Modelling crisis management for improved action and preparedness

CRISMA tool for exercise support & resource planning

PSC Europe Forum Conference

28th May 2015, Graz/ Austria

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 284552 "CRISMA"

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2. Pilot E – Mass Casualty Incident
3. Exercise-Support
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5. Conclusion

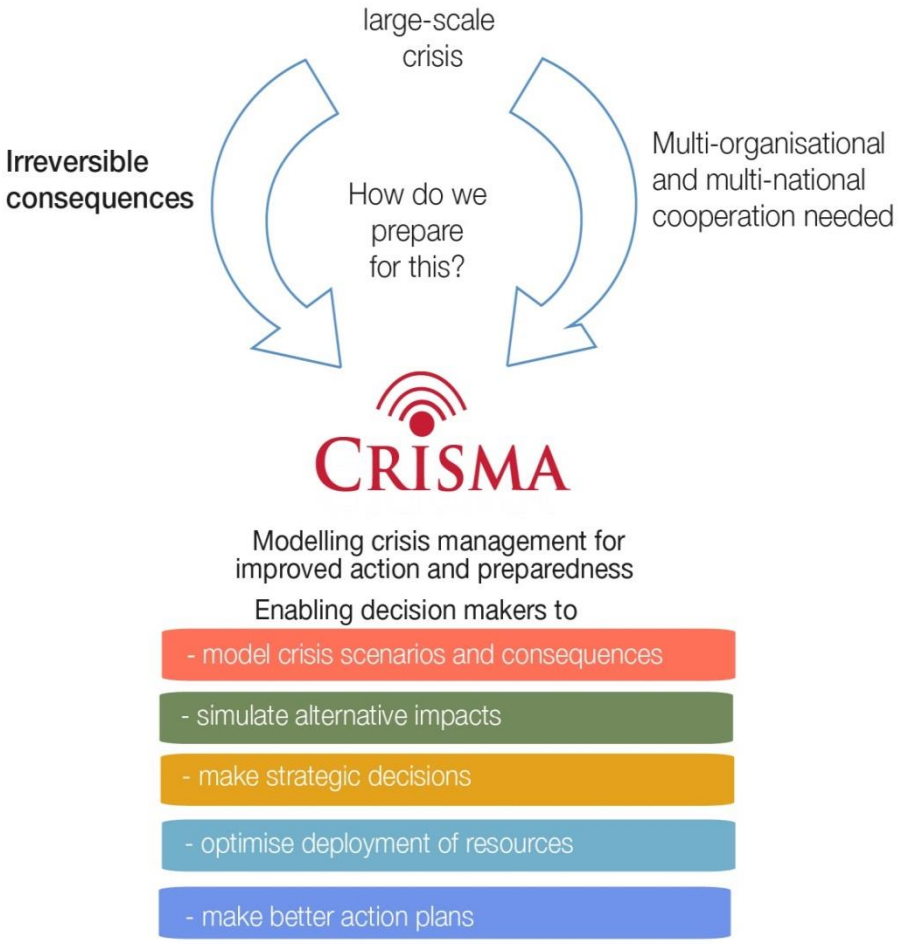
1. CRISMA Intro

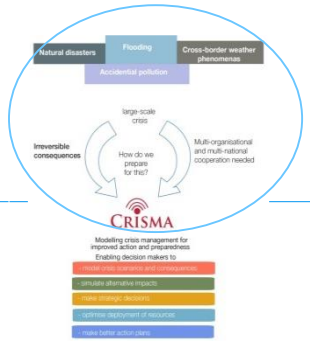
CRISMA project in a nut shell

- An EU's Integration Project funded in EU FP7 Security Programme
- Started 1st March 2012, and ends 30th August 2015
- 17 partners in 9 countries (e. g. Fraunhofer IAO, Airbus Defence & Space, Austrian Institute or Technology, Artelia, Magen David Adom, Cismet)
- Coordinated by VTT, Finland
- Web-pages: www.crismaproject.eu
- Contacts: Dr Anna-Mari Heikkilä (VTT)

