-gaming can be used. For war-fighting, tools like after-action reviews, etc can be used.

8) *Existing Evaluators Programs* - Trained evaluators are needed in order to perform reliable evaluations. The possible use of an existing Evaluators Training Programme will therefore be beneficial.

9) *Analogy to NRF* - Wherever possible and applicable, standards, practical methods and procedures should be analogous to those defined within NRF, as stated in Reference C.

10) *Possible reuse for other types of certification* - It will be favorable if the result of the NBG certification can be reused for other types of certification since member states may commit their assets and capabilities to other Pools of Forces like the UN or the OCC.

11) *Access to Information* - Some methods requires access to Nato restricted documents. This is a critical condition since Sweden and Finland aren't Nato members and several Nato documents regarding evaluation and certification are not yet released to Partner Nations.

7.6.1. Comparison criteria

In accordance with the previous conclusions of the differences between Preparation & Planning and War-fighting evaluation, the 11 requirements in the list above are divided into five sections, as illustrated below. These form the criteria that the different approaches are graded against in the following order:

3. Preparation & Planning (P&P) evaluation method requirements
    3.1. Encompassing the EU BG requirements
    3.2. Transparent and auditable grading (P&P)
4. War-fighting (WF) evaluation method requirements
    4.1. Missions & Tasks
    4.2. Compatible with the NBG exercise schedule
    4.3. Transparent and auditable grading (WF)
5. Development Factors
    5.1. Development time
    5.2. Existing Tools for Certification
    5.3. Existing Tools for Evaluation
    5.4. Existing Evaluators Programs
6. Added-value
    6.1. Analogy to NRF
    6.2. Reusable for other types of certification
7. Accessibility
    7.1. Access to Information

7.7. Methodology used for comparing the approaches

A method called AHP (Analytic Hierarchy Process) was used to support the comparison of the different approaches. The method was utilized through the software tool Expert Choice.

In AHP the grading of the requirements is carried out pair-wise, and the different grading criteria are weighted according to their priorities. See *The Analytic HierarchyProcess* (Reference Q) for a detailed description of the method.

Expert Choice uses a grading scale consisting of five scale steps Equal, Moderate, Strong, Very Strong, Extreme. In addition to this there are intermediate steps between each, and there is also the possibility to manually assign a grade using any number between 1 and 9. The result of this is the possibility to use a continuous mathematical range scale from 1.0 to 9.0. Since the time available for the grading process was limited in this study, only the three scale steps Equal, Moderate, Strong were used, resulting in the discrete mathematical scale 1-3-5. This will cause the grading differences, in some areas, to be either greater or smaller than if a continuous range scale had been applied. Due to this, it will be the different approaches ranking order that will be correct, not the exact grading value. One should therefore be cautious and only use the ranking of the approaches and not the exact value, when analyzing the grading results.

7.8. Comparing the approaches

In this section, a comparison of the approaches is presented. The detailed scoring and the corresponding explanations are found in Annex C.

The aspects that are considered as the most important are: the P&P/WF Evaluation Requirements, the Development Factors and the Accessibility aspect. The reasons behind this are the following facts:

- The fulfillment of the evaluation requirements is critical for the usability of the process
- The development factors are critical for the ability to successfully produce the process
- The Accessibility aspect is important since the lack of critical information might hinder the development and establishment of the certification process.

The Added-value aspects are considered as the least important since these are not critical for producing the certification process. These priorities are seen in the graphs below as the second bar is lower than the other three.

7.8.1. Results for Planning & Preparation comparison

The overall grading for the Preparation & Planning procedures in figure 7 is the combined result of all the gradings for the respective aspects.

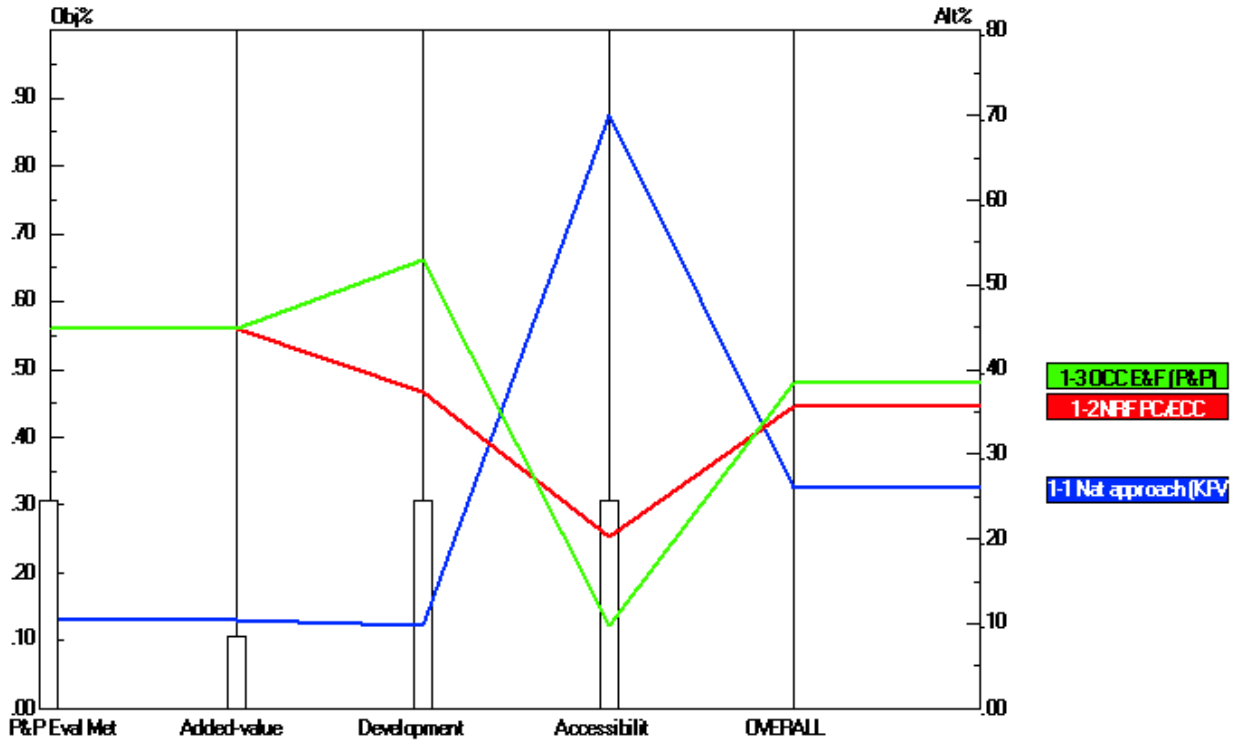

Figure 7. Planning & Preparation over-all grading. The bars corresponds to the relative weight each criteria was given. The lines are the score of each alternative, for each criteria. Overall is the weighted sum of the score and the criteria weight.

The graph, in figure 7, shows that the OCC E&F and the NRF PC/ECC approaches are rather similar. When examining the detailed graphs of each of these aspects, in Annex C, the two approaches seem to supplement each-other, where the first one is weak the second is strong and vice-versa.

The national approach is out-ranked in every aspect except for accessibility, this is mainly caused by the OCC E&F and NRF PC/ECC linkage to the ACO Force Standards (Nato Restricted). If the necessary documents are released then the OCC E&F and the NRF PC/ECC approach would better than the national approach in every aspect.

It is therefore concluded that the following solution would be useful. Firstly, declare the units to the OCC Pool Of Forces to get access to the necessary information. Secondly use the fact that the OCC E&F and the NRF PC/ECC are supplementary and therefore to develop a mix of the best parts of the different approaches. This would create a procedure tailored for the evaluation and certification of NBG Preparation & Planning, a solution that would out-rank all the other alternatives, the national approach, the OCC E&F approach and the NRF PC/ECC approach.

7.8.2. Results for War-fighting comparison

The overall grading for the War-fighting evaluation procedures in figure 8 is the combined result of all the gradings for the respective aspects.

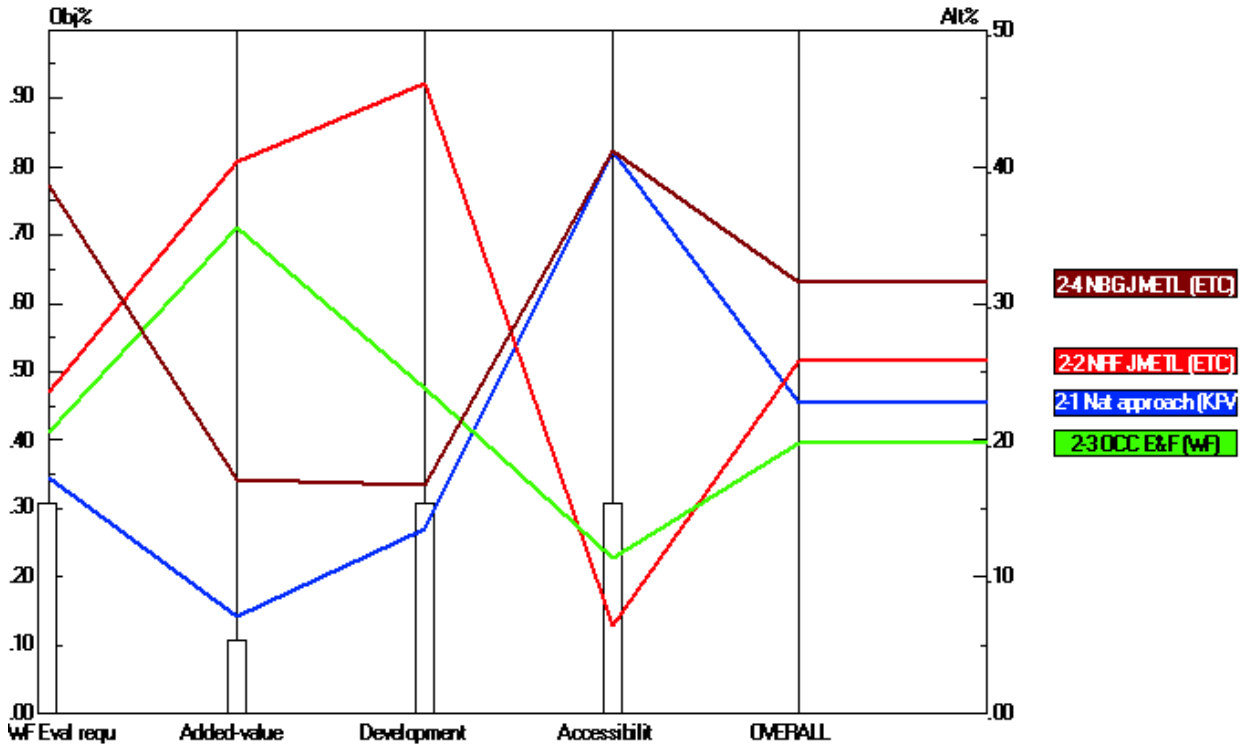

Figure 8. War-fighting - Over-all

The graph, in figure 8, shows that the NBG JMETL approach is top-ranked for the aspects WF Evaluation Requirements and Accessibility, the reason for this is the fact that the NBG JMETL would be tailored for the NBG evaluation and that all necessary documents are released to Partners. For the other two aspects (Added-value and Development Factors) the NRF JMETL

out-ranks the others, because of the analogy to NRF and that the NRF JMETL already exists and probably only needs some adjustment for the NBG.

Because of the strong connection between the NRF JMETL and the NBG JMETL it is concluded that a suitable solution would be a combination of the two. This would mean using the NRF JMETL as a starting-point for developing a NBG JMETL. This will of course require the release of the NRF JMETL to Sweden and Finland. The possibilities of achieving this is not known and further investigations are therefore recommended. When investigating the possibility of releasing the NRF JMETL to Sweden and Finland, one should also investigate the possible access of the NRF certification tools since it would be natural to incorporate these in the NBG JMETL approach. When studying possible enhancements of the NBG JMETL approach, it is also recommended to try to adjust the MARTA tool (from the national approach) for NBG JMETL war-fighting evaluation. These recommended alterations would definitely improve the NBG approach considering the Development aspects where the approach has a weakness.

7.9. Summary of the results of comparing the approaches

For the Preparation & Planning procedures, the study conclude that the OCC E&F and the NRF PC/ECC approaches are quite similar. When examining the detailed graphs, in Annex C, the study found that the two approaches supplements each-other, where the first one is weak the second is strong and vice-versa. Therefore a mix of the approaches would be the best solution for the Preparation & Planning procedures.

For war-fighting evaluation procedure, scoring resulted in the conclusion that the best solution would be a combination of the the NRF JMETL and the NBG JMETL, because of the strong connection between the two approaches, see figure 8. This would mean using the NRF JMETL as a starting-point for developing a NBG JMETL. This would require the release of the NRF JMETL to Sweden and Finland and further investigations are therefore recommended. The possible access of the NRF certification tools should also be investigated, since it would be natural to incorporate these in the NBG JMETL approach. It is also recommended to adapt the MARTA tool (from the national approach) for NBG JMETL war-fighting evaluation.

8. Conclusions

This section summarizes the conclusions drawn in the report.

8.1. Summary of findings on NBG certification procedure

The NBG package must be certified to meet the BG Standards and Criteria no later than November 30 2007. The NBG certification procedure should be, if possible, analogous with the NRF certification procedure and NRF practical methods.

Each member state has to certify that their contributions meet the defined standards and criteria at unit-level. It is fair to assume that it is the responsibility of the Framework Nation (Sweden) to certify that the BG package meets the BG Standards and Criteria. Whenever it is possible and applicable "NBG packages must be trained to meet the same standards and criteria for similar formations assigned to the NRF".

There are several certification processes in the Swedish Armed Forces connected to the NBG certification. To avoid possible redundancy it is important to document these processes and try to make use of any work already done by incorporating these in the NBG certification process.

8.2. Summary of the key concepts

The study found that a certification procedure consists of two tiers: evaluation followed by certification. Due to the fact that the concepts of certification and evaluation are not defined for the EU BG, we suggest that the following definitions will be used in the NBG context:

NBG Evaluation - A structured process of the critical examination of either any NBG activity and/or capability against defined NBG standards.

NBG Certification - The procedure to evaluate and give formal assurance that the NBG complies with the demands and requirements to fulfill the specific tasks in its mission spectrum. In the first step the capability is evaluated against a set of standards. If the standards are met then, in the second step, the NBG package is formally declared certified. At the unit-level each member state are to certify their contribution. When unit-level certification is accomplished, the Framework Nation is responsible for certifying the NBG package.

NBG Standards - A standard provides a way of expressing the acceptable proficiency that a military force must perform an mission essential task under a specified set of conditions. A standard consists of one or more measures for a task and a criterion for each measure.

NBG Measure. Provides the basis for describing varying levels of task performance.

NBG Criterion. The minimum acceptable level of performance associated with a particular measure of task performance.

NBG Conditions - Conditions are variables of the environment that affect the performance of tasks.

NBG War-fighting Requirements - War-fighting Requirements include Tasks, Conditions, and Standards. The War-fighting Requirements follows the syntax of "Perform this task, under conditions of ..., to a standard of ...".

The study gives the following shortfalls for the given *EU BG Standards and Criteria* (Reference B).

- Most of the criteria lacks enough detail for the NBG.
- There aren't any measures or conditions defined for EU BG.
- The EU BG criteria doesn't define any minimum acceptable level of performance.

It is therefore possible to conclude that the given EU BG Standards and Criteria needs further developing before they can be utilized.

8.3. Summary of evaluation procedures

Given the fundamental differences between war-fighting evaluation and the evaluation of preparation and planning matters, it is recommended to divide the evaluation procedure into two separate procedures:

1) *NBG Preparation & Planning evaluation* - Addresses the evaluation of planning and preparation issues like readiness, availability, deployability etc.
2) *NBG War-fighting evaluation* - Addresses combat proficiency and Force Effectiveness evaluation, i.e. the war-fighting ability of the NBG package to fulfill the specific tasks in its mission spectrum

In the previous section Evaluation Processes in the Swedish Armed Forces, the study noted the importance of documenting and incorporating on-going technical evaluation processes. The study also agreed with Nilsson's (Reference P) conclusion on the necessity of conducting OPEVALs on the equipment and systems assigned to the NBG. To cover these issues we therefore suggest that a technical evaluation procedure is added to the two evaluation procedures above.

3) *Technical evaluation* - Addresses technical interoperability and operational performance.

This third procedure ought to be a responsibility for the Defense Procurement Agency (FMV).

8.4. Summary of tools for certification and evaluation

The study found that the EU BG concept does not include any tools for certification, except for the BG Questionnaire in Reference F. For the NBG this causes a problem, since Sweden and Finland do not currently have access to the NRF tools.

The study examined different tools to be used for evaluation in the NBG Preparation & Planning procedure. As a result of discussions with subject matter experts and a list of suitable methods were identified out of *The NATO COBP for C2 Assessment* (Reference O) .

The study found that the EU BG concept does not describe or include any tools for war-fighting evaluation, neither does the NRF concept. As a result of discussions with subject matter experts they found that a combination of tools from the COBP compilation (Reference O) can be used for NBG purposes. These tools are already used by the Swedish Army in the

MARTA[20] and STA[21] concepts for LIVEX evaluation. Further studies are needed to investigate the possible use of the MARTA and STA concepts as tools for NBG war-fighting evaluation.

