A Microworld Study of Task Force Commanders Execution a Maritime Escort Mission

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Design

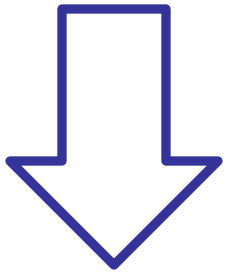
- Explorative Individual Differences Study
- Naval Warfare Microworld – Simple Surface warfare Model (SSM)
- Participants assumed role of task force commander and executed a naval escort mission
- Do differences in the decision making process covary with differences in performance?
  1. A model of the participants decision making process was created
  2. The model was used to identify individual differences
  3. Individual differences were then related to task performance

Participants

- 6 Swedish Navy Officers, acting or retired
- 1 Lt Commander, 3 Commanders, 1 Captain, 1 Flotilla Admiral
- Mean age: 52 (min 40, max 65)
- Mean years of service: 31 (min 21, max 40)

Microworld, Simple Surface warfare Model (SSM)

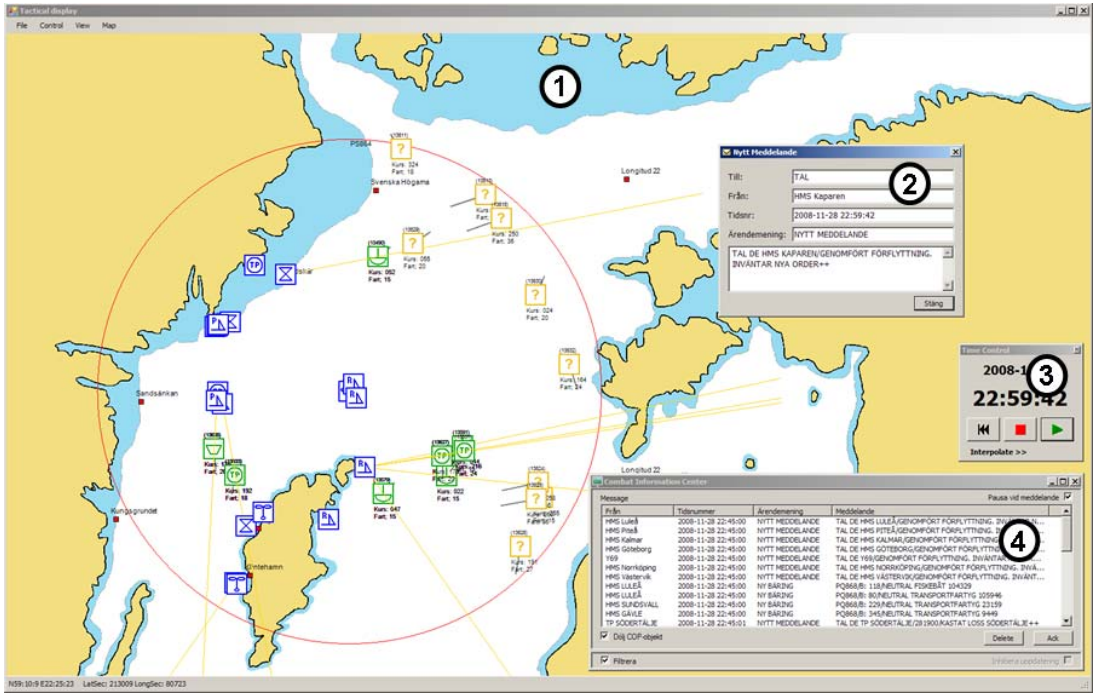
- When using microworlds the human-system is the unit of analysis
- The challenge of using mircoworlds with experienced participants



- The microworld must be kept simple, but at the same time complex enough to make the participants use their ’natural’ desicion making processes.

