



Fachhochschule Köln
Cologne University of Applied Sciences



International Crisis & Risk Communication Conference

Event-based decision support systems to
improve user-oriented communication of
cross-border disaster events

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Institute of Rescue Engineering and Civil Protection

- 6 professors
- 15 employees
- 3 laboratories
- ~ 500 students
- Bachelor's and Master's degree





Institute of Rescue Engineering and Civil Protection

Research:

- Risk & Crisis communication
- Risk & Crisis management
- Disaster Management





State-of-the-art

- Definition of “major disaster” in the **US**:

42 U.S. Code § 5122 (2)

“Major disaster” means any natural catastrophe [...] in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this chapter to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.



State-of-the-art

- Definition of “major disaster” in the **EU**:
- [...] definitions EU wide
- Example Germany
 - 16 federal states
 - 16 defintions





State-of-the-art

Why?

- EU = merger of 28 autonomous member states
- Independent governments
- Independent legislation
- Federal states vs central states





State-of-the-art

- Differences on
 - linguistic
 - semantic
 - cultural
 - and legal levels





State-of-the-art

- Linguistic differences
 - 24 official languages

firefighter			
German	Dutch	French	Danish
Feuerwehrmann	brandweerman	pompier	brandmand



State-of-the-art

➤ Semantic differences



➤ Same?



State-of-the-art

- Cultural differences
- Volunteers vs professionals
- Paramedics vs emergency physicians
- Central vs federal organization
- Command structures, technique, equipment, tactics, ...



State-of-the-art

➤ Legal differences

	Germany	UK	The Netherlands
Fire protection	<ul style="list-style-type: none">• 16 federal legislations	<ul style="list-style-type: none">• “Fire and Rescue Service Act”	<ul style="list-style-type: none">• “Wet Veiligheidsregio’s (2010)”
Emergency Medical Services	<ul style="list-style-type: none">• 16 federal legislations	<ul style="list-style-type: none">• “National Health Service Act”• “Fire and Rescue Service Act”	<ul style="list-style-type: none">• “Wet Veiligheidsregio’s (2010)”• “Tijdelijke wet ambulancezorg (2012)”
Police	<ul style="list-style-type: none">• 16 federal legislations• “Gesetz über die Bundespolizei”	<ul style="list-style-type: none">• “Police Act 1996”• “Criminal Justice and Police Act 2001”• “Police (Scotland) Act 1967”• “Police (Northern Ireland) Act 2000”	<ul style="list-style-type: none">• “Politiewet (2012)”
Disaster relief	<ul style="list-style-type: none">• “Gesetz über den Zivilschutz und die Katastrophenhilfe des Bundes“• 16 federal legislations	<ul style="list-style-type: none">• “Civil Contingencies Act”	<ul style="list-style-type: none">• “Wet Veiligheidsregio’s (2010)”• “Crisisbestrijdingsplan (2023)”



State-of-the-art

- Increasing number of multinational incidents in Europe
- E.g. flooding in Central Europe in 2013
- E.g. surface fires between Germany and The Netherlands in 2011
- Major disasters do not respect national borders





State-of-the-art

➤ EU Civil Protection Mechanism

➤ Established 2001



➤ All 28 member states + Iceland, Norway, and the former Yugoslav Republic of Macedonia

➤ Emergency Response Coordination Centre (ERCC)



State-of-the-art

- EU Civil Protection Mechanism
 - Common Emergency Communication and Information System (CECIS)
 - Bridging possible gaps between ERCC and National Authorities
 - Information exchange on governmental level



State-of-the-art

- Operational level
 - Wide range of technical devices
 - Day-to-day emergency response
 - Major disaster management systems
 - No standardization