8.5. Summary of literature Review

The NRF standards and criteria are described in *Overarching Standards, Procedures and Criteria for Certifying the Nato Response Force* (Reference H) and in *SC-Certification System for the Nato Response Force* (Reference I). The literature review found that the NRF standards and criteria consists of Permanent Criteria (PC), Evolutionary Capability Criteria (ECC) and Evolutionary Training Criteria (ETC). The study concluded that the PCC and ECC might be valuable to use as a foundation when developing checklists for evaluation of Planning & Preparation.

The NRF Evolutionary Training Criteria (ETC) are used for Combat Proficiency evaluation. The review identified that these are not detailed enough, since they do not include the necessary war-fighting requirements to be able to evaluate combat proficiency: tasks, criteria, conditions and measures. To develop these further a JMETL for NBG should be developed. This will also benefit the war-fighting evaluation due to the strong linkage between mission planning and mission training.

The NRF ETC are based on ACO Force Standards. These are Nato restricted and as of today, only the ACO Maritime Force Standards (Reference L) are released to Partners. By analyzing the Maritime Standards the review found that they lacked the level of detail needed for war-fighting evaluation since they do not include the necessary war-fighting requirements: tasks, criteria, conditions and measures. Hence the ACO Force Standards for Land and Air Forces probably also lack the needed level of detail. One way to overcome this problem might be to use checklists developed in the OCC E&F Programme.

The literature review also found a possible benefit of the OCC E&F Programme. The OCC E&F evaluation process uses trained evaluators graduated from an OCC Evaluators Training Course. One conclusion is that it would probably be useful, to study the concept if decided to develop an evaluators training course for the NBG.

In the *NATO Code of Best Practice (COBP) for C2 Assessment* (Reference O) the concept of measures for C2 evaluation is studied in detail. The literature review found that the NATO COBP will almost certainly be useful when developing measures for the NBG evaluation.

8.6. Summary of the results of comparing the approaches

The study identified three alternative approaches for Preparation & Planning and, five possible approaches for War-fighting evaluation. To be able to grade the alternative approaches, 11 requirements where identified and divided into five sections. These form the criteria that the different approaches are graded against. A method called AHP (Analytic Hierarchy Process) was used to support the grading of the different approaches.

The overall score for the Preparation & Planning procedures is the combined result of all the gradings for the respective aspects. When examining the over-all graph, given in Annex C, the study conclude that the OCC E&F and the NRF PC/ECC approaches are quite similar. When examining the detailed graphs of each of these aspects, the study found that the two ap-

20 Military Analysis method for Reliable Tactical Assessment.

21 StridsTräningsAnläggning (Swedish Army Combat Training System).

proaches supplements each-other, where the first one is weak the second is strong and vice-versa. Therefore a mix of the approaches would be the best solution for the Preparation & Planning procedures.

For war-fighting evaluation procedure scoring resulted in the conclusion that the best solution would be a combination of the the NRF JMETL and the NBG JMETL, because of the strong connection between the two approaches. This would mean using the NRF JMETL as a starting-point for developing a NBG JMETL. This would of course require the release of the NRF JMETL to Sweden and Finland. The possibilities of achieving this is not known and further investigations are therefore recommended. The possible access of the NRF certification tools should also be investigated, since it would be natural to incorporate these in the NBG JMETL approach. When studying possible enhancements of the NBG JMETL approach, it is also recommended to adapt the MARTA tool (from the national approach) for NBG JMETL war-fighting evaluation.

9. Recommendations

Given the previous conclusions, we have identified the following recommendations for a strategy to establish a NBG certification procedure.

9.1. Recommended certification plan

We recommend that a project is established with the objective of developing:

1) The NBG certification procedure.
2) The evaluation procedures.
3) The necessary certification and evaluation tools.

We suggest that the NBG certification procedure is divided into the following evaluation procedures:

1) *NBG Preparation & Planning evaluation* - Addresses the evaluation of planning and preparation issues like readiness, availability, deployability etc.
2) *NBG War-fighting evaluation* - Addresses combat proficiency and Force Effectiveness evaluation, i.e. the war-fighting ability of the NBG package to fulfill the specific tasks in its mission spectrum.
3) *Technical evaluation* - Addresses technical interoperability and operational performance.

The third procedure is mainly a matter for the Defense Procurement Agency (FMV), as mentioned previously.

We found that the best strategy to implement these three procedures is probably to:

1) Use the fact that the OCC E&F and the NRF PC/ECC approaches are supplementary. Develop a mix of the best parts for the Preparation & Planning evaluation.
2) Develop a NBG JMETL, if possible use the NRF JMETL as a starting point. Then use the NBG JMETL, the NRF ETC and the NTL to develop war-fighting requirements.
3) Ensure that the technical certification processes in use in the Armed Forces, will be incorporated in the NBG certification procedure. An important first step is to document these processes to to find the gaps where necessary certification is missing.

Since the EU BG concept does not include any tools for certification, this causes a problem for Sweden and Finland, as they lack access to the NRF tools. We suggest that this issue is highlighted and further investigated by the NBG certification project

To achieve the objectives of the NBG certification project we suggest that a core working group is established. The core working group will be responsible for the development of the three evaluation procedures. Each procedure will be developed by a sub-working group with representatives in the core group to ensure that the different procedures harmonize, see figure 10 below.

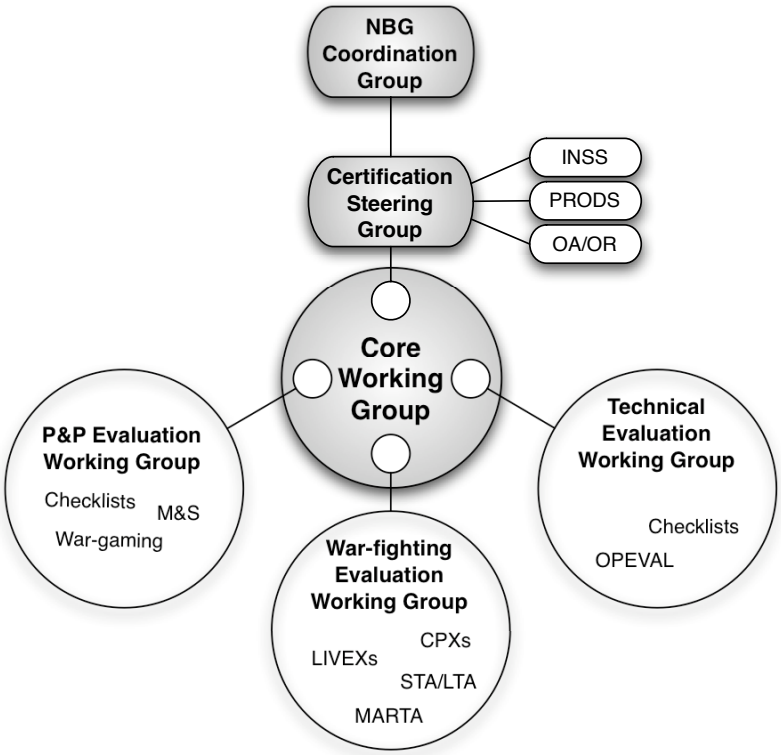

Figure 10. Core and sub-working groups.

Since the certification work will be distributed between different working groups and military units, the core working group will probably need a basic tool to monitor the results of the evaluation actions. We therefore suggest that a small-scale database is developed in order to accomplish this. The database would show the certification status of the military units, equipment, systems etc. assigned to the NBG. The database would be used to answer the following types of questions:

- Which components are planned to be certified?
- To what standards will the respective components be certified?
- What is the certification and evaluation status at the moment?
- Which components lack a certification plan?

It is important to note the current project in the Swedish Armed Forces called NKFS[22], the objective is to create a database to keep track of the certification status of all Armed Forces personnel. The project is conducted by the contractor WM-data and is of a much larger scale than the than the proposed NBG certification database. Nevertheless, it will be necessary to ensure that data can be exported from the NKFS and imported into the NBG certification database and vice versa, to avoid any duplication of effort.

We also would like to remind the reader, as stated in the Limitations section of this report, that the un-availability of relevant Nato Restricted documents brings limitations to the results of this study. For that reason we would like to highlight the EU BG recommendation made in *EU BG Training and Certification* (Reference A):

[22] Nytt KompetensFörsörjningsSystem.

> "BG contributing MS are encouraged to invite other MS to observe the conduct of BG certification in order to share best practice."

Observing how NRF-contributing countries have chosen to approach the EU BG certification process may bring more clarity into subjects this study has not been able to examine.

9.2. Recommended actions

To achieve the objectives of the certification project, we suggest that the following actions are assigned to the working groups:

1. General actions
   - 1.1. If possible, declare the non-Nato units to the OCC Pool Of Forces.
   - 1.2. Establish contact with other Framework Nations to discuss the conduct of BG certification in order to share best practice.
   - 1.3. Investigate the possibility of accessing the OCC E&F Evaluators Course.
   - 1.4. Investigate the possibility of accessing the ACO Force Standards.
   - 1.5. Investigate the possibility of accessing the NRF JMETL.
   - 1.6. Investigate the possibility of accessing the NRF certification tools.
   - 1.7. Develop a small-scale database to monitor the certification status of the different military units and technical equipment assigned to the NBG.
2. Actions for the Preparation & Planning evaluation procedure:
   - 2.1. Develop checklists based on a mix of EU BG standards, NRF standards and ACO Force Standards. Use the OCC E&F checklists as a starting-point.
   - 2.2. Study and implement suitable M&S-tools (e.g. JDLM[23]) for the planning and evaluation of deployability and sustainability issues.
   - 2.3. Develop and use war-gaming to evaluate planning & preparation aspects that can not be evaluated using checklists or M&S.
3. Actions for the War-fighting evaluation procedure:
   - 3.1. Develop a NBG JMETL, using the NRF JMETL as a starting point.
   - 3.2. Use the NBG JMETL, the NRF ETC, the NTL and the EU BG Standards and Criteria to develop war-fighting requirements that follows the syntax of "Perform this task, under conditions of ..., to a standard of ...". The standards should consist of criteria and measures.
   - 3.3. Use the NTL and the NATO COBP for C2 Assessment to develop measures.
   - 3.4. Use the Joint Training System (JTS) approach to develop training requirements and training plans (for CPXs and LIVEXs) based on the NBG JMETL and the war-fighting requirements.

[23] Joint Deployment Logistics Model

3.5. Use the JTS approach to ensure that the training objectives will mirror the operational reality, and that the standards used for training correspond to those used for evaluation. No training should be programmed, planned or conducted without clear definition of training objectives to be achieved.

3.6. Adapt the MARTA tool to be used for NBG JMETL evaluation.

3.7. Use the MARTA tool, the LTA[24] and the STA for CPX and LIVEX evaluation.

4. Actions needed for the technical evaluation

4.1. Document the technical certification processes in the Armed Forces processes and strive to incorporate these in the NBG certification process.

4.2. Conduct a gap-analysis to investigate if there are technical certification processes that needs to be developed or adjusted.

4.3. Conduct OPEVALs for munitions, essential equipment and systems assigned to the NBG package.

The certification procedure and the actions are illustrated in figure 11 below.

9.3. Reflection

When the concerned organizations analyze the recommendations of this report to decide on appropriate actions, we would like to repeat the introductory observation that the importance of this subject should not be underestimated or taken lightly. We agree with Nilsson's conclusion in *OPEVAL - For the war-fighters* (Reference P), that if the establishment of an evaluation process doesn't succeed, then the safety and the lives of the war-fighters will put at risk.

[24] LedningsTräningsAnläggning (Swedish Armed Forces C2 Training Center).

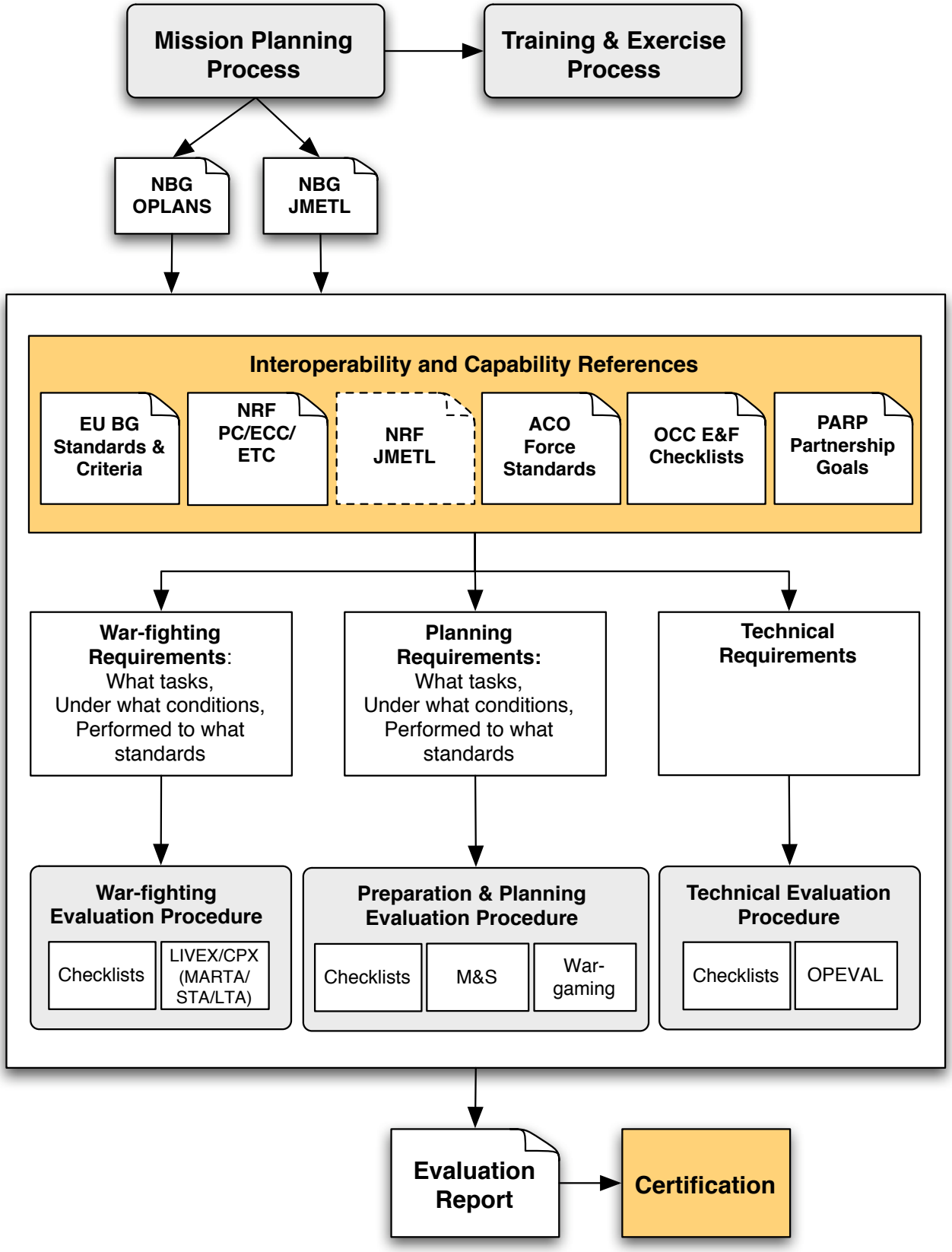

Figure 11. The proposed certification procedure.

Annex A
Evaluation methods and the EU BG Standards and Criteria

This annex contains the analysis of how the possible evaluation methods that were identified previously, could be combined with the given EU BG Standards and Criteria. As a result of that analysis we propose the following combination of methods in the table below.