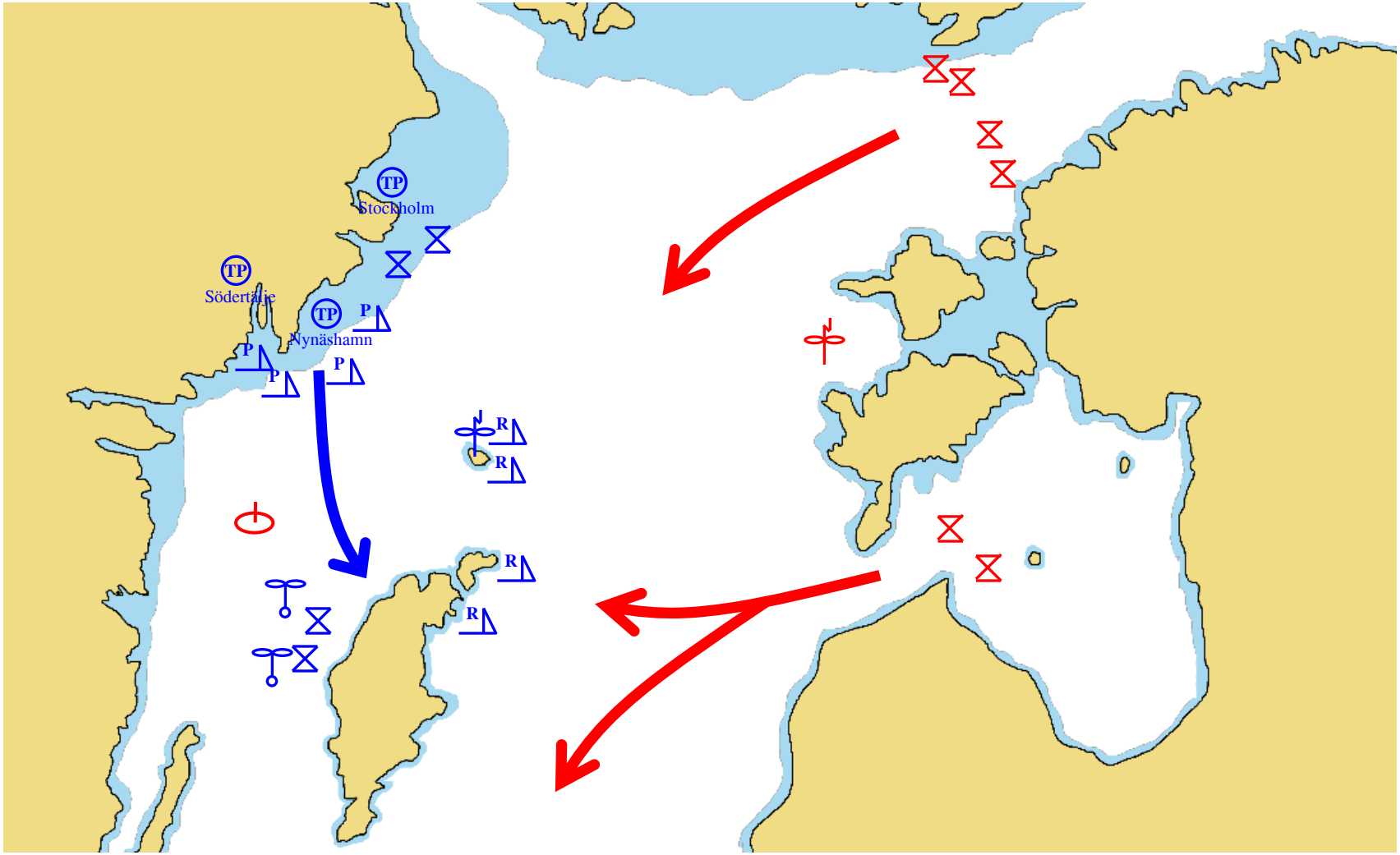
Simple Surface warfare Model (SSM)

- Continous time, interrupted by events
- Movement orders
  Firing orders
  Sensor orders
- Scripted enemy with simple action triggers
- ASW, ASuW, and AAW pictures compiled by SSM using own force's sensordata
- All models (sensor, unit, terrain) are low fidelity