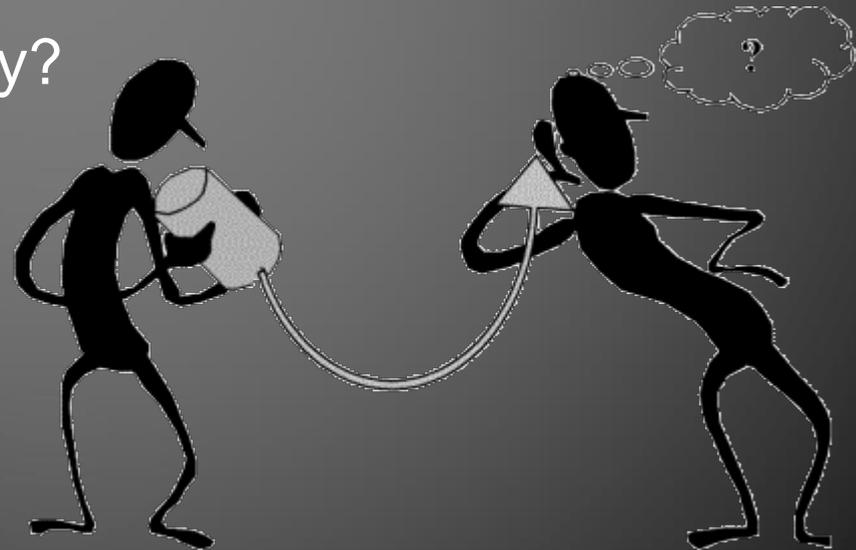


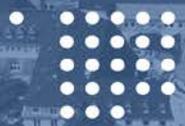
State-of-the-art

- Exchange of information?
 - Yes, via telephone, written correspondence, personally

- Technical interoperability?
 - No

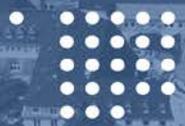
- Data exchange?
 - No





State-of-the-art

- Information sender \neq information receiver?



The DISASTER solution

How can we face these problems?



The DISASTER solution

Data **I**nteroperability **S**olutions **A**t **S**takeholders
Emergency **R**eaction





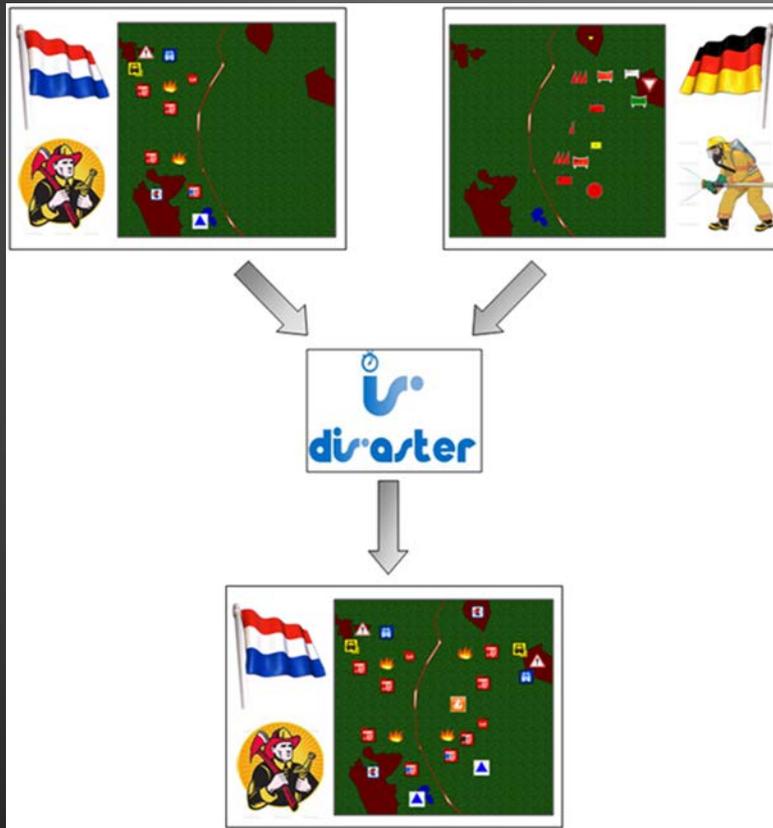
The DISASTER solution

- Face existing problems in the EU
- Creation of a common understanding in disaster situations
- Provision of methodical basis on interoperability





The DISASTER solution

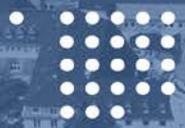


- Common operational picture
- Situation awareness
- Information equality

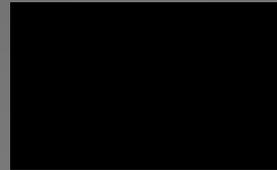


The DISASTER methodology





The DISASTER methodology





The DISASTER methodology

- Development of a gateway
 - Connection of legacy IT systems
- Creation of a common modular ontology: EMERGEL (**EMERGENCY ELEMENTS**)
 - Translation and mediation of emergency management data

