



# **Assessing and Recommending C2 Structures Based on a Network Centric Component Model**

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# Outline of the Presentation

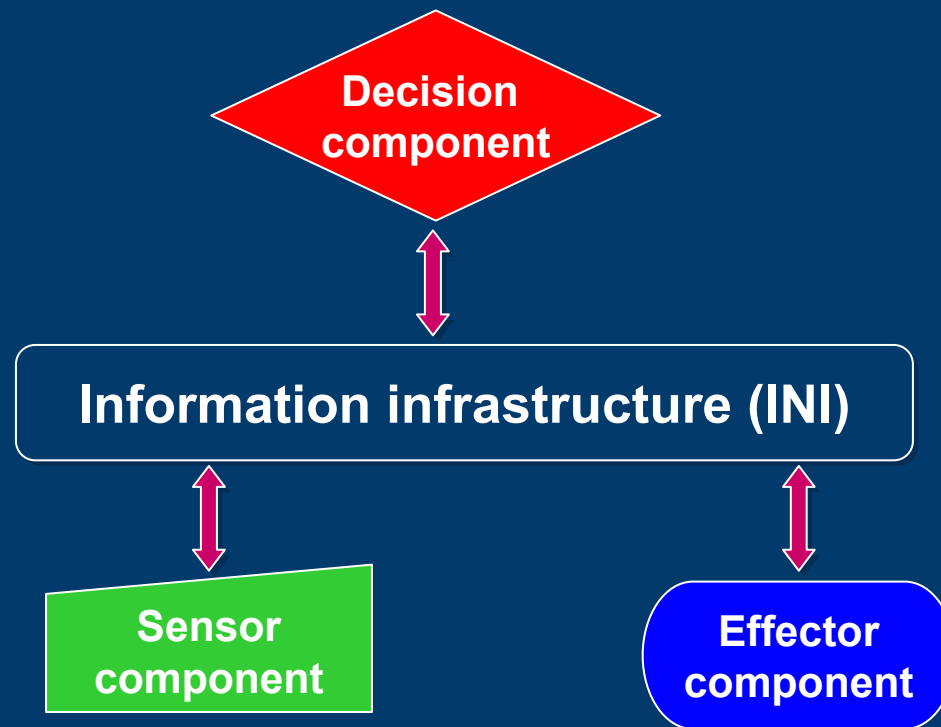
- Introduction
- Network Centric Component Model (NCCM)
- Methodology - Example
- Conclusions

# Introduction

- From requirements to comparison of alternatives against a set of factors
- Focus on development of factors and an iterative process
- Finding the best match between alternatives and factors
- Partially based on the project “Battlespace Digitisation” (FFI\* and Teleplan AS).

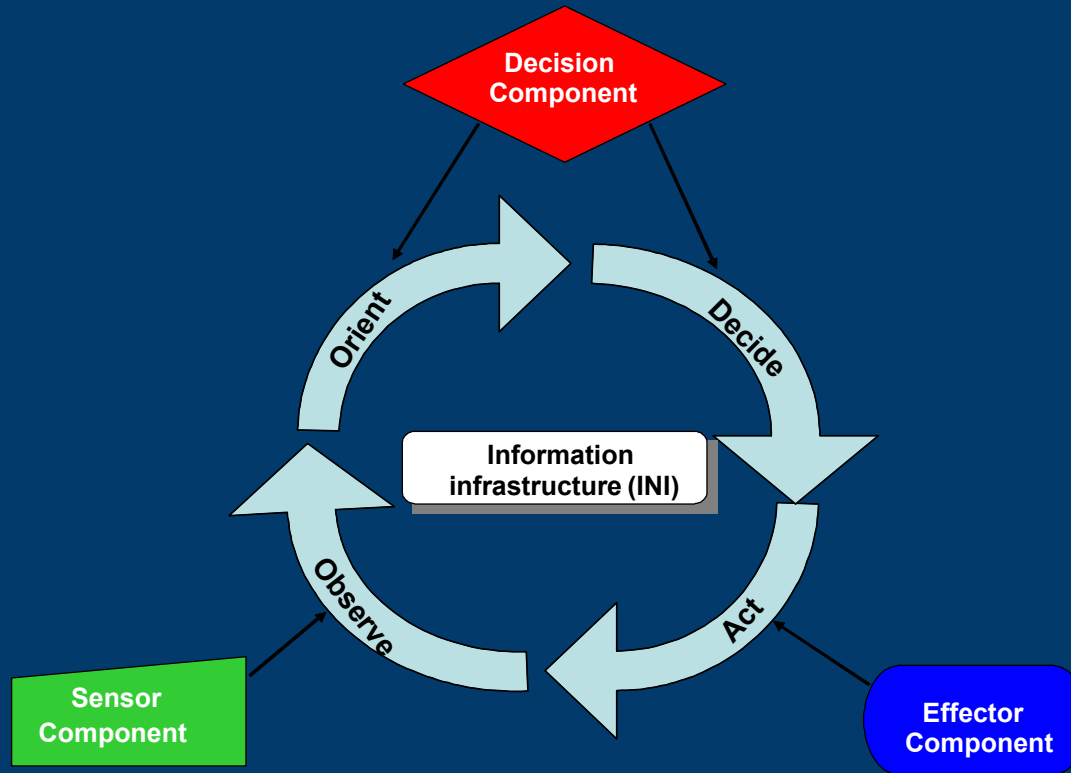
\*: Norwegian Defence Research Establishment

