Extracting Episodes as a Trace of Resilient Performance of Multi-Agency Incident Management Systems

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1. INTRODUCTION

Limitations in Managing Risks from Disasters

- Civil
- Technical
- Natural

‘Prevention’ is the best policy but often societies have to ‘manage’ the disasters once they occur.

2. BACKGROUND

Multi-Agency Incident Management System (MAIMS)

An overarching term for an IMS with the following features:
- Multi-Agency: multiple agencies, jurisdictions, organizations, and disciplines.
- Incident: a general term for an event that needs to be controlled (i.e., emergency, disaster, crisis and planned event).
- Management: use of IMS including prevention, protection, mitigation, response, and recovery (P4MR).

The U.S. National Incident Management System (NIMS) (OCT 2017) is a MAIMS.

3. RESILIENCE ENGINEERING

What is Resilience?

A Definition (Hołnagel, 2011, p. xxxv) of Resilience

‘Resilience’ of Resilience (Hołnagel, 2011)

Four processes of a resilient system

- Monitoring
- Anticipating
- Responding
- Learning

Research Questions

- How is resilience manifested in an incident/emergency context?
- What are patterns of the resilient performance?
- Interactions: human-human and technology
- Technologies: relationship between technology and performance
- Challenges: barriers to resilient performance

4. METHOD – DATA COLLECTION

Data Collection Methods

- Individual Shadowing:
  - Five Observers
  - Tool used: “Dynamic Event Logging and Time Analysis (DELTA)” developed by Dr. Sasangohar
- Audio Recording: 12–20 voice recorders attached to participants
- Video Recording: 2–4 camcorders and 9–12 computer screen captures

Research Facility: TEEX Emergency Operations Training Center (EOTC)

Simulated High-Fidelity Incident Command Exercises

5. PRELIMINARY RESULTS

Major Findings

- There was a common performance pattern:
  - Recording data/simulating
  - Understanding data
  - Verbal exchange of information
  - Copying document (e.g., hard copy)
  - Sharing information with other roles

- Confusion about communication method (e.g., email or hard-carry) may cause longer episodic time.

6. DISCUSSION & FUTURE WORK

Episode Analysis

To gather more episodes and identify patterns of communication/information diffusion after injects.
To understand the use of different technologies in these patterns.
To investigate difference between low-demand and high-demand injects.

Knowledge Elicitation/Validation

To perform interviews with responders of Hurricane Harvey and Irma.
To validate observations from EOTC (simulation) against experts’ experience and knowledge.
To support the ratifiers for the proposed research with real-world inputs.

REFERENCES

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