

Measuring Naval Adaptivity

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Project MONiTOR at a glance

RnD project 2015-2017

- To extend earlier work in Army and Airforce context to Naval operations,

Objective:

- Develop empirical methods to evaluate future naval operational Command and Control (C2) capabilities.
- Focus is on the human component and C2 adaptiveness and agility.

International cooperation

- NATO SAS-104: *C2 Agility, next steps*
- Tri-lateral cooperation TNO and DRDC in a project agreement on: Human and Organizational Adaptiveness and Agility

National cooperation

- Workshops series with the Navy to collect end user perspectives on agility.
 - Conduct methodological trials of assessment of naval C2 agility.
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- The presentation and paper outlines the results from the first explorative study.



Purpose of study

- To explore different possibilities to collect data in the naval context regarding a number of potential adaptivity factors.
 - The technical issues regarding data collection
 - Time serie/Dynamic data
 - Acceptance
 - Security issues

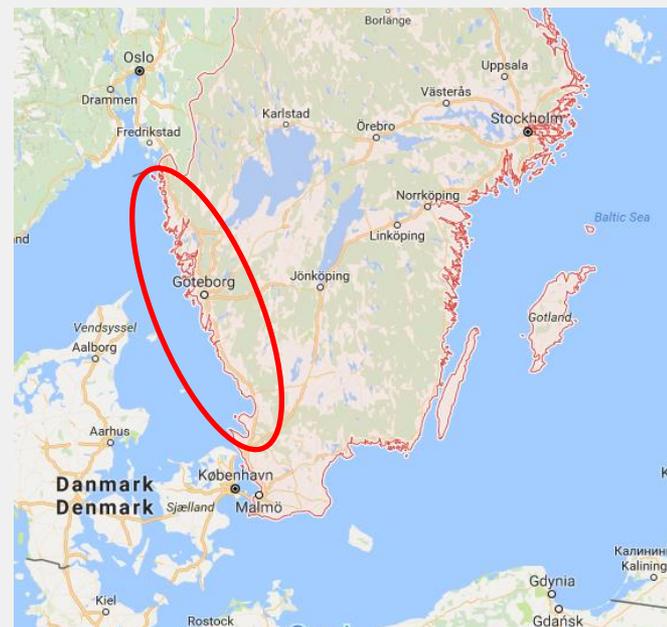


Main factors

- Naval C2
- Adaptivity/Agility
 - The capability to successfully effect, cope with ad/or exploit changes in circumstances.
 - The NATO SAS-085 (2014) definition of agility.
- Organizational adaptivity
 - Instrument under development in the MONiTOR project
 - Cyclical control process: Before-during-after a scenario/event.
 - Detect and handle abnormal events
- Individual adaptivity
 - TNO Work (Oprins and Hart, 2015)
 - Different types of situations regarding adaptivity can be distinguished
 - For the individual, each type situation requires its own form of adaptive behavior.
 - Several different dimensions of demands regarding adaptivity, such as creative problem solving and handling work stress.
 - Individual variation in capability and preference

Setting

- An explorative case study using observations, document analysis and interviews in the operational setting.
 - SWENEX 15, the largest Swedish naval exercise during 2015.
 - 12 days between October 12 to 22.
 - 40 vessels and 1300 soldiers and sailors.
 - The Swedish west and south coast.
 - Protection of shipping in order to ensure Swedish import and export.
 - Included elements of cooperation with the Swedish Maritime Administration, the Coastal Guard and civilian shipping companies.
- Focus of the study was the Task Group Command (CTG) deployed at the command ship HMS Carlskrona.
 - CTG:s subordinate task element were organized into one Task Unit for Mine Clearance Measures (MCM) operations while the other vessels and units were directly under CTG command.
 - Principal Warfare Command for Anti-surface, anti-aircraft and anti-submarine were allocated to three different corvettes.



Procedure

- Successive documentation – proof reading by C TFG, COS and ACOS N5/N3
- The first part of the study focused on data collection in general terms: Interviews with key personnel
 - Focus on dynamic and successive data collection – “on-line” time series data
- The subsequent phase of the study focused on how to measure some adaptivity factors.
 - Using “probes” - examples of questionnaires.
 - Key personnel made assessments once an hour during a watch (8 hours)
 - Followed up by interviews of the individuals subjected to the surveys regarding:
 - The factors relevance,
 - dynamics during an exercise,
 - potential solutions to measure the factors during an exercise
- The important information was their experience of the task and opinions and suggestions for a feasible data collection approach.

Example of "probe" survey

METODTEST – SUCCESIV DOKUMENTATION AV "ARBETSSITUATION"

Enbart avsedd för test av datainsamlingsmetod inför uppföljande diskussion. Insamlad data kommer ej att användas.

Instruktion: Skatta nedanstående faktorer en gång per timme under ditt arbetspass enligt tidsangivningar i kolumnrubriker.

Faktorerna syftar till att återspegla hur du upplevt din arbetssituation den senaste timmen.

Skattningen sker på en skala från 1 till 7 där 1 där ett motsvarar "i mycket låg grad" och 7 motsvarar "i mycket hög grad".

I kolumnen under "kommentar och skattning" gör du en sammanfattande skattning avseende om situationen varit positiv från ditt perspektiv. Utöver detta kan du kommentera dina skattningar.