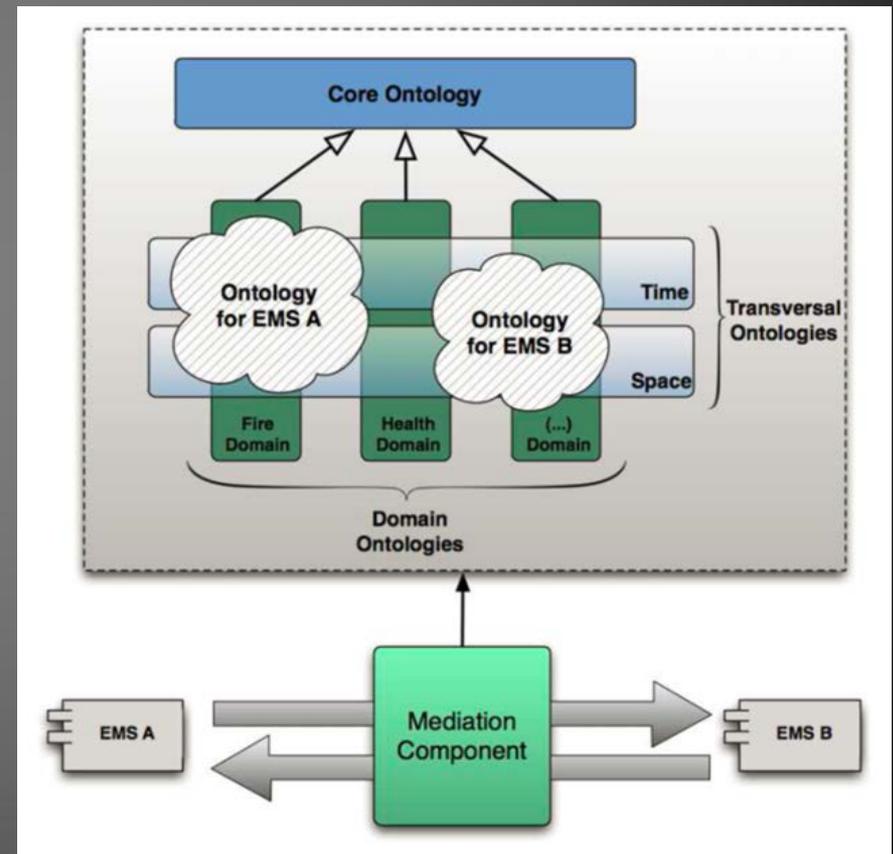


<http://purl.org/emergel/>



The DISASTER methodology

- core module: agents, events, causes
- transversal modules: space and time
- vertical modules: concepts & controlled vocabularies



emergel^{core}

emergel^{modules}



The DISASTER methodology

emergel Vertical Modules viewed with SKOSiC

Home Search Search



Companies
Corporations or business organizations.

[Browse](#)



Places
Areas with definite or indefinite boundaries.

[Browse](#)



Vehicles
Mobile machines that transport passengers or cargo.

[Browse](#)



Dangerous goods
Solids, liquids, or gases that can harm.

[Browse](#)



Emergency symbols
Emergency symbolsets used by different countries.

[Browse](#)



Third-party vocabularies
External vocabularies linked to EMERGEL.

[Browse](#)



Standardization organizations
Organization or agencies that standardize.

[Browse](#)



EMSs
Emergency Management Systems.

[Browse](#)



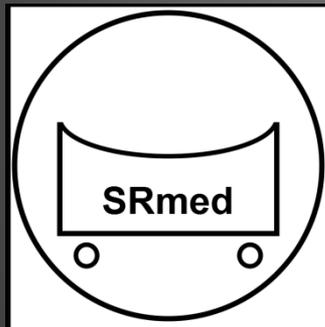
EMERGEL (full contents)
Browse the entire vertical modules of EMERGEL.