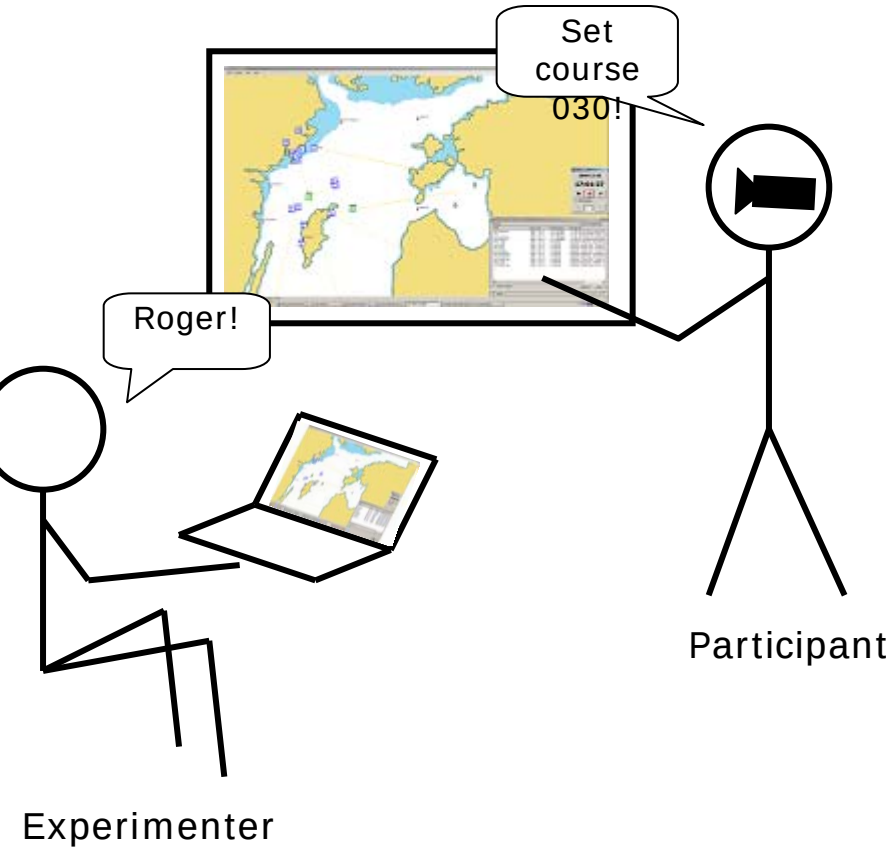


1) Tactical screen, 2) Message window, 3) Time control,
4) Message history

Scenario



rocedure



1. Presentation of SSM (30 min)
2. Training 'Think aloud' (15 min)
3. Exercise scenario (30 min)
4. Task, scenario, old combat estimate
5. Read up, modifiy plan (60 min)
6. Execute the operation (4h)
7. AAR

easurements and Data collection

Decision making process

- Think aloud protocol, screen capture, head and overview cameras
- Model of decision making process
- Quantitative measure (distribution of decision making activities)
- Qualitative measure (mean number of decision making activities covered in a reasoning chain)

Task performance

- Outcomes in the microworld
- Mission accomplished, own losses, enemy losses

Quality of scenario

- Questionnaire
- Enough info to play along, level of uncertainty

Quality of execution

- Questionnaire
- Enough time to command + quality of microworld

General command experience

Command experience in current scenario

nalysis

oice recordings transcribed verbatim

ead and overview cameras, voice recordings, screen capture
aded into a reconstruction software

ranscriptions reduced in three steps

- Simplification to statements (1212), Chronological arrangement of statements, Categorization (decision making activities)

uantitative measure of decision making process

- Number of statements in each decision making activity divided by number of statements