1. CRISMA Intro

CRISMA Vision



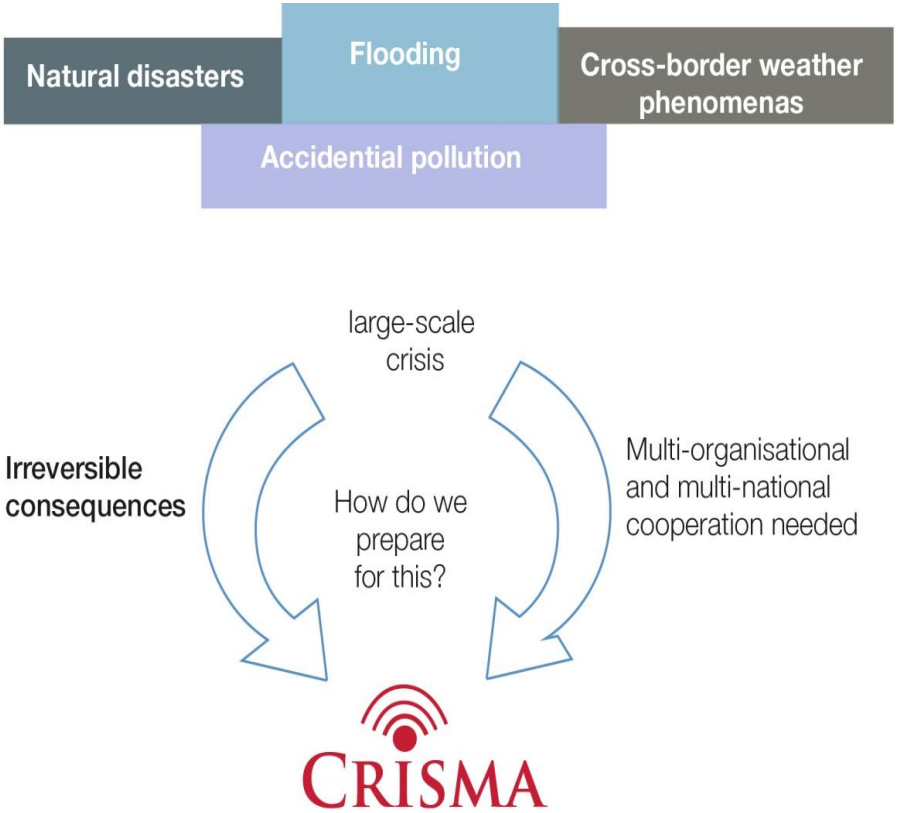


1. CRISMA Intro

CRISMA Vision 1/2

To support crisis managers and other stakeholders in planning activities related to large scale crisis.

These crisis typically surpass the capacity of the local crisis management and may have significant cascaded and side-effects.



1. CRISMA Intro

CRISMA Vision 2/2

Modelling crisis management for improved action and preparedness

Enabling decision makers to

- model crisis scenarios and consequences
- simulate alternative impacts
- make strategic decisions
- optimise deployment of resources
- make better action plans

1. CRISMA Intro

CRISMA Test cases

- Pilot A : Northern winter storm with cross-border effects (Finland)
- Pilot B : Coastal Submersion – Charente-Maritime (France)
- **Pilot C : Accidental Pollution – Ashod (Israel)**
- Pilot D : Geophysical Hazards – L'Aquila (Italy)
- **Pilot E : Mass casualty incident (Germany)**

2. Pilot E – Mass Casualty Incidents

German Red Cross (GRC): Needs

- Development of a resource management simulation tool for an improved evaluation of multi-sectoral crisis scenarios/Mass Casualty Incidents (MCI)
  - GRC Focus: Training evaluation, long-term planning
- Improved disaster preparedness via new plans of actions
- Innovative tool considering
  - Regional characteristics
  - Level of Preparedness
  - Cascading effects
  - Influencing factors (weather, number of victims, etc.)
  - Secondary consequences (daily medical supply)
  - Integration of Voluntary Services

2. Pilot E – Mass Casualty Incidents
Added-Value

- Support of first responder with focus on training and capacity planning
- Gather data from real-life exercises
- **Concept for MCI-exercises incl. assessment scheme**
- Region-specific tool for planning (incl. findings mission processes)
- Identification of "**capacity gaps**" + incorporate the lessons learned into the daily work
- develop optimal tactical schemas that lead to improved region-specific operations, trainings and capacity/resource planning
- Comparison within GRC and other aid organisations

2. Pilot E – Mass Casualty Incidents

General Objectives

Pilot E V1 Two main objectives:

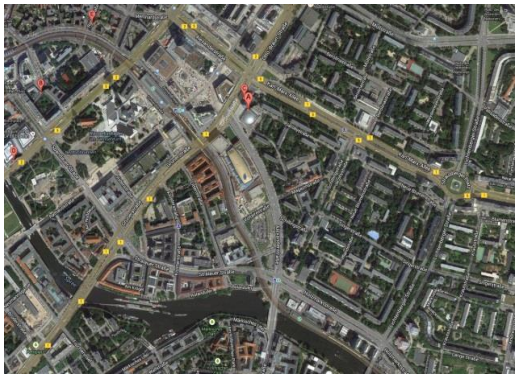
- Support an end-user exercise
- Utilize exercise-data within the CRISMA framework for simulation calibration