Standards	Criteria	P&P evaluation methods	War-fighting evaluation methods
Availability			
Caveats	Any caveats must be identified and declared during the BGGCs.	War-gaming	n/a
Transfer of Authority	Arrangements with member states (MS) to provide the Force Commander with appropriate authority over the BG-package elements.	Checklists	n/a
Flexibility			
Incorporate units	Once a BG-package is deployed, it should be able to incorporate additional needed military units when necessary.	War-gaming	n/a
Adapt to any task	The ability to adapt to any potential military task within the framework of agreed missions.	War-gaming	LIVEX-evaluation
CIS	The BG-packages must be able to rely on autonomous Combat Information System (CIS) capabilities.	War-gaming Checklists	LIVEX-evaluation
Employability			
BG training and equipment	BG-packages must be employable in any geographic location (planning baseline 6000 km). BG-packages' elements must be trained, prepared and equipped to operate under austere conditions. BG-packages' elements must be capable of operating effectively in challenging and hostile environments.	Checklists War-gaming	LIVEX-evaluation
(F)HQ planning capacity	(F)HQ must have the capacity to conduct Operational Planning i.a.w. principles for EU-HQs and subsequent SOPs. The (F)HQ should have the ability to carry out prudent military analysis in anticipation of a possible deployment, without prejudice to the EU decision-making bodies.	Checklists War-gaming	CPX-evaluation
Deployability			
MS transport arrangements to APOEs and SPOEs	Contributing MS must have clearly defined transport arrangements to APOEs, SPOEs to match their readiness status. Including formalized arrangements for border crossing.	Checklist	n/a
BG transport arrangements to JOA	BG-contributing MS must have made arrangements to be capable of deploying and operating over distances in line with the planning baseline (6000 km). (The EUBG Standards & Criteria lack standards concerning APODs and SPODs. Thus, these need to be developed, possibly by using the NRF ECC, before NBG-evaluation.)	M&S (e.g. ADAMS or JDLM) Checklists	CPX-evaluation
RSOI	The EUBG Standards & Criteria lack standards concerning RSOI (Reception Staging, Onward Movement and Integration). Thus, these need to be developed, possibly by using the NRF ECC, before NBG-evaluation.	M&S (e.g. ADAMS) Checklists	LIVEX-, CPX-evaluation

Standards	Criteria	P&P evaluation methods	War-fighting evaluation methods
(F)HQ capacity	The (F)HQ must have the capacity to plan, coordinate and execute the Forces' movement within the JOA. Including arrangements with host nation and IO/NGOs etc.	War-gaming Checklists	CPX-evaluation
Readiness			
Readiness	The BG-packages, incl. op&strategic enablers must be maintained at a readiness of 5-10 days.	Checklists Inspections	n/a
Manning	BG-packages must be manned at full strength throughout the stand-by period.	Checklists Inspections	n/a
Training of personnel	Prior to the stand-by period, contributing MS must have completed pre-deployment preparation, training and qualification of personnel.	Checklists	LIVEX-evaluation (national)
Equipment stocks	Prior to the stand-by period, contributing MS must have completed arrangements by which equipment and logistics stocks will be held at the required readiness.	Checklists Inspections (national)	n/a
Readiness reporting	The Force Commander has to report on readiness, according to agreed procedures.	Checklists	n/a
Connectivity			
C2 standards	C2 Standards and criteria must comply with the Principles for EU-HQs and the C2 specifications of the BG-Concept.	Checklists	n/a
CIS-capability	BG-package elements must have CIS-capability to enable effective C2 of all assets placed under the command for an EU-led military CMO. BG-package elements must have the CIS-capability to communicate with other in-theatre elements of the BG-package.	Checklists	n/a
Sustainability			
Authority	Contributing MS must provide the respective commanders with sufficient authority to execute their responsibilities through all phases of an operation.	Checklist War-gaming	n/a
CSS capability	Contributing MS must ensure that their elements have sufficient Combat Service Support (CSS) capability to sustain operations for 30 days, and up to 120 days with resupply.	Checklists M&S War-gaming Inspections (national)	n/a
Arrangements	Contributing MS must ensure that all necessary multinational/bi-lateral arrangements have been established and made their details available to the (F)HQ.	Checklists	n/a
Availability of stocks	Availability of stocks and equipment has to match readiness criteria of the BG-package throughout the stand-by period.	Checklist Inspection (national) M&S	n/a
Logistic CONOPS	The (F)HQ will be responsible for developing and issuing the in-theatre logistic concept of operations.	Checklist	CPX-evaluation
Deploy and operate	BG-packages are to be able to deploy and operate in austere environments, without recourse to HNS and probably without reliance upon the local infrastructure.	War-gaming Checklists	CPX-evaluation

Standards	Criteria	P&P evaluation methods	War-fighting evaluation methods
Logistic Footprint	The logistic footprint should be kept to a minimum without any detrimental effect on operational capability.	Checklists War-gaming	CPX-evaluation
Survivability			
INTEL	Intelligence and Situational Awareness support (timely, comprehensive and accurate) to be able to prevent adversary attack and to ensure self-protection.	War-gaming Checklists	CPX-evaluation
Physical Protection	BG-packages must be able to operate in environments with potential threats such as terrorism, EW and CBRN-hazards. BG-packages must be trained and equipped adequately to ensure force protection depending on the characteristics of the operation.	Checklists War-gaming	CPX-evaluation LIVEX-evaluation
Information Operations	BG-packages have to maintain OPSEC (COMSEC, COMPUSEC, Personnel security, Physical security and INFOSEC). BG-packages must be trained and equipped to react immediately and adequately to attempt of propaganda. BG-packages must be capable of conducting Information Operations according to operational needs.	Checklists War-gaming	CPX-evaluation LIVEX-evaluation
RoE	BG-personnel must be provided and made familiar with RoE and the RoE-process.	Checklists War-gaming	CPX-evaluation LIVEX-evaluation
EO	BG-packages must be able to to provide limited extraction/evacuation of own personnel within the JOA.	Checklists War-gaming	CPX-evaluation LIVEX-evaluation
Friendly Fire	All BG-package personnel must be trained to identify friendly personnel and assets. BG-package personnel and equipment must be identifiable. Joint Fire Support Coordination measures are to be taken, as required.	Checklists War-gaming	
Medical FP			
Personnel	All personnel must have appropriate level of psychological. medical, dental and physical fitness to operate under austere conditions. All personnel must have completed medical preparation (vaccination. first aid education etc), prior to the stand-by period.	Checklist	n/a
Medical units Equipment	Medical formations must have adequate medical capabilities and capacities (C3, personnel, equipment). BG-packages must have adequate tactical MEDEVAC capabilites. Strategic MEDEVAC must be ensured by contributing MS.	Checklist War-gaming	n/a
Medical units Ability	Medical elements must be prepared and able to treat casualties due to CBRN effects, including initial medical support and qualified evacuation out of contaminated environment.	Checklist War-gaming	CPX-evaluation LIVEX-evaluation
Interoperability			
Co-ordination with IO/NGOs	BG-packages must be able to co-ordinate with other actors, e.g. international organizations or non-governmental organizations (IO/NGO).	Checklist War-gaming	CPX-evaluation
Conduct handover	BG-packages must be able to conduct a hand-over to follow-on forces under the authority of other organizations, e.g. the UN.	Checklist War-gaming	CPX-evaluation

Standards	Criteria	P&P evaluation methods	War-fighting evaluation methods
NRF/NATO	Wherever possible, BG-packages must be trained to and able to meet the same standards and criteria required for similar formations assigned to the NRF. BG-packages must also be trained to and able to implement existing EU principles and procedures complementary with NATO documentation.	Checklist	CPX-evaluation LIVEX-evaluation
SOPs	The same set of SOPs must be used, within a BG-package.	Checklist	n/a
Software tools	Staff personnel must be capable of using standard software tools.	Checklist	n/a
Language	The formal language from F(HQ) upwards and downwards to the BG HQ is English. (The EUBG Standards & Criteria lack language standards for the elements in the BG and its enablers. Since the BG is multinational, such standards need to be developed, before NBG-evaluation.)	Checklist	CPX-evaluation LIVEX-evaluation

Annex B
Literature Review

This section contains a literature review studying different existing practical evaluation and certification methods. The aim is to examine existing methods that might function as a possible starting point for reworking the given Standards and Criteria into more precise detail. In addition to this, the concept of Measures is studied after the methods have been examined.

1. Evaluation and certification methods

Firstly the NRF standards are examined, then the ACO Force Standards, the OCC E&F Programme, the Joint Mission Essential Task List and lastly the Swedish Armed Forces national methods.

1.1. NRF Standards

Due to the mentioned analogy between NRF and EU BG certification it is relevant to examine the NRF certification procedure. In the NRF Standards (Reference H) the procedures for certifying the NRF are described in the following way.

> "Based on the Readiness Reporting System, a General Certification assessment of respective forces/HQs will be performed against the relevant Permanent Criteria (PC) and Evolutionary Capability Criteria (ECC) (...)."
>
> "Operational Training and Combat Readiness Certification is envisioned as a periodic training and evaluation phase, aimed at ensuring that the elements of the NRF package are combat ready as a Force. Operational Training and Combat Readiness Certification will be carried out during the preparation phase preceding the designated stand-by period for each element of the NRF. This phase will be based on the predetermined Evolutionary Training Criteria (ETC). Each component of the NRF package will demonstrate capability across the entire NRF mission spectrum through operational evaluations."

We conclude that the NRF Certification procedure consists of two aspects:

1) General Certification assessment - this aspect certifies that planning and preparations are in order using a checklist assessment approach listing PCs and ECCs.
2) Operational Training and Combat Readiness Certification - this aspect deals with combat proficiency using a LIVEX operational evaluations approach and ETCs.

In NRF Certification System (Reference I) the PCs, ECCs and ETCs are listed. The PCs and ECCs compiled in the table below form a checklist to be used for checking preparations and plans. The analogy is apparent when comparing the lists of NRF and EU BG standards.

NRF PC	NRF ECC	EU BG
Readiness Employability Assured availability Multinationality Interoperability Language		**Availability** **Readiness** **Employability** **Interoperability**
Sustainability Logistics Medical Protection		**Sustainability** **Medical Force Protection**
Capability in terms of CJSOR (Combined Joint Statement Of Requirements) Operations Flexibility Survivability and force protection (S&FP)	**Capability in terms of CJSOR** JOINT Land Maritime Air	**Flexibility** **Survivability**
Deployability Pre-Deployment Deployment RSOI Mobility	**Deployability**	**Deployability**
C2 Capability CIS	**C2 Capability**	**Connectivity**

The above mentioned ETCs outline a number of CPXs and LIVEXs and their respective End State. The ETC section is divided according to the different Joint Force Components: Air, Land, Maritime, and Joint Force.

In the introductory sections of the *NRF Certification System* (Reference I) the concept of ETC are described in the following way:

> "ETC define the essential training requirements at each level - unit, component and joint - which are necessary to ensure the NRF becomes combat ready prior to its stand-by period. These requirements will ensure that the multinational forces of the NRF have conducted integrated and joint training in essential tasks, Unit level training is a national responsibility and considered an essential building block for more complex follow-on training. Criteria for unit training are identified in existing ACO Force Standards and are not covered here."

Hence, it would be fair to assume that the ETCs could form a foundation that just needs some adjustments before it can be applied to the NBG. Unfortunately this is not the case, which is illustrated by using the ETC *C.2.12 Fire Support*:

> "Conduct a training event to ensure the tactical units of the NRF Land Component can effectively plan, employ and integrate fires and manoeuvre on single and multiple targets. Training should include all types of firepower organic within the LCC and should include manoeuvre forces up to at least the battalion level.

> End State: At the completion of this training, NRF Land Component forces and staff will be capable of fully coordinating and integrating Fire Support at all levels."

Though the ETC section is introduced by describing 15 conditions, reaching from climate features to SATCOM coverage, more detailed criteria are needed for the Fire Support case to certify combat capability and for that reason the ACO Force Standards mentioned above seems to be important, hence the concept will be studied in the ACO Force Standard section later.

Additional explanation to why the ETCs lacks detail are given in the *NRF Certification System* (Reference I), in the the following way:

> "It is expected that commanders will produce more specific training objectives prior to these NRF training events. The formulation of additional training objectives by the operational commander will enable him to comply with the requirements set fourth by the ETC while affording him the flexibility to tailor the training events to meet his particular training needs based upon his mission analysis and assessment of his forces.
>
> The ETC are derived from the NRF mission analysis, NRF Joint Mission Essential Task List (NRF JMETL) (draft), and the NATO Task List (NTL) and support the missions that may be assigned to the NRF (...)."

Evidently the NRF JMETL is of great interest for NBG certification since it might function as a foundation for developing a corresponding JMETL for the NBG. Unfortunately the NRF JMETL is not released to Partners and consequently we will have to develop a NBG without utilizing any previous work. The concept of the Joint Mission Essential Task List is covered below.

1.2. ACO Force Standards

As previously mentioned in the section Limitations the ACO Force Standards are Nato restricted and just released to partners. So far only the ACO Force Standards for Maritime Forces (Reference L) are released to Sweden. By analyzing the structure and level of detail in that document, we can try to estimate the correspondence to ACO Force Standards for Land Forces.

According to L the Maritime Forces standards define standards of readiness, sustainability and operational capabilities in order to:

- Establish specific standards of personnel, materiel and operational readiness.
- Provide capability requirements and performance criteria for planning and training of forces.
- Establish standards and capabilities to be used in force planning.
- Provide guidance on evaluation of maritime forces.

As an example we use one of the standards to be met by Mine Countermeasure Vessels (MCMV):

> "Mine hunter shall be equipped with modern mine detection and classification systems. They shall be fitted with an interoperable high precision localisation and verification system, remote controlled mine disposal vehicle and non-magnetic

> clearance diving equipment. They should be capable to identify and dispose off sea mines in shallow water and beyond."

Apparently the Standards for Maritime Forces does not follow the syntax on war-fighting standards we are looking for (see previous sections) and thus do not offer the level of detail we are seeking. Since this is a matter of structure this conclusion will probably also apply to corresponding standards for land and air forces.

1.3. OCC Evaluation and Feedback

According to the OCC E&F Maritime Concept (Reference M), the Operational Capabilities Concept Evaluation and Feedback Programme (OCC E&F) aims to improve, through evaluation and feedback, the level of interoperability and operational effectiveness of Partner nations forces declared to the OCC Pool of Forces. The OCC E&F Programme is:

> "a structured process for critical examination of any activity and/or capability against appropriate defined NATO standards and criteria."

The evaluation process is a process in two tiers, conducted by trained evaluators graduated from an Evaluators Training Course. Without having been able to study the concept of the Nato Evaluators Training Course, it is hard to estimate in detail its relevance as a model for developing a corresponding training course for NBG evaluators. But it would probably be useful, at least on a general level, to study the Evaluators Training Course concept if it is decided to develop an evaluators training course for the NBG.

The first level of the E&F process focus on interoperability and safety. The second level focus on "evaluating military capabilities" and for that reason the structure and conduct might be interesting as a model for a NBG certification process.

According to the OCC E&F Maritime Concept (Reference M), checklists based on ACO Force Standards will be developed for maritime evaluation in the OCC E&F Programme. One example of a checklist based on ACO Maritime Force Standards (Reference L), is attached to Reference M. The example covers *AFS 311. Seamanship and Navigation* and lists the first three elements in the table below.

Elements	**Shortfalls**				
	None	Discrepancy	Deficiency	Not Graded	Not Evaluated
Seamanship to include anchoring, mooring, towing, man overboard recovery and abandoning ship drills.					
Safe and precise navigation under all conditions of weather, visibility and traffic density.					
Steering gear and gyro breakdown drills.					

Evidently it is very hard to make any assumptions what such a checklist would look like for the combat proficiency context for land forces.

1.4. Joint Mission Essential Task List (JMETL).

A JMETL is a list of joint mission-essential-tasks identified from the Nato Task List (Reference K) by the commander to accomplish his peacetime mission or an assigned operational mission. It includes associated tasks, conditions, and standards and requires the identification of sup-

porting tasks. The JMETL identifies the Command's mission requirements and forms the basis for determining the training requirements for the mission, see figure 12 below.

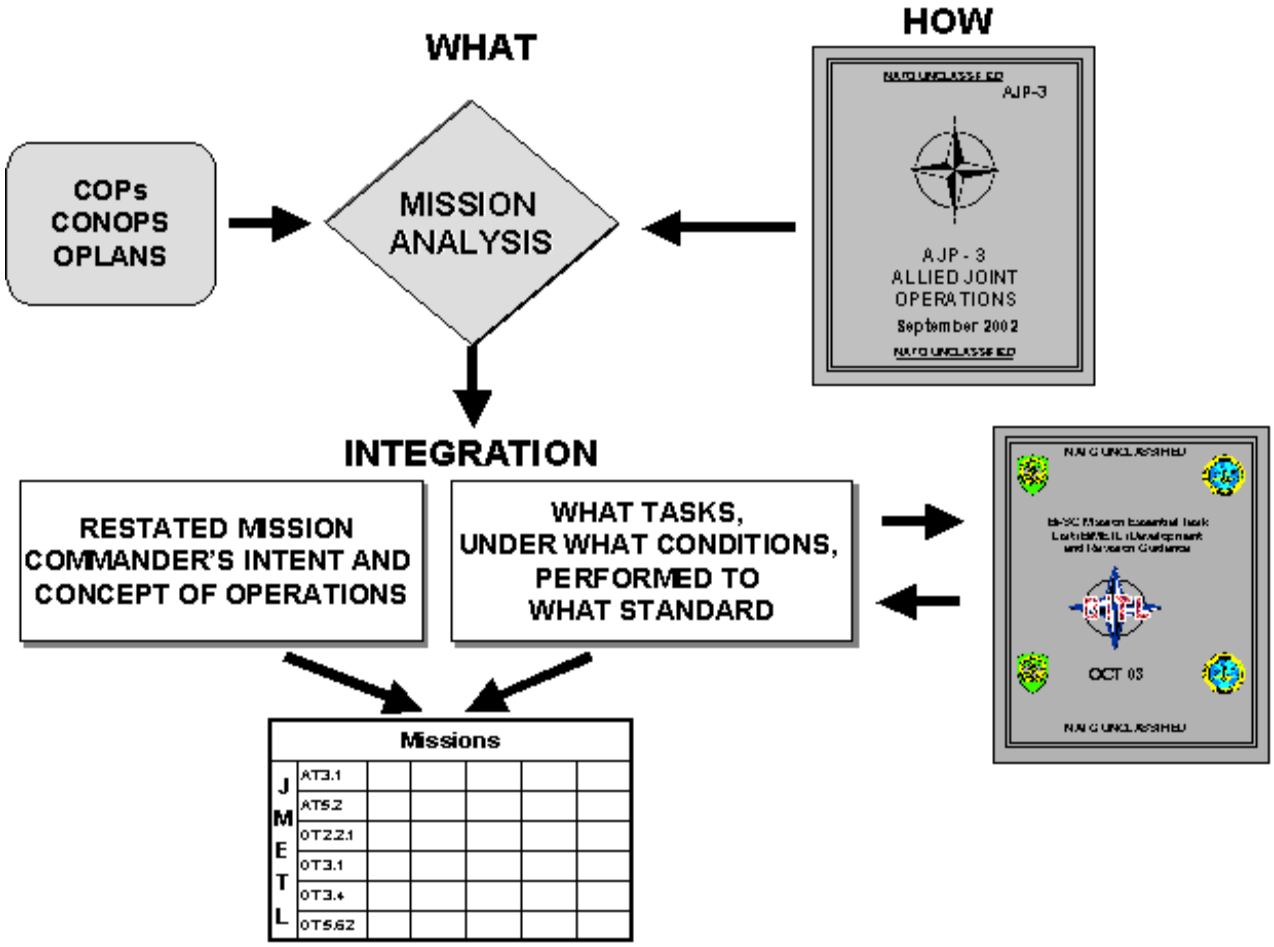

Figure 12. The JMETL definition process (Reference K).

