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Information Support in Collaborative C² Work – Empirical Research Using a Role- Playing Exercise

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Agenda

Introduction
Overview
Case: ALFA-05
Discussion

Introduction



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- **Command and Control (C²)** presents a complex set of interactions between actors, the technology they use as well as the environment.

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- Two common ways of studying C² work – **Exercises and Experimental Simulations:**
 - Exercises are often highly realistic, but difficult to analyze.
 - Simulations are often overly simplistic/unrealistic, but easy to analyze.

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- Two common ways of studying C² work – **Exercises and Experimental Simulations**:
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 - Simulations are often overly simplistic/unrealistic, but easy to analyze.
- In this paper, we suggest a third approach – **Role-Playing Exercises (RPE)** – a middle-way that allows detailed study of realistic behavior at both the organisational and the technical level of C² work.



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Overview

Methods related to RPE
RPE approach

Methods related to RPE



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- **Tactical Decision Games**
 - Short & single task
 - Passive involvement (no need to interact with other actors)
- **Operational Games**
 - Explorative & interactive
 - High pace of simulation (4-6x faster than reality)
- **Functional Exercises**
 - Focus on specific functions
- **Full-scale Exercises**
 - All involved functions considered
 - High level of realism

RPE approach (i)



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- **Concept**

- High realism of simulation content (time, resources and their behavior, geography)
- Low fidelity workplace settings
- Co-localization of participants
- Involvement of domain and simulation experts

- **Scope**

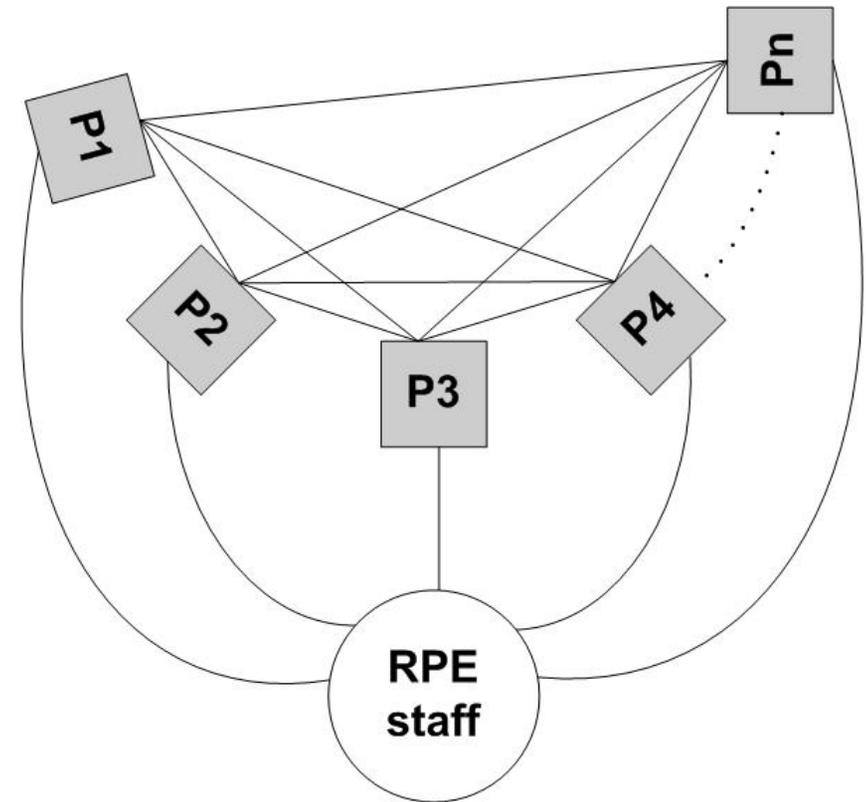
- Individuals
- Teams
- Roles

RPE approach (ii)



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- **Processes**
 - Problem recognition (Alarm, other events)
 - Coordination work
 - Decision making
- **Unit(s) of analysis**
 - Interaction
 - Communication
 - Behavior





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Case: ALFA-05 – Emergency scenario focusing on distributed C2

Research questions

RPE application

Results

Research questions



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- Information seeking at different command posts
- Data/information sharing between different command posts
- Selection of information sources by individual participants

RPE application



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- Planning
 - Scenario
 - Data collection
 - Facilities
- RPE execution
- After action review

Planning – scenario (i)



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- Border of two counties
- Forest fire & additional incidents
- Real resources
- First two hours
- Seven commanding officers (dispatch & on-site command)