[Browse all](#)

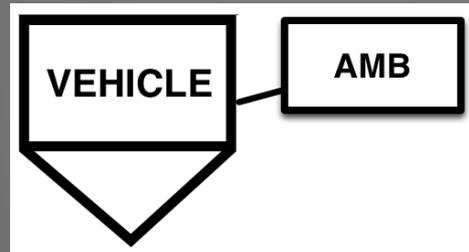


The DISASTER methodology

➤ Icon 'ambulance'



Poland



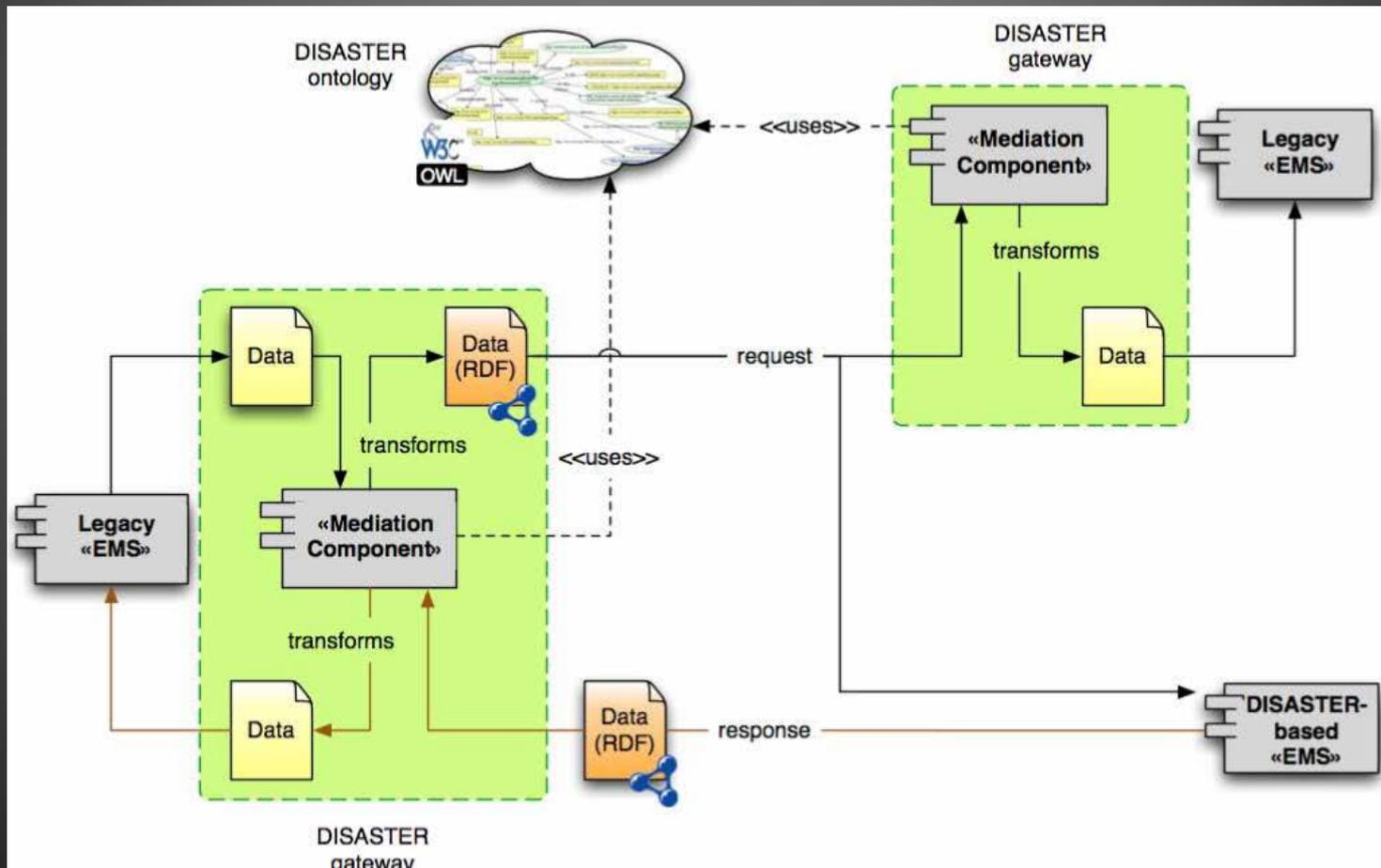
UK



Belgium

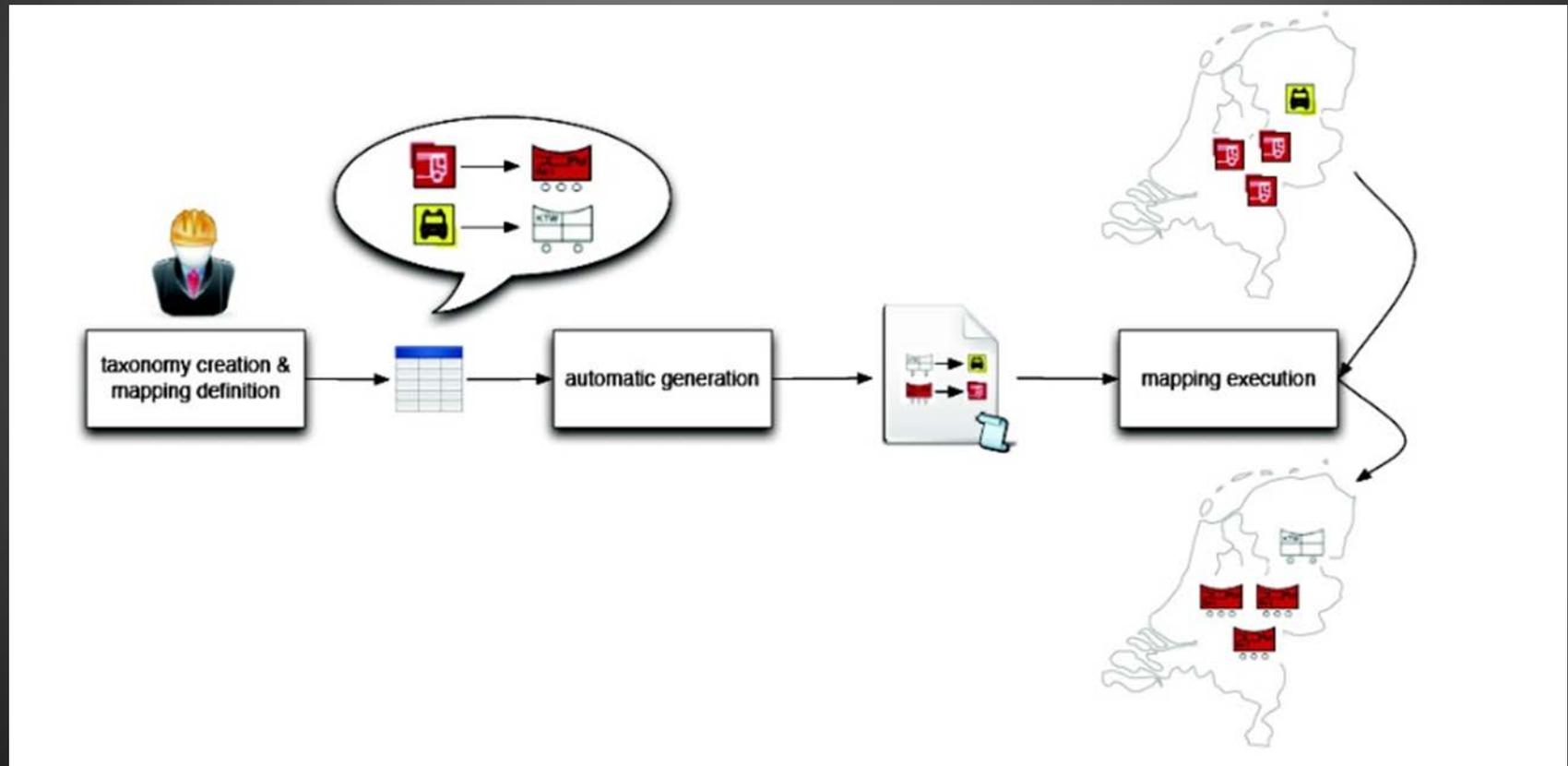


The DISASTER methodology





The DISASTER methodology





Result

- No changes in software architecture
- Familiar systems
- Economical solution





Result

- Low training effort
- High user acceptance
- Different languages and semantics, but same information content





Consortium

All research was done within the joint research project

DISASTER

treeellogic

AIMTech

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DBI

antwortING
Tailors of fine safety & security concepts.



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Thank you very much for your attention