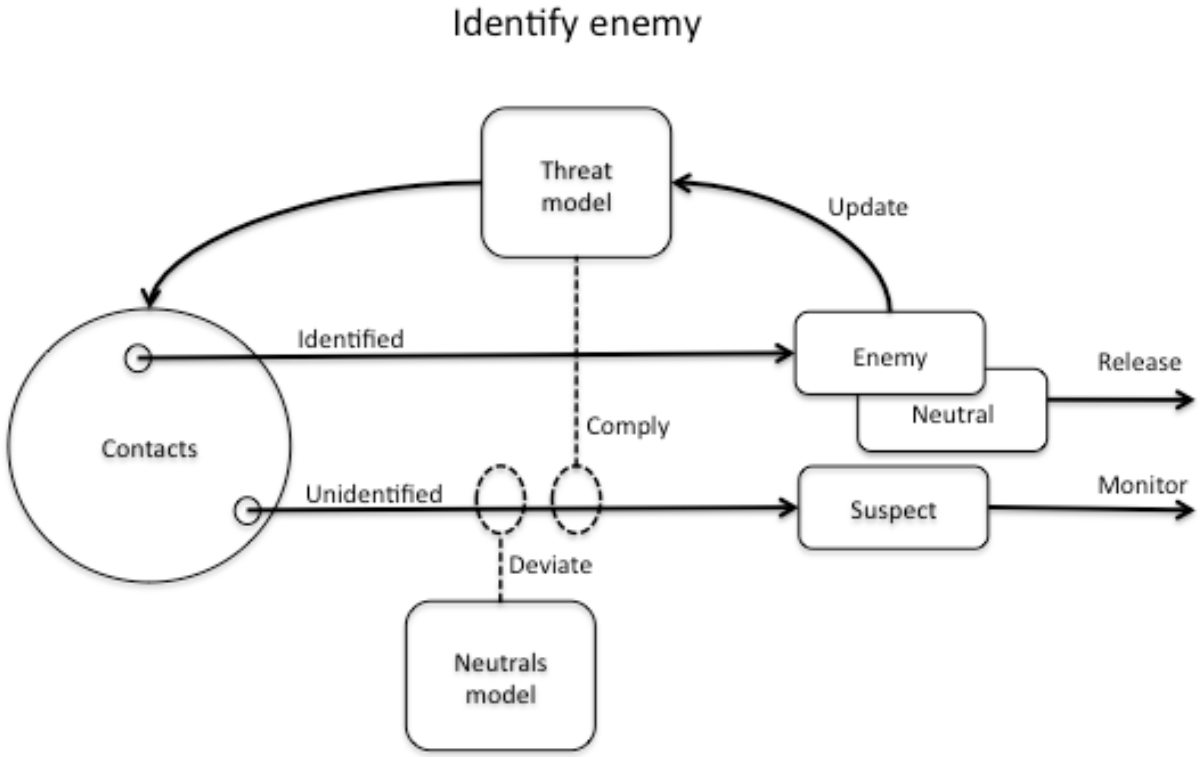
ualitative measure of decision making process

- Number of statements covered in each coherent reasoning chain divided by number of reasoning chains (single statement=chain with length 1)

nter-rater reliability

- 100 statements randomly selected to reflect distribution of 1212
- A second rater assigned each statement to one of 22 decision making activities
- Same categorization in 74 of 100 cases (74%)