Planning – scenario (ii)



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Planning - facilities



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Planning – workplace



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- Paper maps
- Text based communication
- Pen and paper
- Resource overview



Data collection



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- Observations
- After action review
- Communication logs
- Video recordings
- Notes
- (Interviews)

The screenshot displays a web interface for an SOS call-center (County A) with the following elements:

- Date:** 2005-07-02
- Time:** 10:42
- Header:** SOS call-center (County A) 112 / 911 operator
- Incoming message from:** OCO (A-1)
- Message content:** Text text text
- Buttons:** Read message, Forward message
- Write new message:** Text text text
- Send to:** A selection menu with the following options:
 - EMS (A)
 - SOS call (B)
 - EMS (B)
 - Dispatch (A-1)
 - OCO (A-1)
 - IRU (A-1)
 - OCO (B-2)
 - IRU (B-2)
 - Dispatch (A)
 - OCO (A)
 - Dispatch (B)
 - County (A+B)
 - Other
 - Information

RPE execution (i)



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RPE execution (ii)



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After action review



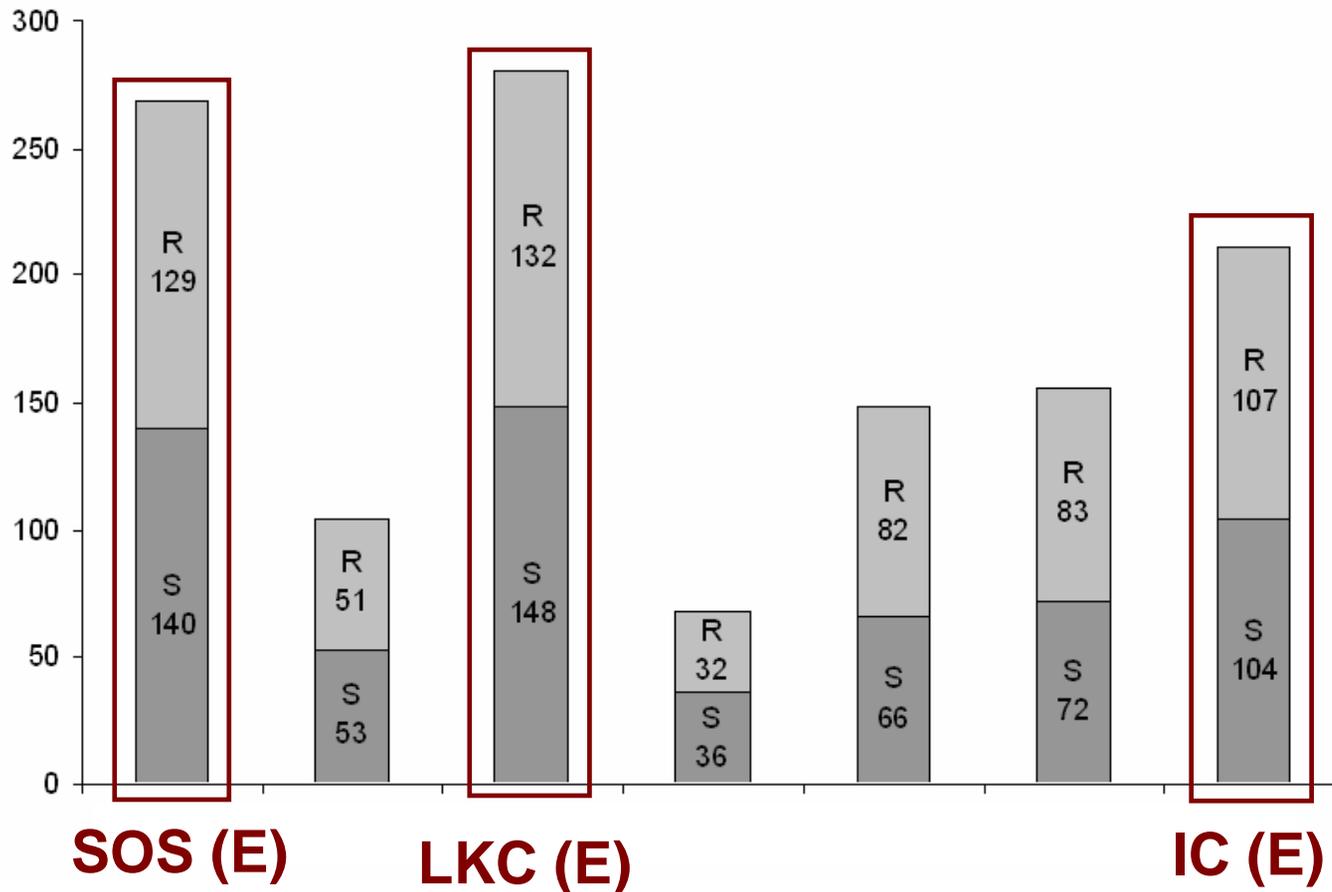
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- Goal: Feedback, reflection & evaluation
- Execution:
 - Question
 - Write down answer
 - Read out loud (selected)
 - Discussion
 - Iterate through a number of pre-defined topics