# Representation of Force Structures – The Network Centric Component Model



- Model applied in a recent study: Defence Staff Norway, Norwegian Network Enabled Warfare Concept (2002) (In Norwegian).

# The Military "Value Chain"

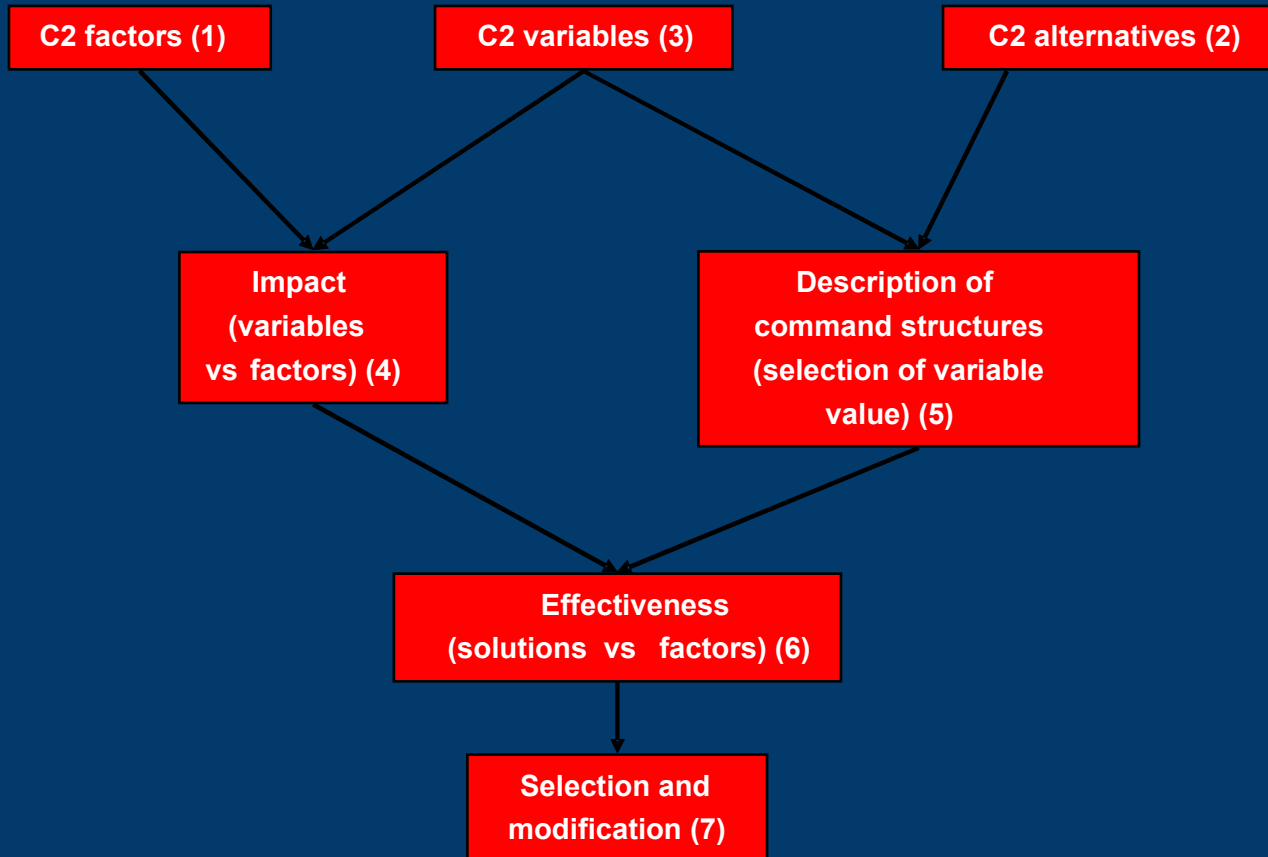


- Contributions to different parts of the military "value chain" (Observe, Orient, Decide, Act).

# Characteristics of the Components - *Factors*

- Foundation for the comparison of alternatives
- Relevant and *linked* to prioritized capabilities
- Factors common for all components (examples):
  - *Robustness*
  - *Interoperability*
  - *Speed*
  - *Strategic Deployability.*
- Additional component specific factors:
  - Decision component: *Decision Effectiveness*
    - the ability to establish a relevant operational picture
    - the knowledge, experience and culture for decision makers and staff personnel (sub factors).
  - Information Infrastructure (INI): *Connectivity and Distribution Capacity.*