esults, Decision making model



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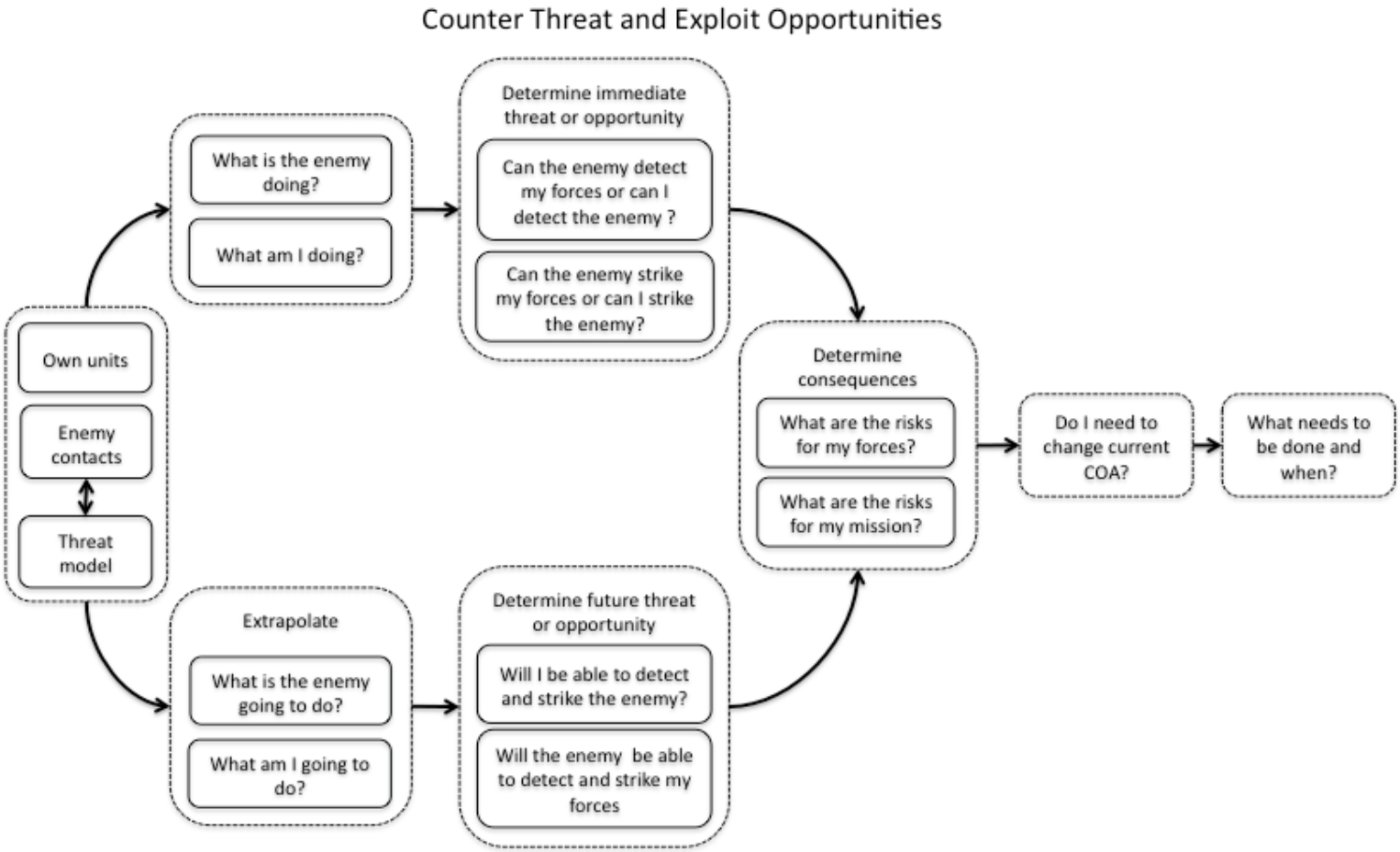