The development of a JMETL for a NATO Commander's peace time mission comprises the following steps depicted in figure 13 below.

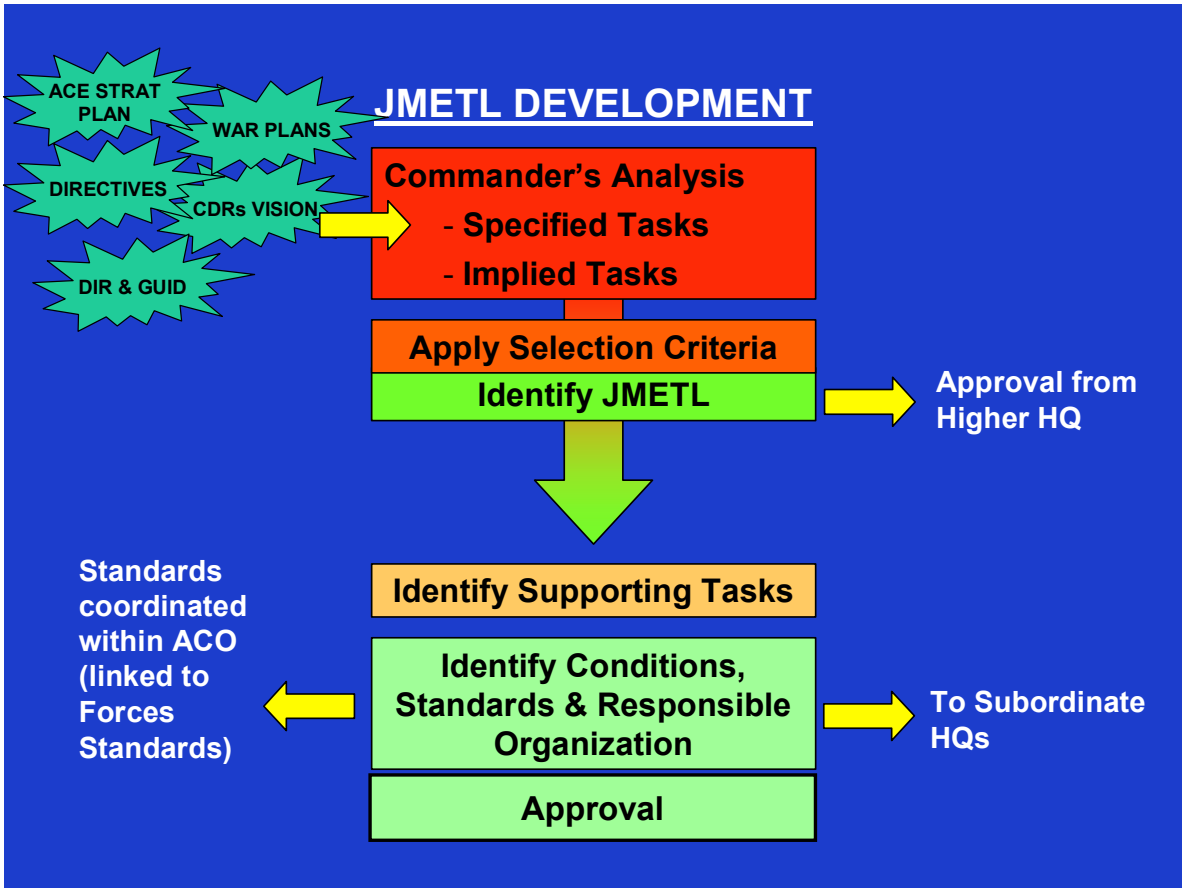

Figure 13. JMETL Development (Reference K).

The standards and criteria are derived from suitable references, e.g. the ACO Force Standards (Reference L) and the NRF Standards (Reference H and I). The conditions and measures are identified from the compilation in the Nato Task List. This is a process in three steps, see figure 14 below.

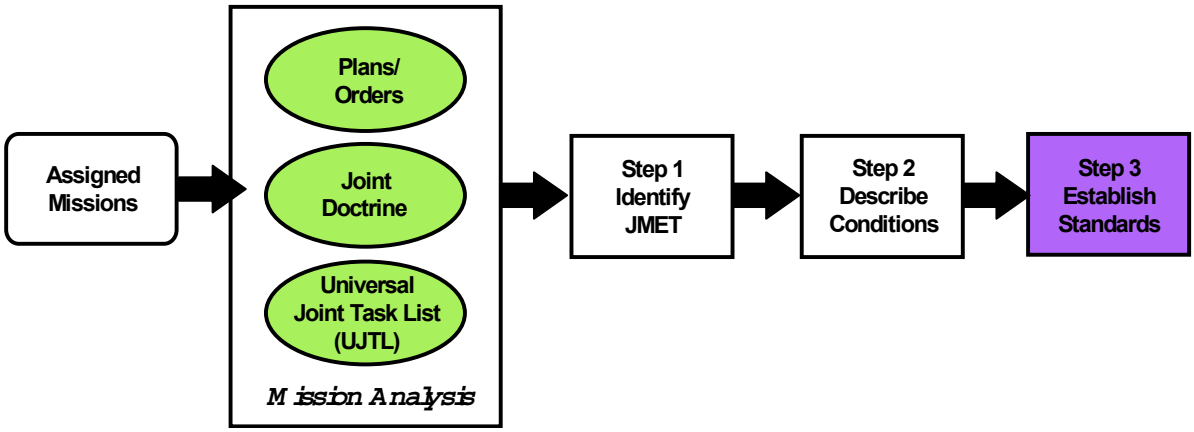

Figure 14. The JMETL process (Reference G)

Based on the (J)MET, the NATO commanders are to assess their staffs' and units' ability to perform their missions. This assessment will compare the actual level of proficiency against the required standards defined in the (J)MET, and will determine the training requirements necessary to achieve and sustain desired levels of proficiency for each (Joint) Mission-Essential Task. The training requirements are to be translated and consolidated into training objectives, which describe the desired outcome of a training activity for a training audience, and the measures for evaluating the performance outcome, see figure 15 below.

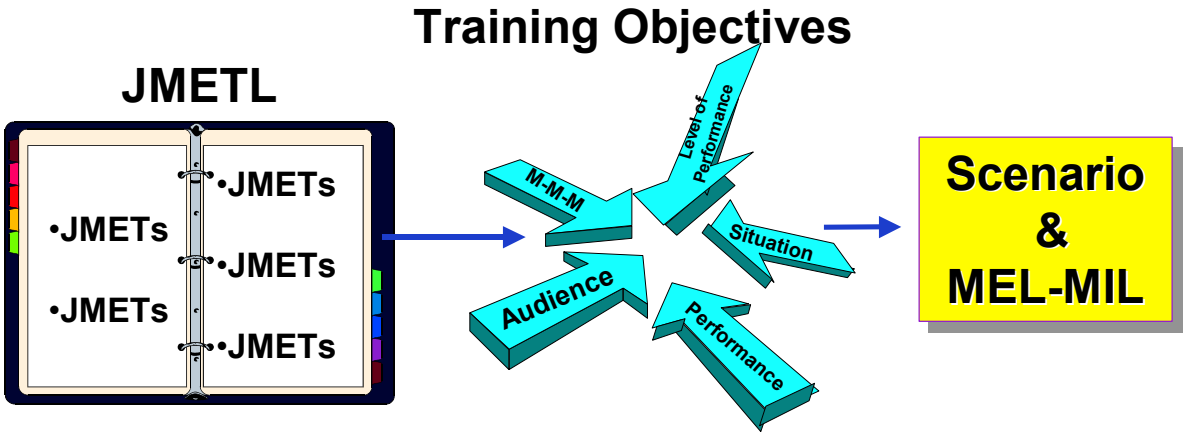

Figure 15. Development of training objectives (Reference K).

Training objectives consist of a specific performance requirement (task), the training situation (conditions), and the level of performance (standard). Several incremental training objectives may be required to attain a performance standard defined in a (J)METL. Training objectives form the basis from which training events are designed, developed, executed and evaluated. See figure 16 below for an example of training objectives derived from the JMET *AO 3.5.4 Protect and Secure Air, Land and Sea Lines of Communication (LOCs).*

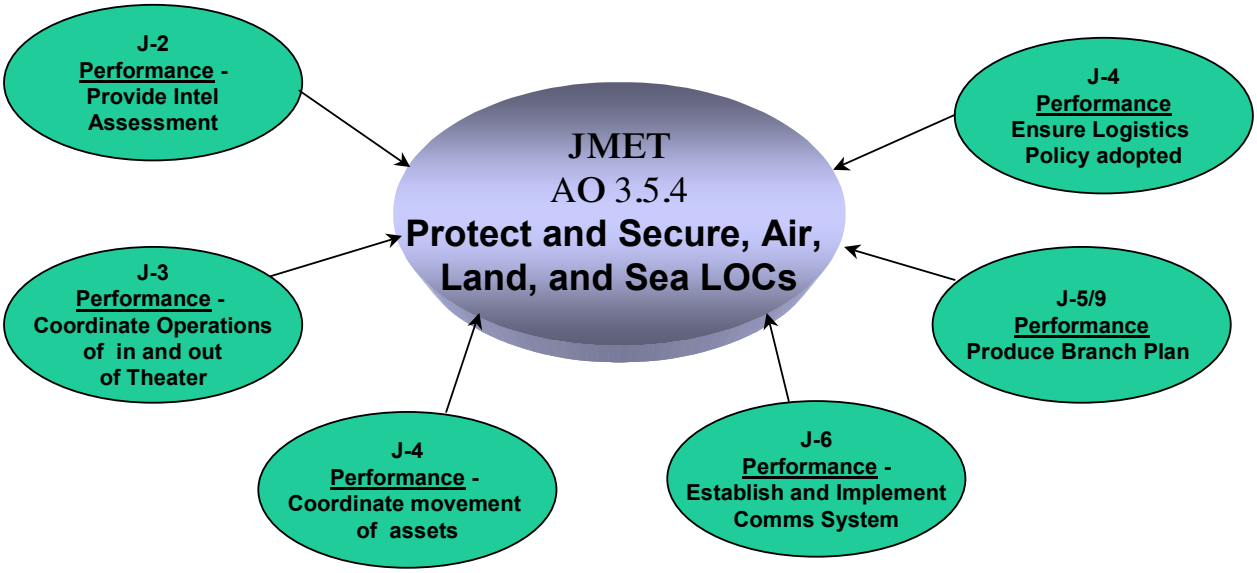

Figure 16. Example of training objectives derived from a JMET (Reference K).

The JMETL approach ensures that selected training objectives will mirror the operational reality. No training should be programmed, planned or conducted without clear definition of training objectives to be achieved. This is called the Joint Training System and is illustrated in figure 17 below.

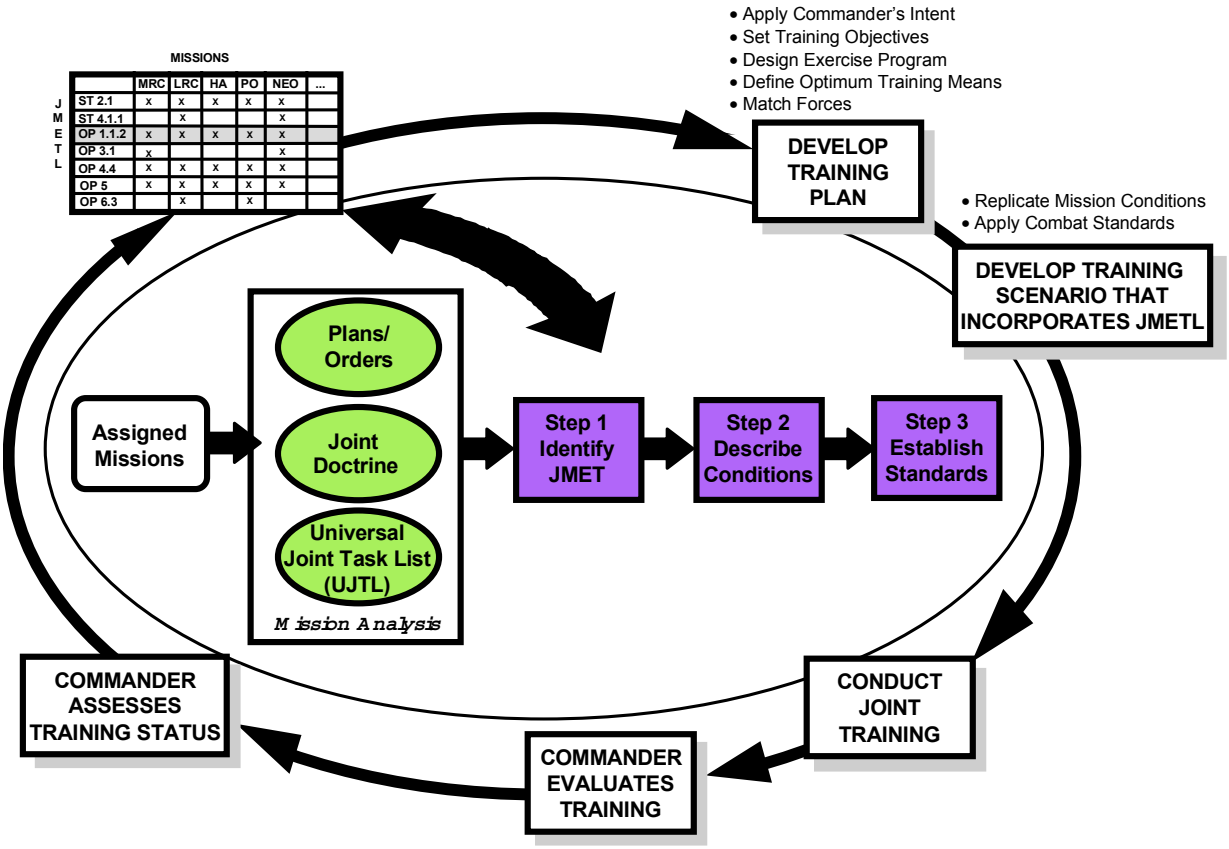

Figure 17. Joint Training System (Reference G)

Thus, all together indicate that the JMETL approach can be useful for the NBG. The development of the NBG will probably benefit from the strong linkage between mission planning and mission training. The training process and the JMETL linkage is illustrated in figure 18 below.

