

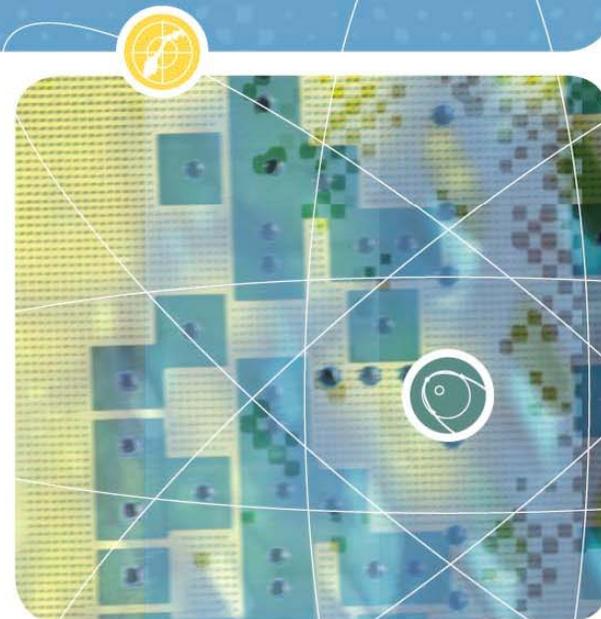
FFI Forsvarets
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An Exploratory Study of Transactive Memory System Development in a Geographically Distributed Temporary Organization

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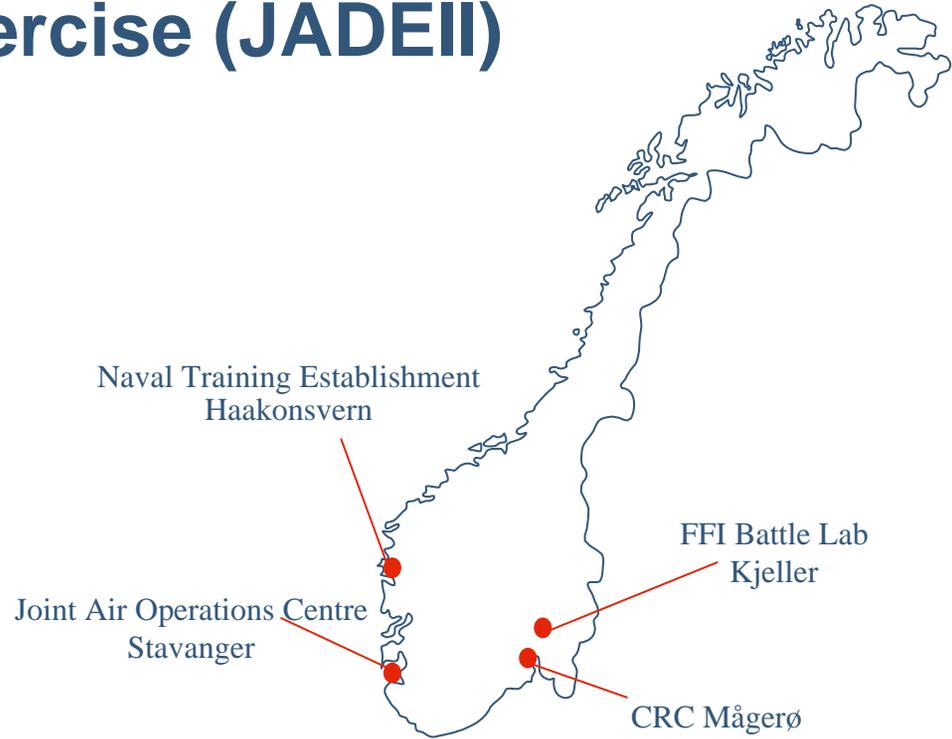
Overview of the presentation

- Background
- Setting
- Research questions and model
- Theoretical considerations
- Design
- Results
- Further research
- Implications for practice and training
- Questions

Background

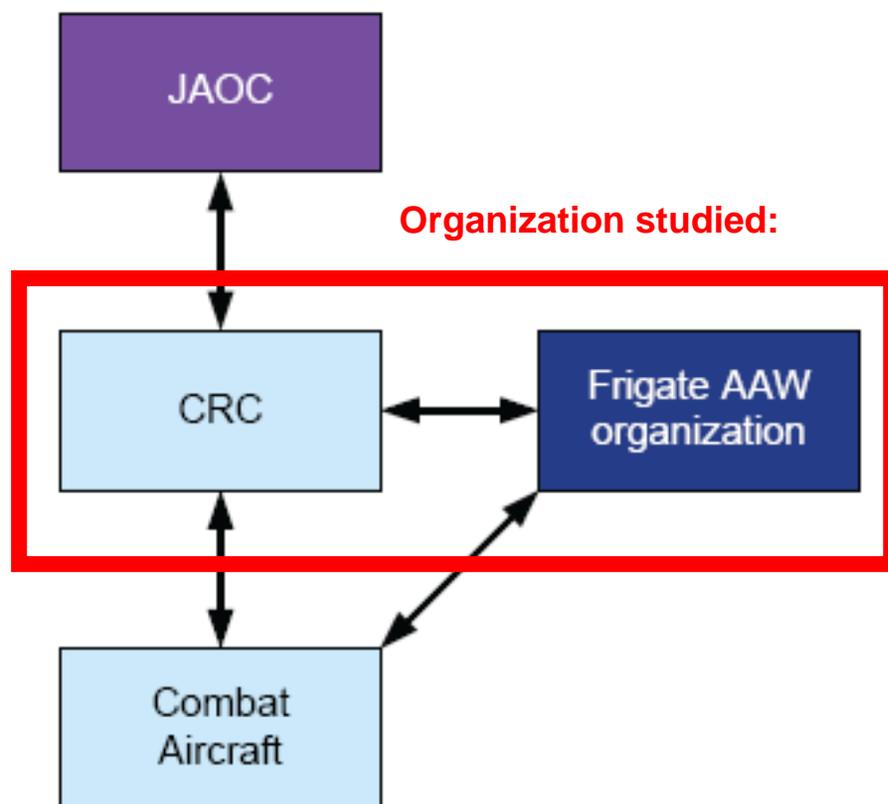
- Transactive Memory Systems (TMS) defined as:
The shared division of cognitive labor with respect to encoding, storing and retrieving knowledge from different domains
- May facilitate accurate and rapid information processing
- To our knowledge TMS is not investigated in depth in a military context
- TMS may be valuable as a concept that shed light on the development of shared knowledge in network based military organizations