Results – communication density (volume)



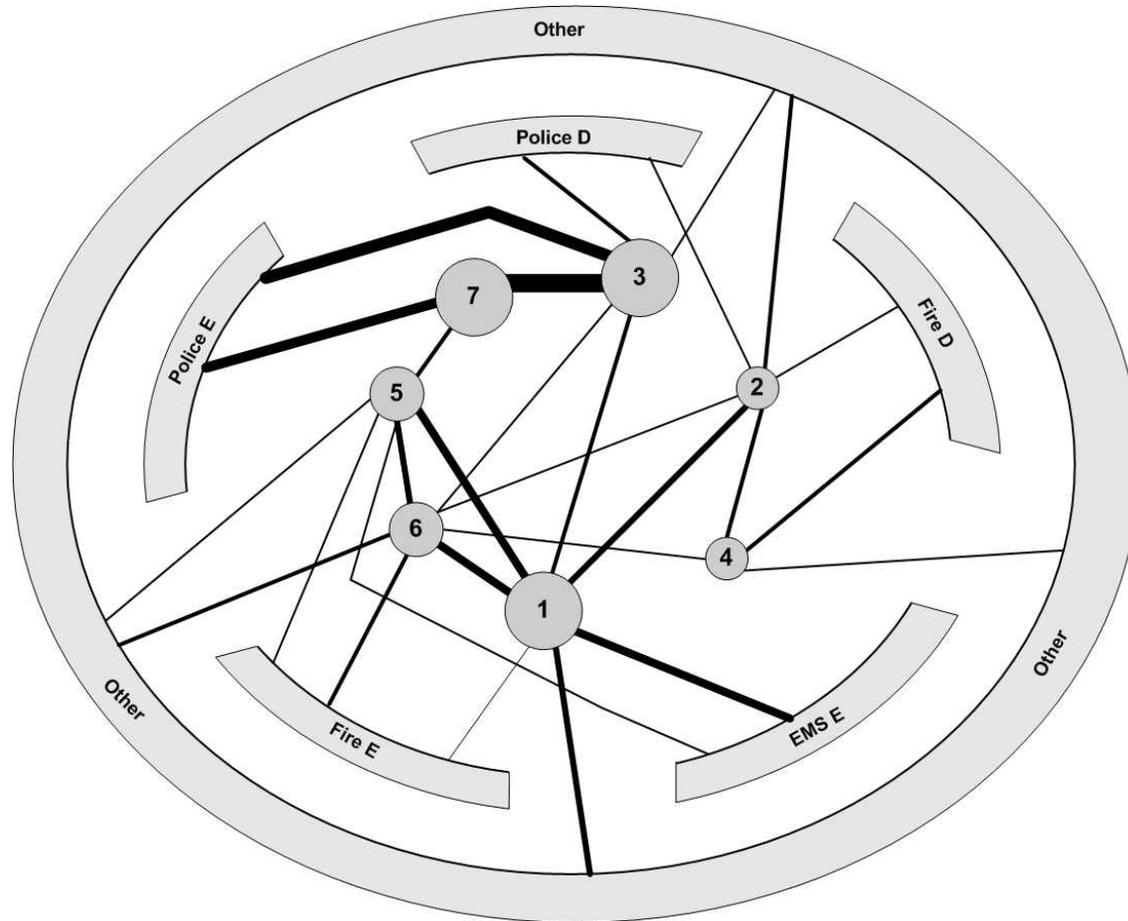
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Results – communication density (distribution)