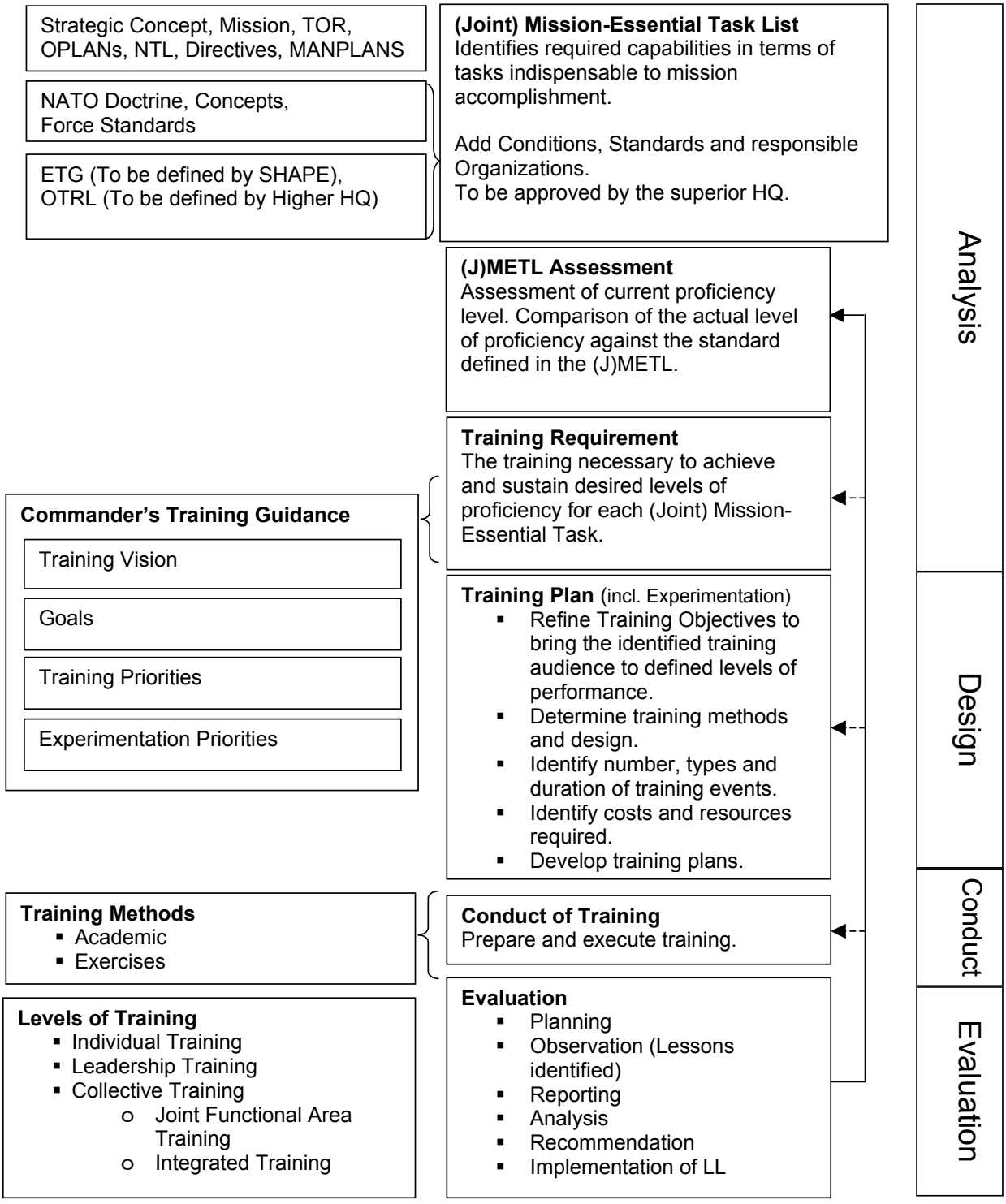

Figure 18. The training process and JMETL linkage (Reference K).

1.5. National Tools - Swedish Armed Forces

In this sub-section two evaluation tools used by the Swedish Armed Forces are briefly described.

1.5.1. MARTA

MARTA is an exercise-based method for assessment of performance and ability of military units, developed by the Swedish Army together with the Swedish Defense Research Agency (FOI). The method combines an assessment of the unit's performance together with the environmental factors of the exercise through two operations research methods, and results in an assessment of the unit's ability.

To determine the ability of the unit, several exercises are monitored and for each the performance and level of difficulty is established. The level of difficulty for an exercise is assumed to constitute the environmental factors of the exercise and the opponent's performance. Hence, both sides' performance must be monitored and assessed in order to do a full evaluation.

The method facilitates a transparent and comprehensive way to assess units, by using a wide range of criteria that has been predetermined. The use of observers is the foundation for the method and enables the assessment to include qualitative measures along with the quantitative. The observational data is collated and the predetermined weightings from AHP are applied to each criterion. Based on this assessment, the evaluator will decide on a score for the unit's performance. This is then combined in a Bayesian network, were all the environmental factors together with the opponents performance are linked with our performance. From this an assessment of the ability is made, and combined with a summary of the unit's strengths and weaknesses.

1.5.2. STA

The combat training centre (STA) uses simulator systems and qualified technical equipment to train units for all levels of conflict. By collecting data from for example weapon simulators, GIS information and analyzing the methods and tactics used, fact-based evaluations can be made with the unit. The evaluations can be directed at commanders, units or specific functions such as logistics of indirect fire. STA is used in the regular exercise schedule as a means to enhance the performance of the unit. Usually the unit is able to redo tasks after the evaluation to learn from their experiences.

2. Measures

From the previous discussions the importance of Measures has been brought up since Standards consists of Measures and Criteria. In the NATO Code of Best Practice for C2 Assessment (Reference O) the concept of Measures of Merit (MoM) is discussed in the following way:

> "It has been recognized that a single definition for measures of performance (MoP) and effectiveness (MoE) does not exist. MoM is recommended as a generic term to encompass different classes of measures. The measures are defined in hierarchical levels related to each other, each in terms of its own boundary."

The Code of Best Practice (COBP) has adopted the following five levels of MoM:

- Measures of Policy Effectiveness (MoPE), which focus on policy and societal outcomes;
- Measures of Force Effectiveness (MoFE), which focus on how a force performs its mission or the degree to which it meets its objectives;
- Measures of C2 Effectiveness (MoCE), which focus on the impact of C2 systems within the operational context;
- Measures of Performance (MoP), which focus on internal system structure, characteristics and behavior; and
- Dimensional Parameters (DP), which focus on the properties or characteristics inherent in the physical C2 systems.

This approach can probably, with some adjustments, be extended to the wider context of BG evaluation not just C2 evaluation. The COBP will therefore be useful when developing measures for the NBG evaluation.

3. Summary of the findings of the literature review

This section concludes the findings of the literature review.

The review found that the NRF Standards and Criteria (Reference I) consists of Permanent Criteria (PC), Evolutionary Capability Criteria (ECC) and Evolutionary Training Criteria (ETC).

When comparing the structure of the NRF PC and ECC to the EU BG Standards and Criteria (Reference B), it is easy to see the previously mentioned analogy between the EU BG standards and criteria and the corresponding for NRF.

The review concluded that the PCC and ECC might be valuable to use as a foundation when developing checklists for evaluation Planning & Preparation.

The NRF Evolutionary Training Criteria (ETC) are used for Combat Proficiency evaluation. The review identified that these are not detailed enough, since they do not include the necessary war-fighting requirements: tasks, criteria, conditions and measures. One of the reasons behind this lack of detail, is the fact that the NRF Force Commander is expected to produce further training objectives, using the NRF Joint Mission Essential Task List (NRF JMETL). The review found that the JMETL approach can be useful for the NBG. The development of the NBG will probably benefit from the strong linkage between mission planning and mission training. Due to this, the review concluded that the NRF JMETL will be of interest for NBG certification, since it might function as a foundation for developing a corresponding JMETL for the NBG. Unfortunately the NRF JMETL is not released to Partners and consequently if the NBG are to develop a NBG JMETL it has to be done without utilizing this previous work.

In addition to the NRF JMETL, the ETC are based on ACO Force Standards. These are Nato Restricted and today, only the ACO Maritime Force Standards (Reference L) have been released to Partners. It is reasonable to assume that the different volumes of the ACO Force Standards (Land, Air, Maritime) have corresponding levels of detail. By analyzing the Maritime Standards the review found that they lacked the level of detail needed for war-fighting evaluation since they do not include the necessary war-fighting requirements: tasks, criteria, conditions and measures. Hence the ACO Force Standards for Land and Air Forces probably also lack the

needed level of detail. One way to overcome this problem might be to use checklists developed in the OCC E&F Programme mentioned previously. But it is difficult to assess the probability for success with this approach since this study has not been able to examine any such checklists for Land Forces.

The literature review found a possible benefit of the OCC E&F Programme. The OCC E&F evaluation process uses trained evaluators graduated from an OCC Evaluators Training Course. One conclusion is that it would probably be useful, at least on a general level, to study the OCC Evaluators Training Course concept if decided to develop an evaluators training course for the NBG.

By the definition Standards consists of Criteria and Measures. The development of the latter is therefore an important issue. In the *NATO Code of Best Practice (COBP) for C2 Assessment* (Reference O) the concept of measures for C2 evaluation is studied in detail. The findings of this can probably, with some adjustments, be extended to the wider context of BG evaluation not just C2 evaluation. The COBP will therefore almost certainly be very useful when developing measures for the NBG evaluation.

Annex C
A comparison of the approaches

This annex consist of a introductory section, followed by the second section where the grading of the alternatives is described. The conclusions of the overall grading are compiled in the third section.

1. Introduction

In this section the alternative approaches and the grading criteria are summarized and the grading methodology is described.

1.1. Alternative approaches

In the table below, the different approaches are summarized.

Alternative Approaches	Aspect	Practical methods	Information basis	Evaluator Training Course
1-1. National approach (P&P)	Preparation and planning	Checklist M&S War-gaming	EU BG documents National methods	No
1-2. NRF PC/ECC			EU BG NRF PC/ECC	Nato restricted
1-3. OCC E&F (P&P)			EU BG AFS OCC Checklists	Yes
2-1. National approach (WF)	War-fighting evaluation	Operational evaluations: CPXs LIVEXs	EU BG documents National methods	No
2-2. NRF JMETL			EU BG NRF ETC AFS NRF JMETL	Nato Restricted
2-3. OCC E&F (WF)			EU BG AFS OCC Checklists	Yes
2-4. NBG JMETL			EU BG NTL	No

1.2. Method Criteria

Eleven criteria has been developed for the comparison between the approaches. These criteria have been divided into five sections as out-lined below. Criteria 1 and 2 addresses Preparation and Planning (P&P) and War-fighting (WF) respectively. The other three criteria (3,4 and 5) are used for both P&P and WF.

1. Preparation & Planning (P&P) evaluation method requirements
    1.1. Encompassing the EU BG requirements
    1.2. Transparent and auditable grading (P&P)
2. War-fighting (WF) evaluation method requirements
    2.1. Missions & Tasks
    2.2. Compatible with the NBG exercise schedule
    2.3. Transparent and auditable grading (WF)
3. Development Factors
    3.1. Development time
    3.2. Existing Tools for Certification
    3.3. Existing Tools for Evaluation
    3.4. Existing Evaluators Programs
4. Added-value
    4.1. Analogy to NRF
    4.2. Reusable for OCC E&F certification
5. Accessibility
    5.1. Access to Information

1.3. Methodology used for comparing the approaches

A method called AHP (Analytic Hierarchy Process), see explanation below, was used to support the grading of the different approaches compiled in the table below. The method was utilized through the software tool Expert Choice.

All comparisons, both for weighting and alternatives are done on a 1-9 scale.

The scoring is carried out pair-wise and the different requirements are weighted according to their priorities.

Expert Choice uses a grading scale consisting of the five scale steps Equal, Moderate, Strong, Very Strong, Extreme. In addition to this there are intermediate steps between each, and there is also the possibility of manually assign any number between 1 and 9. The result of this is a continuous mathematical range scale from 1.0 to 9.0. Since the time available for the grading process was limited in this study, only the three scale steps Equal ,Moderate, Strong were used, resulting in the discrete mathematical scale 1-3-5. This will cause the grading differences to sometimes be either greater or smaller than if a continuous range scale had been applied. Due to this it will be the different approaches ranking order that will be correct and not the exact grading value. One should therefore be cautious and only use the ranking of the approaches when analyzing the grading results.

1.3.1. Analytic Hierarchy Process (AHP)

AHP belongs to a class of decision support methods called multiple criteria decision analysis. These methods are used for comparing alternatives by using predetermined criteria. The first step in AHP is usually to develop a criteria hierarchy. This is done to group all the low-level

criteria that are used for the comparison. When buying a car the following hierarchy might be used:

1. Cost 70%

1.1. Price of purchase 60% (42,00%)

1.2. Maintenance cost 40% (28,00%)

2. Technical 30%

2.1. Engine size 50% (15,00%)

2.2. Fuel consumption 50% (15,00%)

After the hierarchy has been developed, each criterion is to be given a weight. In AHP this is elicited by pairwise comparison of the criteria. Here, criterion 1.1 and 1.2 would be compared and then criterion 2.1 with 2.2. Then on the next level criterion 1 would be compared with criterion 2. On each level the resulting weightings would be as percentages, as can be seen above. In the overall weighting criterion 1.2 will contribute with 28 %.

The next step is to compare the predefined alternatives. Here, it could be two or more different types of cars, here A, B and C. This comparison is also done pairwise. Here car A would be compared with cars B and C respectively for criterion 1.1 and then care B and C would be compared with respect to criterion 1.1. Then the same procedure is followed for all low-level criteria. The overall result is the sum of products between the score each alternative got for the low-level criterion and the corresponding weight for that criterion.

1.4. Underlying assumptions

To be able to grade the different approaches a few assumptions had to be made. These assumptions are compiled in the following table.

Aspect	Assumptions
National Approach	It has not been possible to examine the four NBG contributing nation's different evaluation methods, due to time limitations and accessibility restrictions. Therefore, the Swedish Armed Forces Military Unit Evaluation (KFV) has been used as the only example of a national approach, when an illustrative example has been needed.
Evaluators Training Programme	An evaluators training programme does not exist for the NBG (EU BG). But if the Nato Evaluators Training Programme would be available, then it would be useful for NBG evaluation.
War-fighting evaluation: Missions & Tasks	Missions, tasks, standards, criteria, conditions, etc will be needed in order to conduct war-fighting evaluation.
Access to information	The ACO Force standards etc not released to Partners, but can be released through the OCC E&F Programme. It is easier to release information and tools to the other NBG members if it is just a national matter than if it is a multinational matter involving NATO. Sweden and the NBG lacks an established Evaluators Training Course.
OCC E&F	It is assumed that if the OCC E&F approach is to be used the military units of the NBG will be declared to the OCC Pool Of Forces. A foundation for the OCC E&F is the ACO Force Standards. These were not developed for evaluating the mission and tasks of a Rapid Response Capability, but they do encompass important factors as deployability, sustainability etc. and therefore can be usable for evaluation of P&P.
JMETL	It is reasonable to assume that the NBG JMETL would be useful for war-fighting evaluation, since the purpose of producing the NBG JMETL is to accomplish NBG missions and tasks and a JMETL thus forms the basis for training and evaluation.

2. Comparison

The different approaches were compared using the criteria as out-lined in the section above. The scoring of the approaches was carried-out by a small group of officers and OA[25]. First the approaches for Preparation and planning is examined, then the approaches for War-fighting evaluation.

2.1. Preparation & Planning evaluation method requirements

In this section, the P&P approaches are graded against the Preparation & Planning evaluation method requirements.

2.1.1. Criteria

The examining criteria are compiled in the table below.

P&P Evaluation Requirements	Description
1. Encompassing the EU BG Requirements	The P&P evaluation procedure should at least encompass the EU BG Standards and Criteria on: • Availability • Flexibility • Employability and deployability • Readiness • Connectivity • Sustainability • Survivability • Medical Force Protection • Interoperability
2. Transparent and auditable grading within the NBG.	The grading system should be transparent to all NBG contributing countries, i.e. the countries should have access to: • The grading scale and its criteria. • The necessary information to understand how the evaluator's grade is related to the level of performance of the examined unit. The grading system should be auditable, i.e: • It should be easy to trace how the evaluators have produced their gradings. • It should be easy to trace requirements trail from the produced gradings to the original standards and criteria and other fundamental requirements.

2.1.2. Priorities

The two aspects are considered equally important and therefore given the same weight, as seen in the graph below, (the two bars have the same height).

[25] Operations Analyst.

2.1.3. P&P Findings

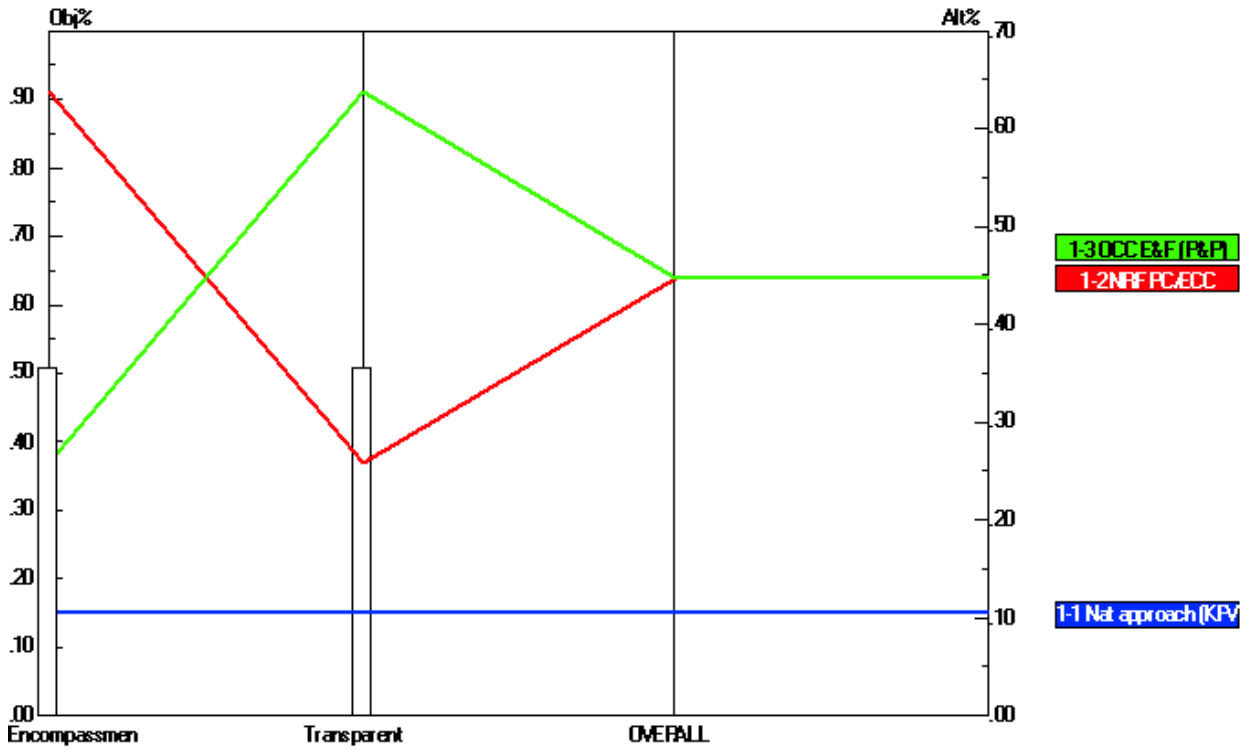

Figure 19 Preparation & Planning - Evaluation method requirements

The graph above shows that the national approach is the least suitable considering the aspects Encompassment and Transparency. It is also apparent that the other two approaches supplements each-other. The reasons for this are, that the NRF approach is focused on Rapid Reaction Capability and therefore well encompasses the EU BG requirements, and that transparency is one of the fundamental concepts of the OCC E&F Programme, see the Grading Comments below.