# Methodology – the Design and Analysis Process



Repeat as many times as appropriate

# Assessment of Variables Relative to Factors

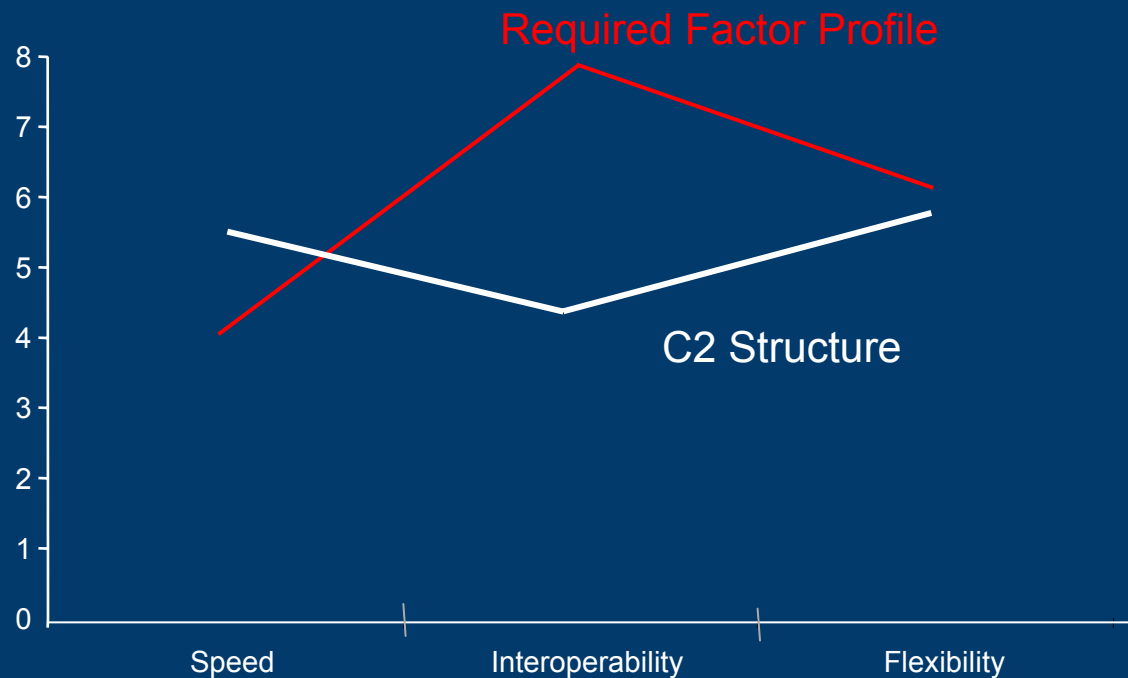
Variables	Factors			
	<i>Speed</i>	<i>Interoperability</i>	<i>Flexibility</i>	<i>More C2 factors</i>
Value of variables				
<b>Status of SOP in HQ</b>				
Incomplete	L	NA	NA	Assessments
Worked through but only partly followed	M	NA	NA	Assessments
Suitable and implemented	H	NA	NA	Assessments
<b>Degree of standardized processes</b>				
SOP based on national procedures unlike NATO standards	NA	L	NA	Assessments
SOP partly based on NATO standard	NA	M	NA	Assessments
SOP according to NATO standard	NA	H	NA	Assessments
<b>Staff organisation</b>				
Organised in a national specific way not conform with J/G/S structure	NA	L	NA	Assessments
Organised as J/G/S structure	NA	H	NA	Assessments
<b>Training standard, staff</b>				
Medium	M	NA	M	Assessments
High (conducted several excersises)	H	NA	H	Assessments
<b>Strategic manoeuvre of HQs</b>				
Can be transported by plane (e.g C 130)	NA	NA	H	Assessments
Must be transported by sea or land	NA	NA	L	Assessments
<b>Decision support SW applications</b>				
Simple applications to produce situation picture, no simulation/decision support	L	H	L	Assessments
Advanced applications both for producing situation picture and simulations/decision support	H	L	H	Assessments
<b>Communications</b>				
Mainly based on voice, not able to receive and send data formats, old technology with limited bandwidth used for connection to tactical network, no SAT COM terminal	L	H	L	Assessments
Modern technology communications, sufficient bandwidth, mainly based on data exchange, several SAT COM terminals	H	L	H	Assessments
<b>Information exchange standards</b>				
The Command facilities have information systems delivering information on formats according to NATO standard	M	H	NA	Assessments