Faktor	09	10	11	12	13	14	15	Kommentar och skattning
1. Interpersonal situation. Situations in which it is necessary to work in a new teams, in which the composition of the team has changed, and/or situations in which it is necessary to deal with unfamiliar people								
2. Crisis situation. Situations that are dangerous or very threatening and in which it is necessary to take quick decisions to resolve the crisis.								
3. Situation with demand of creative problem. Situations in which a new, unknown and complex problem has to be solved, for which existing solutions cannot be used.								
4. Uncertain or unpredictable situation. Situations that are unexpected, unpredictable or uncertain and it is necessary to act without prior experience.								
5. Learn new tasks, technologies and procedures. Situations where it is necessary to learn new tasks; e.g. using new equipment or systems, or to perform a job in a substantially different way than normal.								
6. Other cultural environments. Situations with a different culture, demand to tune into the manners, values and practices of the other culture.								
7. Physical demands. Situations that exceptional from a physical point relative the individual's physical qualities.								
8. Stress situation. Situations which put pressure on the individual, and in which it is necessary to keep emotions in check.								

Data collection methods

- Observation
- Questionnaires
- Cellular phones
- Interviews
- Documents
- Communication
- Photography and video
- Log files
- Positions
- Physiological measures



Organizational adaptivity factors

- *Ability to detect abnormal event.* Ability to predict changes in the environment.
 - Ability to monitor external events.
 - Ability to monitor internal events
 - Ability to detect differences between normal (desirable) condition and abnormal (unwanted) of external activities
 - Ability to detect differences between normal (desirable) condition and abnormal (unwanted) State of internal activities
 - Ability to inform within the system about detected abnormal events
- *Ability to deal with abnormal events*
 - Ability to deal with external events.
 - Variations in how to perform a function
 - Specialization of equipment
 - Specialization of personnel?
 - Ability to deviate from normal procedures
 - Resource preparations
 - Understanding of organization and functions.
 - Ability to learn from abnormal events.
 - Functional redundancy.
 - Location specific
- *Adaptive C2*
 - Ability to allocate decisions,
 - Ability to distribute information
 - Ability to interact.

Individual adaptivity factors

- **Interpersonal situations.** Situations in which it is necessary to work in a new teams, in which the composition of the team has changed, and/or situations in which it is necessary to deal with unfamiliar people.
- **Crisis situations.** Situations that are dangerous or very threatening, in which people are in need, and in which it is necessary to take quick decisions to resolve the crisis.
- **Situations with demand of creative problem.** Situations in which a new, unknown and complex problem has to be solved, for which existing solutions cannot be used.
- **Uncertain or unpredictable situations.** Situations that are unexpected, unpredictable or uncertain and it is necessary to act without prior experience.
- **Learn new tasks, technologies and procedures.** Situations where it is necessary to learn new tasks; e.g. using new equipment or systems, or to perform a job in a substantially different way than normal.
- **Other cultural environments.** Situations with a different culture (e.g. different country, different type of company), demand to tune into the manners, values and practices of the other culture.
- **Heavy physical conditions.** Situations that exceptional from a physical point relative the individual's physical qualities.
- **Stress situations.** Situations which put pressure on the individual, and in which it is necessary to keep emotions in check.

Results and conclusions I

- Conditions are suitable for collecting dynamic data from Navy exercises.
 - Given the right preparations, most types of data possible to retrieve.
- Participants to be able and willing to provide data on a regular basis.
 - That is a few times a day - in the beginning and in the end of each watch or when they perceive a change in conditions.
- Some important restrictions imply.
 - Security
 - Limited possibility to deploy observers
 - Not even navy officers.
 - The tradition is that the commander or the second in command takes the observer role.

Results and conclusions II

- Data on perceived adaptivity should, for most respondents, be anchored in the perception of their own task.
 - But any assumptions of organizational adaptivity being positively affected by a match between individual's preferred level and the situations adaptivity demand should be further investigated.
- Data on perceived organizational adaptivity only possible from a few key informants.
 - Analytical approach must be adjusted accordingly.
 - Alternatives to the traditional Likert scales could be considered.
- Detection-response model could perhaps be reconsidered for the navy context in order to better stress proactive measures.
- Measurement sensitive to a bias due to necessary adjustments to the exercise scenario and context.
 - One should expect high demands on some factors in the early phases with subsequent lower perceived ratings due to the inevitable initial frictions before routines are settled.
 - Data collection should not be initiated until routines has settled – that is unless this settling process is the scope of the study.

Results and conclusions III

- The importance of anchoring the rationale for the data collection is stressed.
 - Not different compared to assessment task in the other branches of the Armed Forces but routines to coordinate research efforts with the specific conditions that apply for Navy exercises can be further developed.
- Planning must start well in advance of the exercise - that is several months.
- Planning should be integrated with the overall exercise planning.
- Planning should be based on an assessment task defined or accepted by the commander of the unit.
- In dialogue and well in advance, the researchers can be responsible of developing an assessment plan, at least for the parts relevant for the research task.
- The assessment plan, when agreed and approved, is then transformed to order format and distributed through the chain of command.

Forthcoming work

- Next study during SWENEX 16.
- 24/7 data collection during exercise from several different task units.
 - Five out of six Task Units in the Task Group.
- Project embedded/integrated in exercise evaluation organisation.
- Data collection plan included in exercise evaluation FragO.
- Developed data collection instrument incorporating both individual and organizational factors.
- Still, explorative focus on the task of collecting data.



Questions?