2.1.4. P&P Grading Comments

P&P: Encompassing the EU BG Requirements	Explanation to the grading
1-1 National approach (P&P)	The Swedish Armed Forces Military Unit Evaluation (KFV) is developed for evaluation of the planning and preparation phase. But it is not developed for evaluation of Rapid Reaction Forces and therefore does not encompass factors as deployability, sustainability etc.
1-2 NRF PC/ECC	The NRF PC/ECC is developed to evaluate the planning and preparation phase of a rapid reaction force.
1-3 OCC E&F (P&P)	The OCC E&F is not developed for evaluation of Rapid Reaction Forces. But it does encompass important factors as deployability, sustainability etc.

P&P: Transparent and auditable grading within the NBG.	Explanation to the grading
1-1 National approach KFV (P&P)	The use of four different national grading systems will probably be less transparent and more difficult to audit than using one multinational.
1-2 NRF PC/ECC	The NRF PC/ECC system is a multinational system. It will therefore probably be more transparent and auditable than the national approach, but transparency is not as fundamental as for the OCC E&F approach.
1-3 OCC E&F (P&P)	The OCC E&F grading system is multinational and available to Partners. Transparency is one of the fundamental concepts of the OCC E&F Programme, due to this it gets a higher grade than the NRF PC/ECC.

2.2. Added-value

In this section, the P&P approaches are compared using the added-value criteria.

2.3. Criteria

The examining criteria are compiled in the table below.

Added-value	Description
1. Analogy to NRF	Wherever possible and applicable, standards, practical methods and procedures should be analogous to those defined within NRF, according to Reference C.
2. Reusable for other types of certification	It will be favorable if the result of the NBG certification can be reused for other types of certification since member states may commit their assets and capabilities to other Pools of Forces like the OCC. The possibility of meeting the high readiness Partnership Goal G0035 is also considered in this criteria.

2.3.1. Priorities

The two aspects are considered equally important, as seen in the graphs below (the bars are equally high).

2.3.2. P&P Findings

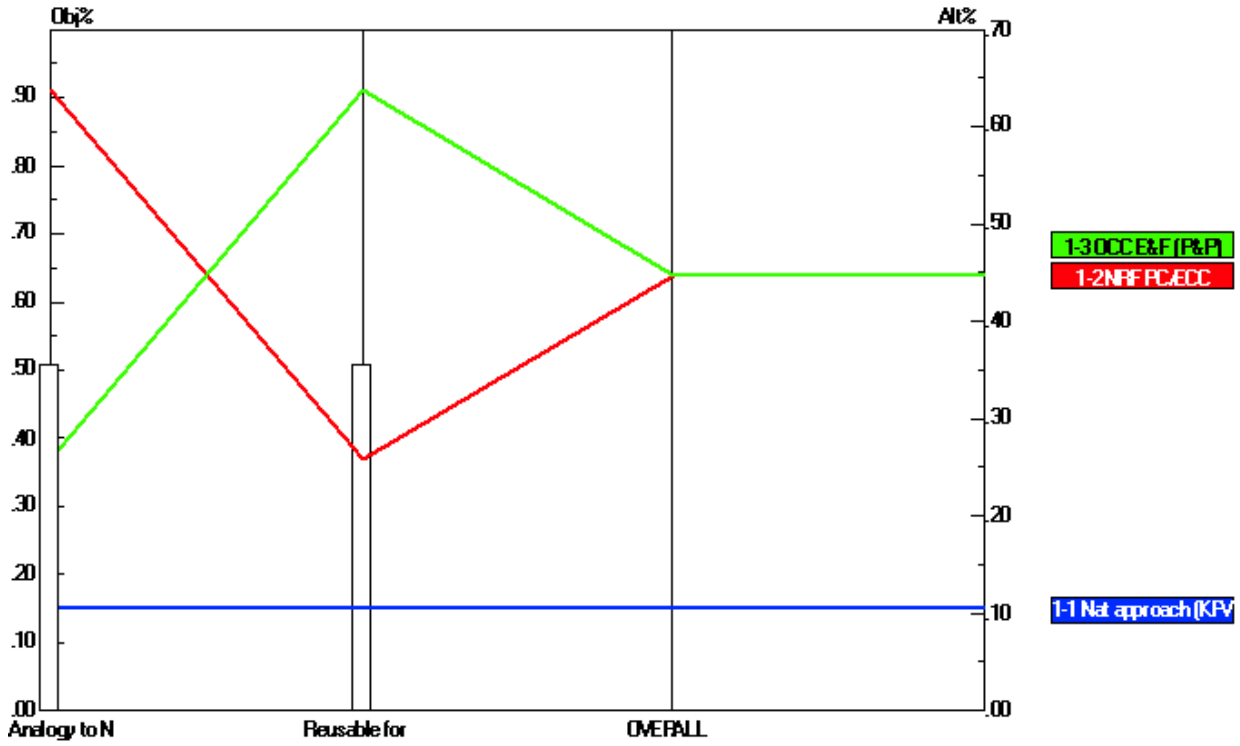

Figure 21. Preparation & Planning - Added-value

The graph above shows that the national approach is the least suitable considering these aspects, and that the other two approaches supplements each-other in the different aspects. The NRF PC/ECC approach is of course analogous to the NRF, and the OCC E&F approach is naturally reusable for OCC E&F Pool Of Forces certification, see the Grading Comments below.

2.3.3. P&P Grading comments

P&P: Analogy to NRF	Explanation to the grading
1-1 National approach KFV (P&P)	It is self-evident that a national approach is not analogous to the NRF procedures.
1-2 NRF PC/ECC	Self-evident.
1-3 OCC E&F (P&P)	The OCC E&F is of course analogous to Nato, but it is not developed for evaluating Rapid Response Capability.

P&P: Reusable for OCC E&F certification	Explanation to the grading
1-1 National approach KFV (P&P)	The national approach does not prepare the organization for certification to multinational pools of forces.
1-2 NRF PC/ECC	By using the NRF approach the units will meet the PARP high readiness Partnership Goal G0035. According to Reference E the PARP result may be used as part of the nation's OCC E&F Self-assessment. The use of the NRF approach will therefore prepare the organization for certification to OCC Pool of Forces, but not as well as if a complete OCC E&F evaluation would have been used.
1-3 OCC E&F (P&P)	Fully.

2.4. Development Factors

In this section, the P&P approaches are compared using the developmen factors criteria.

2.5. Criteria

The examining criteria are compiled in the table below.

Development Factors	Description
1. Development Time	Using the original method as a starting point, some methods needs further developing to produce the necessary measurable criteria.
3. Tools for Certification	Different types of tools will be needed for the certification, e.g.: readiness reporting system, certification reporting system, observation of training, databases, etc. The problem is that some tools are not accessible to Partners, but that aspect is considered in the next section (access to information).
4. Tools for Evaluation	Different types of tools will be needed for the evaluation. For P&P tools like M&S, checklists and war-gaming can be used. For war-fighting evaluation, tools for after-action review, AHP, BN, etc can be used. The problem, as it is for certification tools, is that some tools are not accessible to Partners.
5. Evaluators Training	Trained evaluators are needed in order to perform reliable evaluations. The possible use of an existing Evaluators Training Course (ETC) Programme will therefore be beneficial. The problem is, as it is for certification tools, that some courses are not accessible to Partners.

2.5.4. P&P Findings

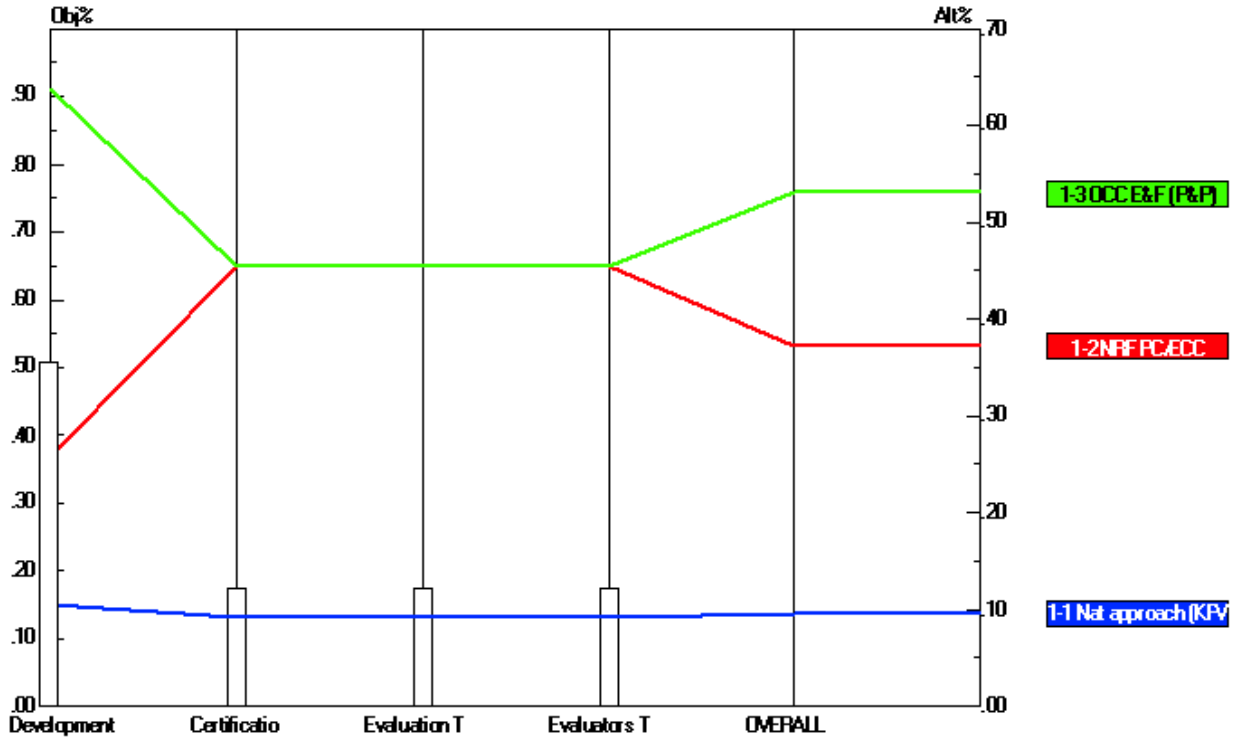

Figure 23. Planning & Preparation - Development factors

The graph above shows that the national approach is the least suitable considering these aspects, and that the OCC E&F and the NRF PC/ECC approach are quite equal except for the important Development Time aspect where the OCC E&F approach is favorable. The reason for this is the fact that the PC/ECC checklists are not very exact and detailed and therefore needs some development, not as much as the national approach but more than the OCC E&F approach, see the table below.

2.5.5. P&P Grading comments

P&P: Development Time	Explanation to the grading
1-1 National approach KFV (P&P)	Sweden has some limited methods for evaluation (KFV), but these lack the aspects of deployability, readiness, etc. and therefore probably need quite extensive development.
1-2 NRF PC/ECC	The PC/ECC is not very exact and detailed and therefore needs some development, not as much as the national approach but more than the OCC E&F approach.
1-3 OCC E&F (P&P)	The OCC E&F Programme produces checklists quite well suited for evaluation of P&P, but these are not developed for rapid reaction capability and therefore probably need some adjustment.

P&P: Tools for Certification	Explanation to the grading
1-1 National approach KFV (P&P)	Sweden lacks the necessary tools for certification of a rapid reaction force. It is not very likely that any of the other NBG contributing countries would have any national tools. Norway and Estonia probably uses the NRF tools.
1-2 NRF PC/ECC	The NRF has tools for certification like the readiness reporting system, certification reporting system, observation of training, databases, etc. (But the NRF tools for certification are not available to Partners.)
1-3 OCC E&F (P&P)	Tools and Databases etc. exists and can be used for military units if they are declared to the OCC Pool Of Forces.

P&P: Tools for Evaluation	Explanation to the grading
1-1 National approach KFV (P&P)	Sweden has some limited tools for evaluation (KFV method) but these are not developed for the needs of a rapid reaction force, i.e. they lack the aspects of deployability, readiness, etc. Norway and Estonia probably uses the NRF tools.
1-2 NRF PC/ECC	The NRF has tools for evaluating P&P, like the checklists for PC/ECC.
1-3 OCC E&F (P&P)	The OCC E&F Programme develops checklists (based on ACO Force Standards) for the evaluation of P&P (interoperability and capability) for military units implied that they are declared to the OCC Pool Of Forces.

P&P: Evaluators Programs	Explanation to the grading
1-1 National approach KFV (P&P)	Sweden lacks an established Evaluators Training Course and there is probably not enough time to develop one either. Norway and Estonia probably uses the NRF programme.
1-2 NRF PC/ECC	NATO has an evaluators training programme, (but it is not accessible to Partners.)
1-3 OCC E&F (P&P)	The OCC E&F Evaluators Training Course is available to units declared to the OCC Pool of Forces.

2.6. Access to Information

In this section, the P&P approaches are compared using the information access criteria.

2.6.1. Criteria

For the Accessibility aspect, there is only one examining criteria as seen in the table below.

Access to information	Description
1. Access to Information	Some methods requires access to Nato restricted documents not yet released to Sweden and Finland.

2.6.2. P&P Findings

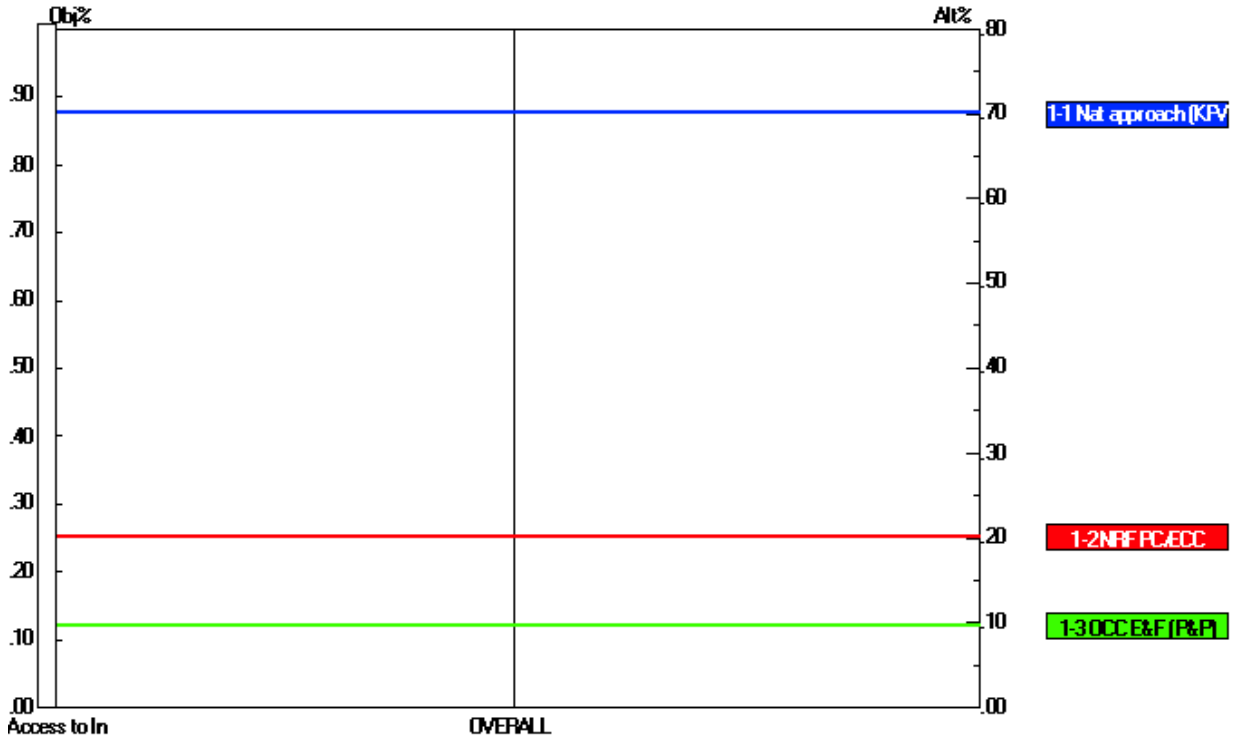

Figure 25. Preparation & Planning- Access to Information

The graph above shows that the national approach is the most accessible and the OCC E&F is the least, the reason for this is the fact that the OCC E&F is dependent of the ACO Force Standards, which are Nato restricted, see the Grading Comments below.