The Command facilities have information systems delivering information on formats not according to NATO standard	L	L	NA	Assessments
<b>More variables</b>				
More values	Assessments	Assessments	Assessments	Assessments
More values	Assessments	Assessments	Assessments	Assessments



# Factor Profile for a C2 structure

<b>Variables</b> (Value of variables)	<b>Factors</b>		
	<b>Speed</b>	<b>Interoperability</b>	<b>Flexibility</b>
<b>Status of SOP in HQ</b>			
Worked through but only partly followed	5	NA	NA
<b>Degree of standardized processes</b>			
SOP according to NATO standard	NA	8	NA
<b>Staff organisation</b>			
Organised as J/G/S structure	NA	8	NA
<b>Training standard, staff</b>			
Medium	5	NA	5
<b>Strategic manoeuvre of HQs</b>			
Can be transported by plane (e.g C 130)	NA	NA	8
<b>Decision support SW applications</b>			
Advanced applications both for producing situation picture and simulations/decision support	8	2	8
<b>Communications</b>			
Modern technology communications, sufficient bandwidth, mainly based on data exchange, several SAT COM terminals	8	2	8
<b>Information exchange standards</b>			
The Command facilities have information systems delivering information on formats not according to NATO standard	2	2	NA
<b>Command structure solution # 1 - C2 factor profile</b>	<b>5,6</b>	<b>4,4</b>	<b>5,8</b>

# The C2 Factor Profile for a C2 Structure



Comparison of alternative with a required factor profile.

# Conclusions

- A candidate methodology for assessing C2 structures have been presented.
- The proposed methodology utilizes a Network Centric Component Model (NCCM).
- Emphasis on establishing a profile for the factors characterizing the structure.
  - By applying C2 components in different structural alternatives, it is possible to evaluate and compare these alternatives.
- Assessments must be based on:
  - An extensive interaction between analysts and military expertise.
  - An iterative process where refinement and derivations are made continuously.