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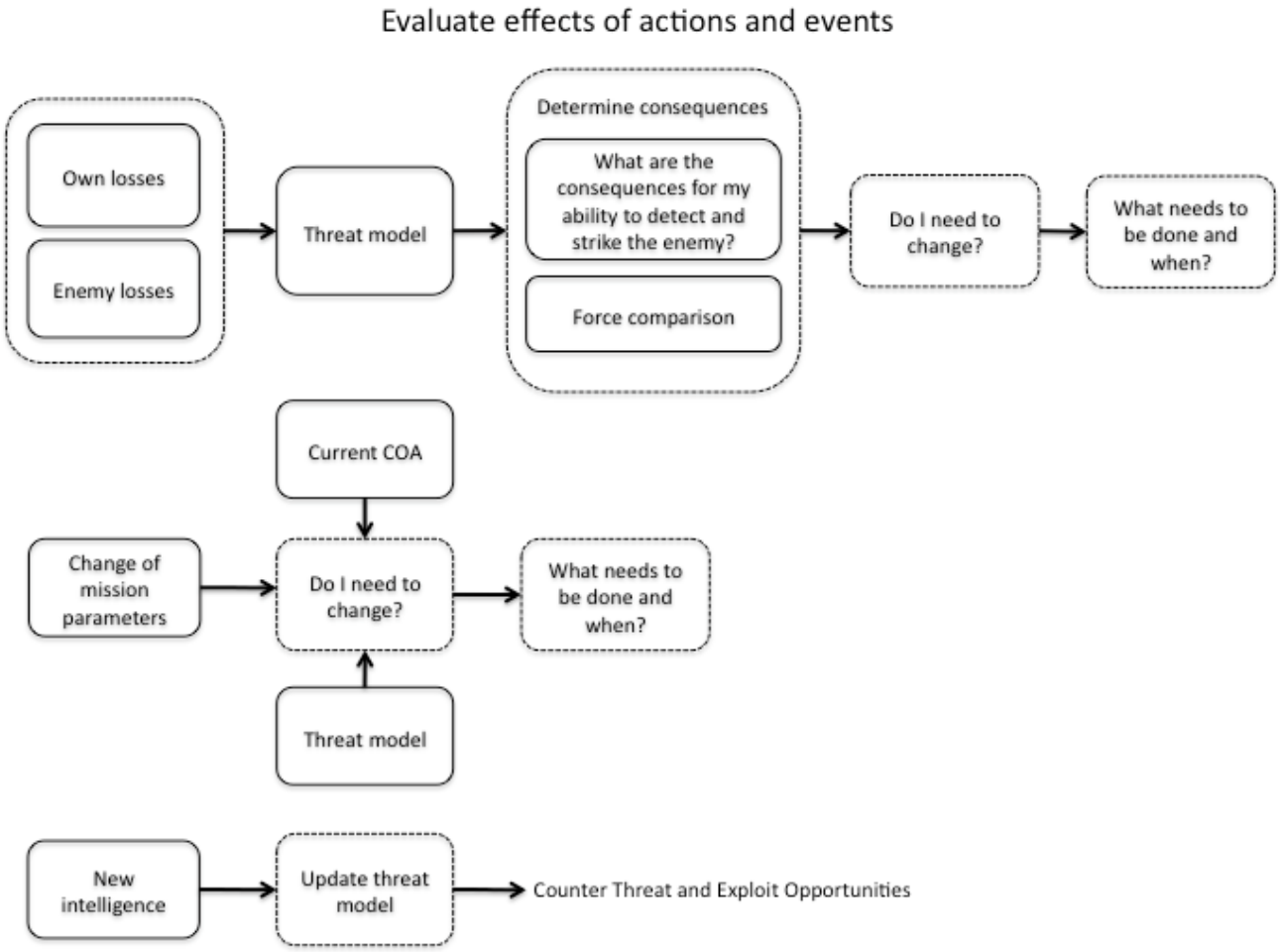

esults, Decision Making Process and ask Performance

orrelations (Pearsons *r*) between *task performance* and he *quantitative* and *qualitative measure* of decision naking process was calculated

here were no significant correlation between any ecision making activity and task performance quantitative measure)

here was a significant correlation (r=0,87, p=.025) etween the mean length of the reasoning chains and ask performance (qualitative measure)

iscussion

- xplorative, individual differences study
- articipants commanded an escort mission in a aval warfare microworld
- nvestigate relation between decision making rocess and task performance
- ew participants, moderate inter-rater reliability

he study suggests that that it is more mportant to consider many aspects of a roblem at the same time, rather than that ertain decision making activities are more mportant that others