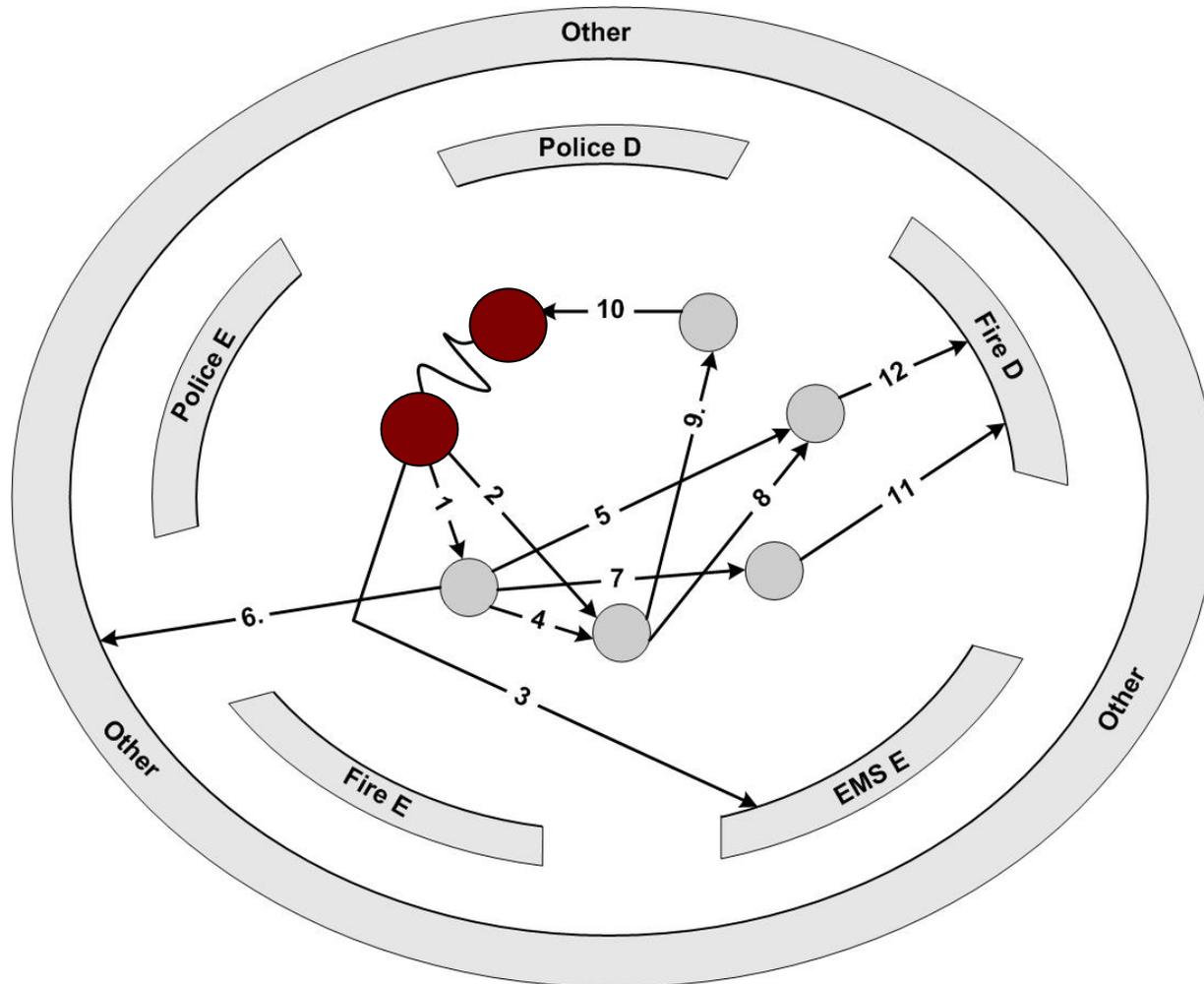
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Results – tracking communication



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Discussion

RPE – findings from case

RPE – methodological lessons

RPE findings



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- Distribution of communication density depended on resource (units) availability and their allocation
- Information seeking, what, where and how, depends on the task load as well as on local knowledge and experience
- Commanding officers communicated proactively, on push basis
- Differences between actual and planned C2 work

RPE method (i)



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Features & data:

- Data on actual command and control work and collaborative processes
- Joint decision-making
- Interaction, communication & information seeking
- Professional users

RPE method (ii)



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Positive aspects:

- High acceptance by participants
- Rich data sets
- “Relatively” cheap (compared to exercises)
- Social network

RPE method (iii)



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Challenges:

- Not only the pros of both exercise and simulation, also vulnerable for criticism from both areas
- Demands time and expertise
- Costly (relative to most forms of low-fidelity simulation)

Application areas:

- Effects of different forms of support technology
- Evaluation of command capacity
- Design of future command environments



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Thank you!

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