2.6.3. P&P Grading comments

P&P: Access to Information	Explanation to the grading
1-1 National approach KFV (P&P)	Since all information is national, the ability to release it to the other NBG members is a national matter and therefore probably easier than for NATO.
1-2 NRF PC/ECC	The NRF PC/ECC is released to Partners, but the tools for certification and the AFS which is the foundation for NRF PC/ECC are not. This approach will therefore get a higher grading than the OCC E&F approach, but a lower grading than the national approach.
1-3 OCC E&F (P&P)	The ACO Force standards for land and air and other important linked documents, and the evaluators training course are not released to Partners. But they can be released through the OCC E&F Programme.

2.7. War-fighting evaluation method requirements

In this section, the WF approaches are compared using the War-fighting evaluation method requirements.

2.7.1. Criteria

The examining criteria are compiled in the table below.

War-fighting Evaluation Requirements	Description
1. Missions and tasks	The procedure should be able to evaluate if the NBG has the war-fighting capability to fulfill the specific tasks in its mission spectrum.
2. Transparent and auditable grading within the NBG.	The grading system should be transparent to all NBG contributing countries, i.e. the countries should have access to: • The grading scale and its criteria. • The necessary information to understand how the evaluator's grade is related to the level of performance of the examined unit. The grading system should be auditable, i.e: • It should be easy to trace how the evaluators have produced their gradings • It should be easy to trace requirements trail from the produced gradings to the original standards and criteria and other fundamental requirements.
3. Compatible with the NBG Exercise Schedule	It should be easy to adjust the procedure to fit the NBG training and exercise schedule.

2.7.2. Priorities

The three aspects are considered equally important and therefore given the same weight, as seen in the graph below (the three bars have the same height).

2.7.3. WF Findings

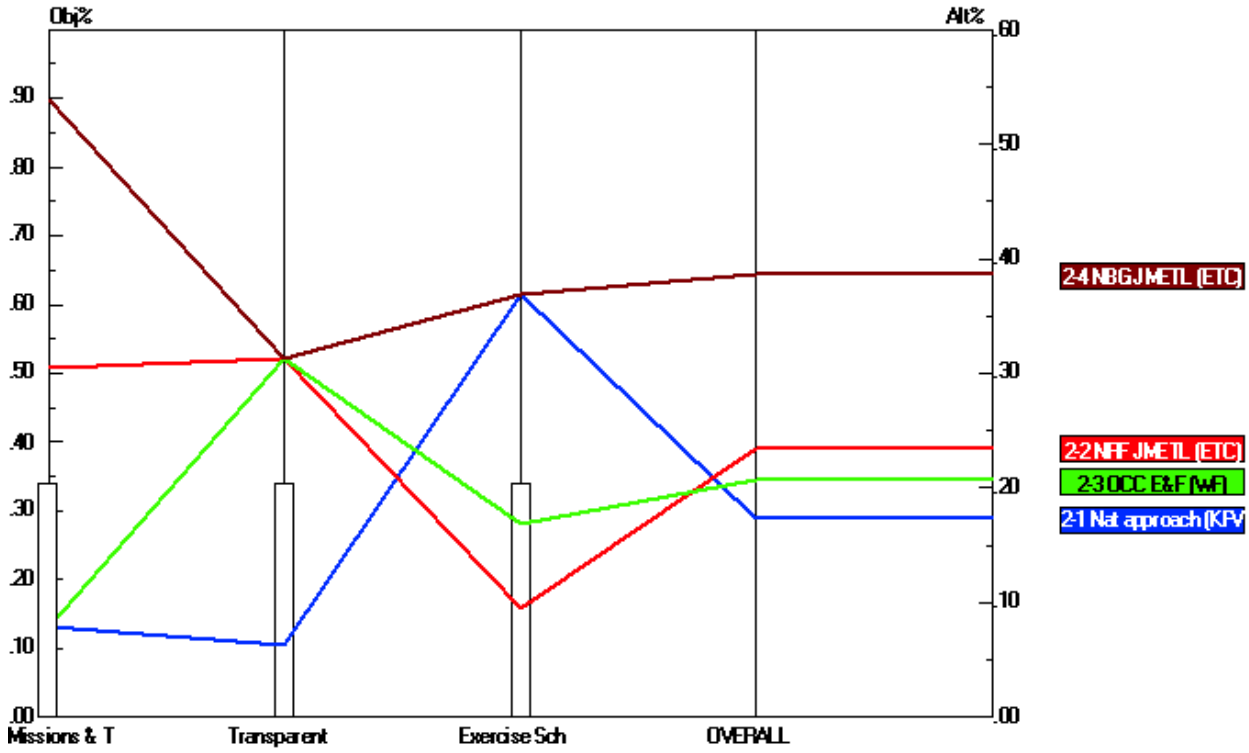

Figure 20. War-fighting - Evaluation method requirements

The graph above shows that the NBG JMETL out-ranks the other three approaches, primarily since it is suitable for evaluating the Missions & Tasks aspect, but it is also transparent and adjustable to the NBG exercise schedule, see the Grading Comments below.

2.7.4. WF Grading comments

WF: Missions and tasks	Explanation to the grading
2-1 National Approach KFV (WF)	The Swedish Armed Forces Military Unit Evaluation (KFV) focus is the planning and preparation phase. It is probably not suitable for war-fighting evaluation.
2-2 NRF JMETL (ETC)	The NRF JMETL is produced by the commanders to tailor the training events to meet the particular training and evaluation needs. Considering the NRF is a rapid reaction force, it is reasonable to assume that the NRF JMETL would be useful for war-fighting evaluation for the NBG.
2-3 OCC E&F (WF)	A basis for the OCC E&F is the ACO Force Standards. These are not developed for evaluating the missions and tasks of a Rapid Response Force.
2-4 NBG JMETL (ETC)	It is reasonable to assume that the NBG JMETL would be useful since it will be produced by the commanders to tailor the training events to meet the particular training and evaluation needs for the NBG. It will therefore form the basis for training and evaluation.

WF: Transparent and auditable grading within the NBG.	Explanation to the grading
2-1 National Approach KFV (WF)	The use of four different national grading systems will probably be less transparent and more difficult to audit than using one multinational.
2-2 NRF JMETL (ETC)	The JMETL system is a multinational system with clearly defined task, conditions and measures. It will therefore probably enable transparency and auditability.
2-3 OCC E&F (WF)	The OCC E&F grading system is multinational and available to Partners. Transparency is one of the fundamental concepts of the OCC E&F Programme.
2-4 NBG JMETL (ETC)	The JMETL system is a multinational system with clearly defined task, conditions and measures. It will therefore probably enable transparency and auditability.

WF: Compatible with the NBG Exercise Schedule	Explanation to the grading
2-1 National Approach KFV (WF)	With the national approach (like the KFV) the planning will be a national matter, therefore the schedule can probably be adjusted to fit the NBG - at least easier than for a multinational organization like NATO.
2-2 NRF JMETL (ETC)	We consider it is possible to use the NRF JMETL but not as easy as for a tailored approach (the national or the NBG JMETL).
2-3 OCC E&F (WF)	The compatibility with the exercise schedule will of course depend on the access and availability of trained OCC evaluators. We consider it is possible to fit the OCC E&F to the exercise schedule, but not as easy as for a tailored approach (the national or the NBG JMETL).
2-4 NBG JMETL (ETC)	It is reasonable to assume that the NBG JMETL will fit the NBG schedule since it is a tailored approach and the JMETL would form the basis for training and evaluation.

2.8. Added-value

In this section, the WF approaches are compared using the added-value criteria.

2.9. Criteria

The examining criteria are compiled in the table below.

Added-value	Description
1. Analogy to NRF	Wherever possible and applicable, standards, practical methods and procedures should be analogous to those defined within NRF, according to Reference C.
2. Reusable for other types of certification	It will be favorable if the result of the NBG certification can be reused for other types of certification since member states may commit their assets and capabilities to other Pools of Forces like the OCC. The possibility of meeting the high readiness Partnership Goal G0035 is also considered in this criteria.

2.9.5. Priorities

The two aspects are considered equally important, as seen in the graphs below (the bars are equally high).

2.9.6. WF Findings

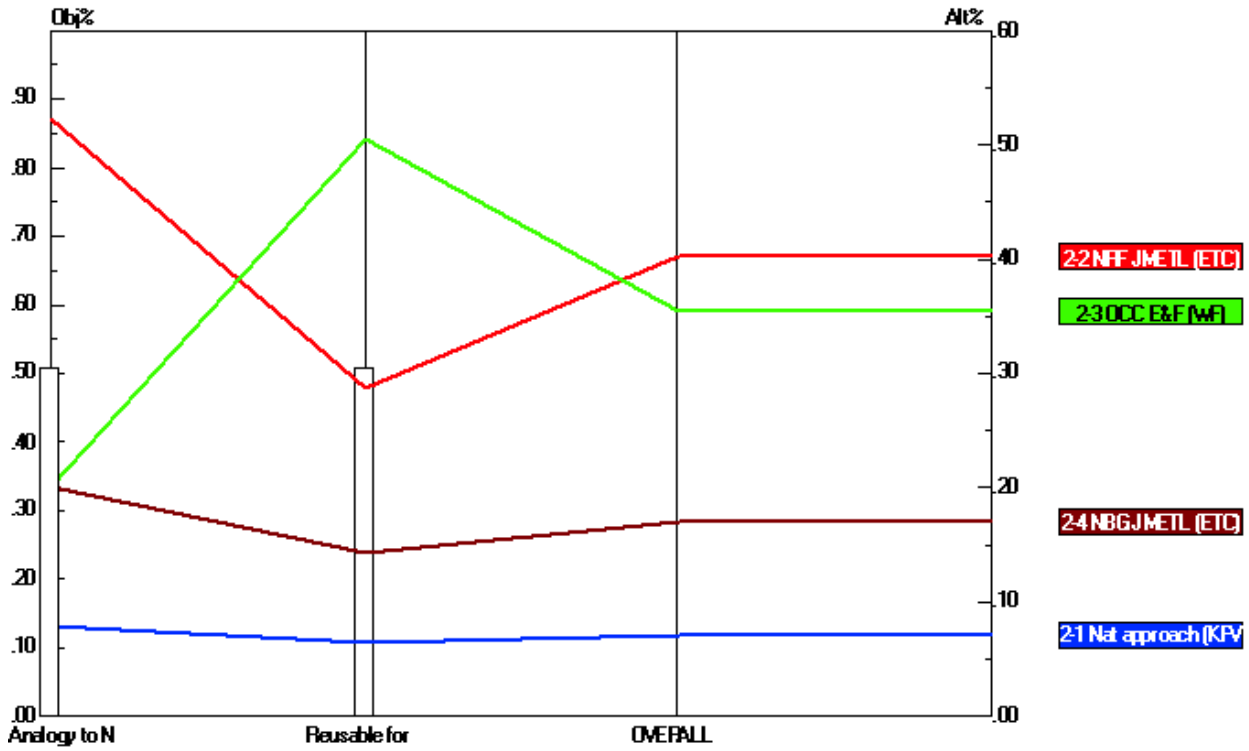

Figure 22. War-fighting - Added-value

The graph above shows that the national approach is again the least suitable considering the Added-value aspects since it does not prepare the organization for multinational certification. The study also finds that the NRF JMETL and the OCC E&F approach supplements each-other in the different aspects, in the same way as in the previous section, the NRF PC/ECC approach is analogous to the NRF, and the OCC E&F approach is reusable for OCC E&F Pool Of Forces certification, see the Grading Comments below.

2.9.7. WF Grading comments

WF: Analogy to NRF	Explanation to the grading
2-1 National Approach KFV (WF)	Not applicable.
2-2 NRF JMETL (ETC)	Fully.
2-3 OCC E&F (WF)	The OCC E&F is of course analogous to Nato, but it is not developed for evaluating NRF Rapid Response Capability.
2-4 NBG JMETL (ETC)	The NBG JMETL will be tailored to fit the needs of the NBG. By using the JMETL system the standards, practical methods and procedures will be similar to those defined within NRF, but the conformity will probably be less than 100%.

WF: Reusable for OCC E&F certification	Explanation to the grading
2-1 National Approach KFV (WF)	The national approach does not prepare the organization for certification to multinational pools of forces.
2-2 NRF JMETL (ETC)	By using the NRF approach the units will meet the PARP high readiness Partnership Goal G0035. According to Reference E the PARP result can be used as part of the nation's OCC E&F Self-assessment. The use of the NRF approach will therefore prepare the organization for certification to OCC Pool of Forces, but not as well as if a complete OCC E&F certification would have been used.
2-3 OCC E&F (WF)	Fully.
2-4 NBG JMETL (ETC)	By using the JMETL system the organization will be better prepared for certification to multinational pools of forces than if a national approach is used. But since it is not exactly the same as the NRF JMETL approach it will get a lesser score than the NRF.

2.10. Development Factors

In this section, the WF approaches are compared using the development factors criteria.

2.11. Criteria

The examining criteria are compiled in the table below.

Development Factors	Description
1. Development Time	Using the original method as a starting point, some methods needs further developing to produce the necessary measurable criteria.
3. Tools for Certification	Different types of tools will be needed for the certification, e.g.: readiness reporting system, certification reporting system, observation of training, databases, etc. The problem is that some tools are not accessible to Partners, but that aspect is considered in the next section (access to information).
4. Tools for Evaluation	Different types of tools will be needed for the evaluation. For P&P tools like M&S, checklists and war-gaming can be used. For war-fighting evaluation, tools for after-action review, AHP, BN, etc can be used. The problem, as it is for certification tools, is that some tools are not accessible to Partners.
5. Evaluators Training	Trained evaluators are needed in order to perform reliable evaluations. The possible use of an existing Evaluators Training Course (ETC) Programme will therefore be beneficial. The problem is, as it is for certification tools, that some courses are not accessible to Partners.

2.11.8. WF Findings

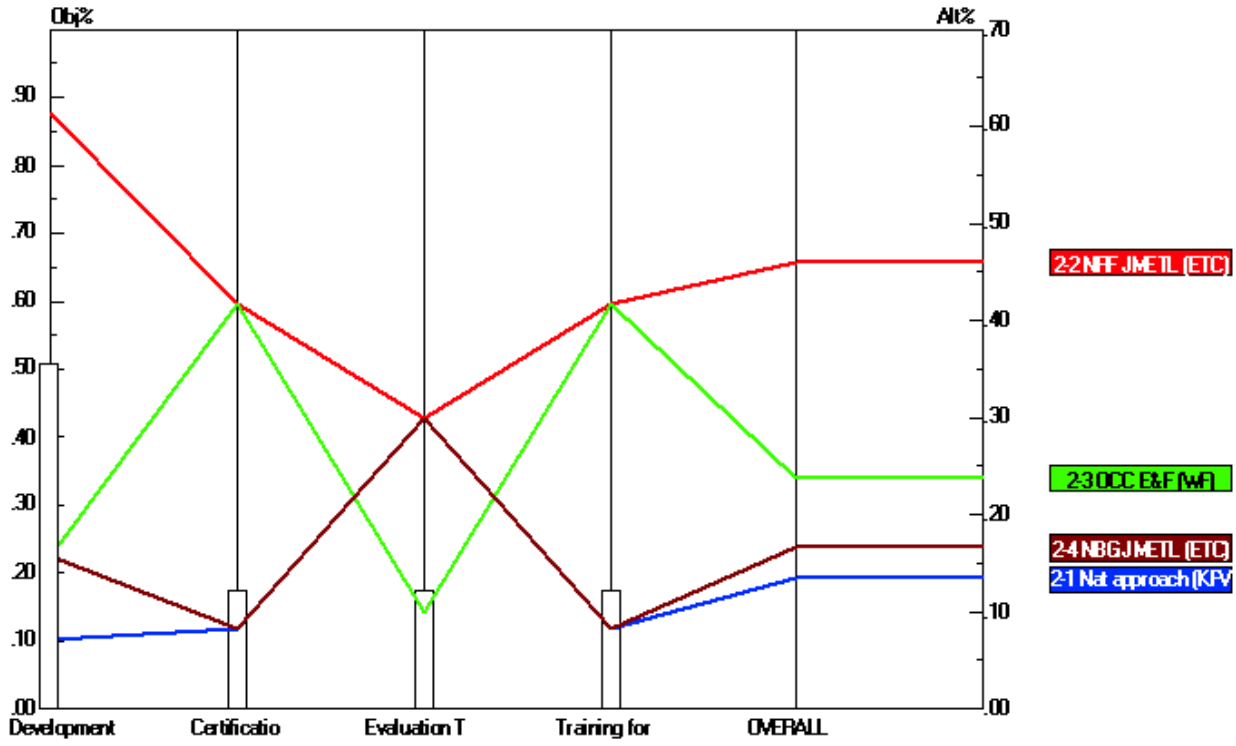

Figure 24. War-fighting - Development factors

The graph above shows that the NRF JMETL approach out-ranks the other three, the primary reason for this is the fact that it is does not need much development since it has an existing JMETL and tools etc, see the Grading Comments below. The OCC E&F approach is not considered as suitable as the NRF approach since it is not focused on war-fighting evaluation of rapid response forces. The problem with the NRF JMETL is that it is not released to Partners, but that issue is considered in the aspects of information availability.