Setting: Joint tactical exercise (JADEII)



Setting: CRC and Frigate AAW organization

- Joint Air Operational Command element
- **An air surveillance and combat management element (control and report centre (CRC))**
- **A maritime task group (two Frigate Anti-Air Warfare (AAW) teams)**
- Combat aircraft



Challenges for developing TMS in this setting

Distributed cooperation:

- CRC (location: Mågerø)
- Frigate AAW organization (location: Bergen)

Ad hoc organizing:

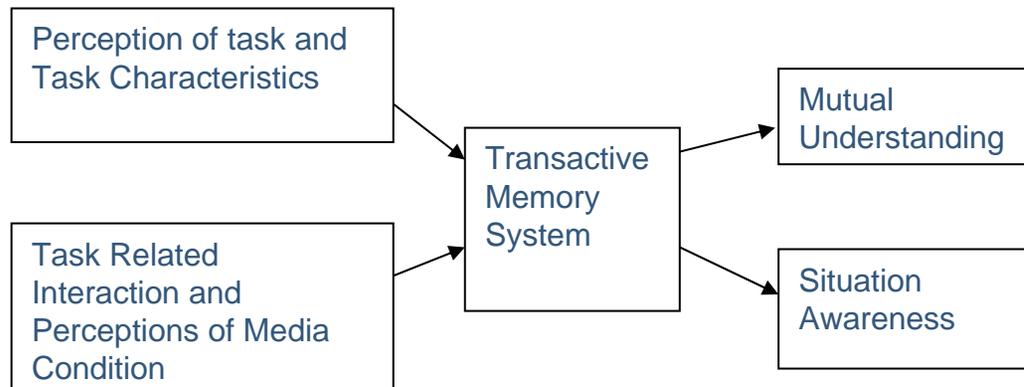
- Two teams interacting for the first time

Joint task requirements:

- Perform basic Recognized Air Picture production procedures
- Electronic Support Measures data exchange between Frigates and CRC
- Handover of Combat Aircraft Control to Frigate Fighter Control

Research questions and model

- **What are the factors that may enhance TMS in a distributed temporary military organization?**
- **What is the utility of TMS in a distributed temporary military organization?**



Theoretical considerations

Antecedents:

- Training tasks that differ in surface characteristics may enhance TMS
- Low task analyzability and high task variability may enhance TMS
- High levels of safety organizing and perceived media richness may enhance TMS

Outcomes:

- TMS may enhance mutual understanding (MU) and situation awareness (SA)

Control variables:

- Intragroup conflict
- Experience working distributed

Design

- **Combination of quantitative experiment and qualitative observation**
- **Measured development of TMS in the organization (n=8) during two days of training:**
 - Questionnaire on background variables before the training
 - Questionnaire with items relating to the variable of the research model and intragroup conflict after each day of training
- **Control group (n=4)**
- **Expert observations:**
 - Focusing on responses to incidents of interaction between CRC and AAW team

Results 1

TMS developed in all groups all days

No large influence seen from the control variables

Impact of Antecedents on TMS:

- **Training seem to sustain TMS and particularly develops trust in others knowledge**
- **High task analyzability correlates negatively with knowledge of others expertise**
- **High task analyzability correlates positively with trust in others knowledge and coordination**
- Mixed results for task variability
- Mixed results for safety organizing and media richness

Results 2

Outcomes of TMS

- **Positive influence of knowledge of others expertise on SA and MU**
- Mixed results for trust in others knowledge and coordination

Qualitative observation indicates that:

- knowledge of others expertise, trust in others knowledge and coordination developed

Incidents revealed challenges to coordination:

- Lack of coordination because of differences in vocabulary and routines
- The two units were able to acknowledge differences in vocabulary and overcome differences in routines

Further research

- More refined instruments of TMS applied to particular task environments need to be developed and tested
- The impact of communication condition on TMS development need to be investigated further in particular task environments
- More rigorous tests of the propositions in this study with adequate sample size

Implications for practice and training

- **Knowledge of others expertise may enable SA and MU**
- **Perceptions of low task analyzability can be occasions for learning and TMS development**
 - through debriefing and communication practice
- **The availability of rich communication media may be essential for building TMS rapidly**
 - This may enable feedback, sharing of knowledge and building of relationships
 - However, possible trade-offs in an operational setting between media that enable interaction and cognitive processing, which needs to be addressed in various task environments

QUESTIONS?