2.11.9. WF Grading comments

WF: Development Time	Explanation to the grading
2-1 National Approach KFV (WF)	The tool called MARTA (see Annex B) could probably be used for war-fighting evaluation of land forces, but in order to do this the standards, criteria, conditions etc has to be reworked. This work will probably be quite extensive.
2-2 NRF JMETL (ETC)	Since the NRF JEMTL is produced for the commanders need it will probably just need some minor adjustments to be suitable for the NBG commanders needs.
2-3 OCC E&F (WF)	The OCC E&F Programme checklists are probably better suited for evaluation of Planning&Preparation rather than for war-fighting evaluation and this approach will therefore require extensive development. A problem with this approach is that it is dependent on the willingness of Nato.
2-4 NBG JMETL (ETC)	It will probably take a considerable effort to develop a complete and detailed NBG JMETL without the benefit of using any such work already done. But even without access to the NRF JMETL the support of the JMETL system will make this approach somewhat easier than the national approach.

WF: Tools for Certification	Explanation to the grading
2-1 National Approach KFV (WF)	Sweden lacks tools for certification of a rapid reaction force. It is not very likely that any of the other NBG contributing countries would have any national tools. Norway and Estonia probably uses the NRF tools.
2-2 NRF JMETL (ETC)	The NRF has tools for certification e.g. the readiness reporting system, certification reporting system, observation of training, databases, etc. (But the NRF tools for certification are not available to Partners.)
2-3 OCC E&F (WF)	Tools and Databases etc. exists and can be used for military units if they are declared to the OCC Pool Of Forces.
2-4 NBG JMETL (ETC)	There are no existing tools for the NBG (EU BG). (But if accessed the same tools as for the NRF JMETL approach could probably be used as a starting point for the NBG.)

WF: Tools for Evaluation	Explanation to the grading
2-1 National Approach KFV (WF)	Sweden has a tool called MARTA (see Annex B) for war-fighting evaluation of land forces, but it will need further development to be used for a rapid reaction force. Norway and Estonia probably uses the NRF tools.
2-2 NRF JMETL (ETC)	The NBG JMETL-concept can probably function as a tool for war-fighting evaluation since it defines measures and conditions for a rapid reaction force. Nato probably lacks other tools for war-fighting evaluation since it is considered a national responsibility.
2-3 OCC E&F (WF)	The OCC E&F checklists are based on ACO Force Standards, they are therefore probably more useful for evaluation of P&P than for war-fighting evaluation of a rapid reaction force.
2-4 NBG JMETL (ETC)	The NBG JMETL-concept can function as a tool for war-fighting evaluation since it defines measures and conditions for the NBG. (The national tool MARTA could probably be adjusted to be used for the evaluation of the NBG JMETL.)

WF: Evaluators Programs	Explanation to the grading
2-1 National Approach KFV (WF)	Sweden lacks an established Evaluators Training Course and there is probably not enough time to develop one either. Norway and Estonia probably uses the NRF programme.
2-2 NRF JMETL (ETC)	NATO has an evaluators training programme (but it is not accessible to Partners).
2-3 OCC E&F (WF)	The OCC E&F features an Evaluators Training Course to be used for military units scheduled for OCC E&F certification. The question is how useful it is for evaluating war-fighting capability of a rapid reaction force, therefore it gets a lower grading compared to the corresponding for the P&P phase.
2-4 NBG JMETL (ETC)	An evaluators training course does not exist for the NBG (EU BG) and there is probably not enough time to develop one either(but if accessed the same course as for the NRF JMETL approach could be used).

2.12. Access to Information

In this section, the WF approaches are compared using the accessibility criteria.

2.12.10. Criteria

For the Accessibility aspect, there is only one examining criteria as seen in the table below.

Access to information	Description
1. Access to Information	Some methods requires access to Nato restricted documents not yet released to Sweden and Finland.

2.12.11. WF Findings

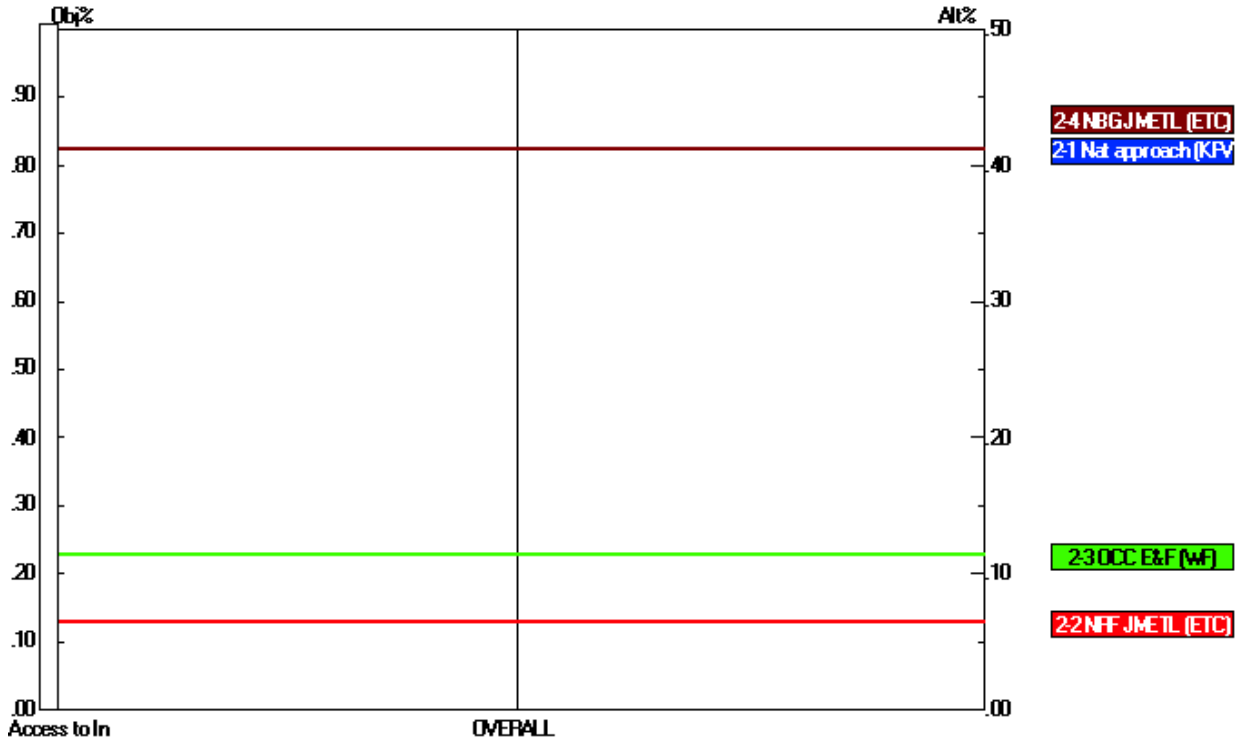

Figure 26. War-fighting - Access to Information

The graph above shows that the national approach and the NBG JMETL are the most accessible and the NRF JMETL approach is the least. The reason for this is the fact that the NRF JMETL is not releasable to Partners and it is not known if it ever will be. The OCC E&F is dependent of the ACO Force Standards, which are Nato restricted but they can be released to Partners declared to the OCC Pool Of Forces, see the Grading Comments below.

2.12.12. Grading comments

WF: Access to Information	Explanation to the grading
2-1 National Approach KFV (WF)	Since all information is national, the ability to release it to the other NBG members is a national matter and therefore probably easier than for Nato.
2-2 NRF JMETL (ETC)	The NRF JMETL and the NRF certification tools are not released to Partners.
2-3 OCC E&F (WF)	The ACO Force standards for land and air forces and other important linked documents are not released to Partners yet. But the can be released through the OCC E&F Programme.
2-4 NBG JMETL (ETC)	All absolutely necessary information (NTL) is released to Partners, (but the lack of the NRF JMETL will make the work considerable more difficult).

3. Conclusions - Overall comparisons

This section contains the combined result of the comparisons for the respective aspects.

3.1. Priorities - Overall

The aspects that are considered the most important are the P&P/WF Evaluation Requirements, the Development Factors and the Accessibility aspect. The reasons for this are that the fulfillment of the evaluation requirements is critical for the usability of the process; the development factors are critical for the possibility of successfully produce the process; and the Accessibility aspect is important since the lack of critical information might hinder the development and establishment of the certification process.

The Added-value aspects are considered as the least important since these are not critical for producing the certification process. These priorities are seen in the graphs below as the second bar is lower than the other three.

3.2. P&P - Conclusions

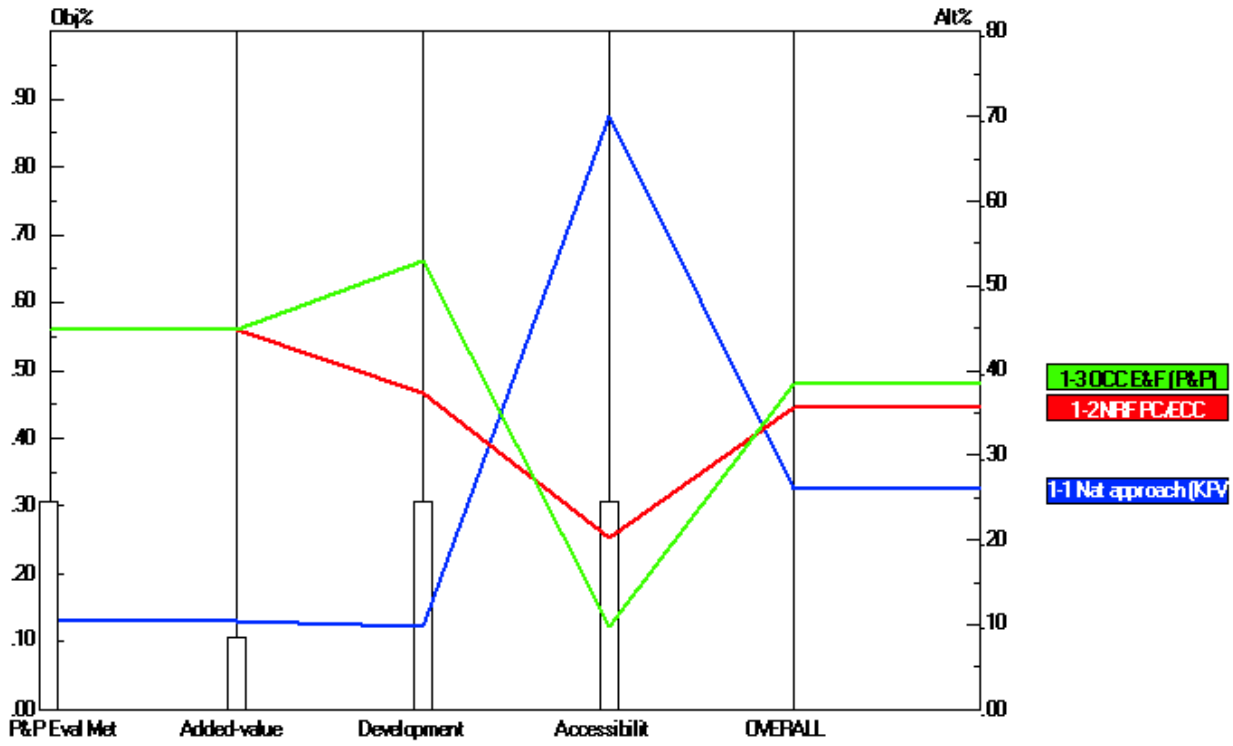

Figure 27. Planning & Preparation

The graph above shows that the OCC E&F and the NRF PC/ECC approaches are rather similar. When examining the detailed graphs of each of these aspects, in the previous sections, the two approaches seem to supplement each-other, where the first one is weak the second is strong and vice-versa.

The national approach is out-ranked in every aspect except for accessibility, this is mainly caused by the OCC E&F and NRF PC/ECC linkage to the ACO Force Standards (Nato Re-

stricted). If the necessary documents are released then the OCC E&F and the NRF PC/ECC approach would better than the national approach in every aspect.

It is therefore concluded that the following solution would be useful. Firstly, declare the units to the OCC Pool Of Forces to get access to the necessary information. Secondly use the fact that the OCC E&F and the NRF PC/ECC are supplementary and therefore to develop a mix of the best parts of the different approaches. This would create a procedure tailored for the evaluation and certification of NBG Preparation & Planning, a solution that would out-rank all the other alternatives, the national approach, the OCC E&F approach and the NRF PC/ECC approach.

3.3. WF- Conclusions

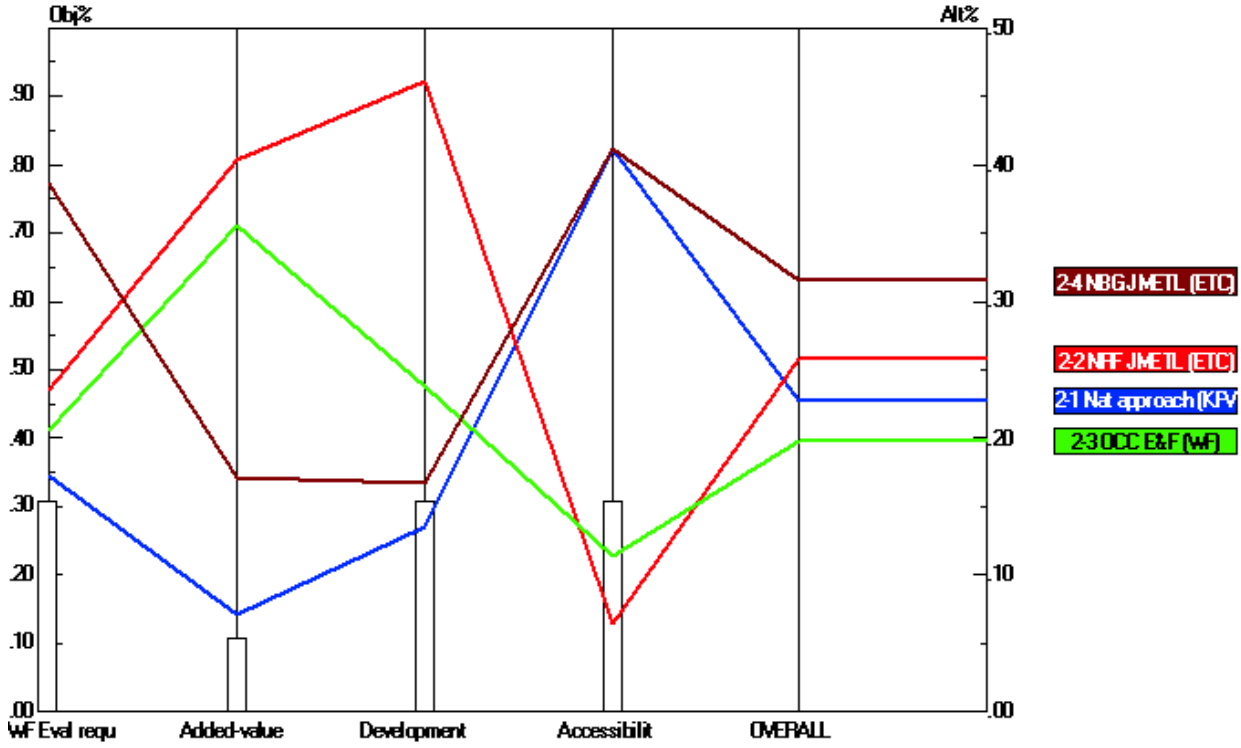

Figure 28. War-fighting - Over-all

The graph above shows that the NBG JMETL approach is top-ranked for the aspects WF Evaluation Requirements and Accessibility, the reason for this is the fact that the NBG JMETL would be tailored for the NBG evaluation and that all necessary documents are released to Partners. For the other two aspects (Added-value and Development Factors) the NRF JMETL out-ranks the others, because of the analogy to NRF and that the NRF JMETL already exists and probably only needs some adjustment for the NBG.

Because of the strong connection between the NRF JMETL and the NBG JMETL it is concluded that a suitable solution would be a combination of the two. This would mean using the NRF JMETL as a starting-point for developing a NBG JMETL. This will of course require the release of the NRF JMETL to Sweden and Finland. The possibilities of achieving this is not known and further investigations are therefore recommended. When investigating the possibility of releasing the NRF JMETL to Sweden and Finland, one should also investigate the possible access of the NRF certification tools since it would be natural to incorporate these in the

NBG JMETL approach. When studying possible enhancements of the NBG JMETL approach, it is also recommended to try to adjust the MARTA tool (from the national approach) for NBG JMETL war-fighting evaluation. These recommended alterations would definitely improve the NBG approach considering the Development aspects where the approach has a weakness.