Traffic accident in rural area

Pilot E V2 main objectives:

- Use real data from exercises to calibrate simulation model
- Support resource planning by a validated simulation tool

Multi-hazard in Berlin



2. Pilot E – Mass Casualty Incidents Applications

Exercise Leader

Debriefing

Select region with specific capacitis/availabilites

Capture exercise runs

Choose mission strategies and run simulation

Planner (MIC/CEP/ Command Center)

MIC… medical incident commander (german: OrgL)
CEP…chief emergency physician (german: LNA)

Field Exercise

Exercise Data Steward

Identify best plan for Decider in specific region

Prepare exercises

- **Exercise-Support**
  (Development August 2013–July 2014)
- **Planning**
  (Development since August 2014)

3. Exercise-Support

3. Exercise-Support

Staus-quo

Bewertungsbogen Vorderseite
-Patientennummer
-Name
-Adresse
-Geburtsdatum
-Nationalität
-Ausweisnummer (Übung)
-Sichtungskategorie
-Verltezungsmuster
-Puls
-Atemfrequenz
-Blutdruck

Übungsausweis Patient
-Name
-Adresse
-Geburtsdatum
-Nationalität
-Ausweisnummer (Übung)

Einsatzkraftausweis
-Einsatzkraft ID

4	Name	T	Zeit Start	Zeit Vorsichtung	Einsatzkraft Vorsichter NR	Ergebniss Vorsichtung 1,	Zeit Sichtung	Einsatzkraft Arzt Nr	Ergebniss Sichtung 1,	Zeit Versorgung Begin	Versorgt durch	Bewusstsein Einsatzkraft Nr	Qualität 1, 3 o. 6
5	**Musterman**	**I**	**10:05**	**10:12**	**1**	**1**	**10:58**	**12**	**1**	**12:00**	**125**	**12**	**1**
6	Brinkmann	1	10:05	10:10	C08	3	10:20		3	10:23	J03	J03	1
7	Fischer	1	10:05	10:08	C08	2	10:23	H06	2	10:40	A04	C05	1
8	Gindhard	1	10:05	10:10	H08	2	10:20	H06	1			J04	1
9	Hausenblas	1	10:05	10:10	C/D05	1			1	10:29	C/D05	C/D05	1
10	Hartmann	1	10:05	10:10	H08	2	10:23	C06	2			C05	
11	Gerke	1	10:05	10:23		1	10:53		1	10:58			
12	Schliekau	1	10:05	10:25		1	10:30		1	10:40	J01		1
13	Stöckl	1	10:05	10:10		1	10:13		1	10:25			1
14	Türk	2	10:05	10:10		1	10:35		1	10:40			1
15	Strötz	2	10:05	10:15	C08	2	10:30	C04	2	10:35	I04	I04	1
16	Stauder	2	10:05	10:10	C08	1	10:20	C06	1	10:50	A01		1
17	Bechtenbreit	2	10:05	10:20	C08	2	10:30	C06	2	10:40	G02	G02	1
18	Ressel	3	10:05	10:15		2	10:20		2	10:40			1
19	Doppler	3	10:05	10:15		3	10:20	J02	3	10:25		J02	1
20	Feistl	3	10:05	10:18	C08	3	10:20		3	10:25	J03		
21	Warschnitz	3	10:05	10:15		3	10:20		3	10:50			1
22	Hitzelsberg	3	10:05	10:30		3			3	10:30			3
23	Schwarz	3	10:05	10:10		2	10:35		1	10:50	H05	H05	1
24	Hosp	3	10:05	10:15		3	10:25		3				

Bewertungsbogen Rückseite
-Patientennummer
-Name
-Mimennummer
-Patientenanhängekartennummer
-zeitlicher Verlauf
-Sichtung
-Vorsichtung
-Versorgungsstart
-Einsatzkraft mit Maßnahme und Bewertung
-Abtransport

Patietenanhängekarte
-Name
-Patientennummer
-Geburtsdatum
-Adresse
-Fundort
-Geschlecht
-Religion
-Nationalität
-Datum
-Uhrzeit
-Transportziel
-Verbleib
-Bemerkungen

3. Exercise-support

Concept

- Patient centered approach
- Key Performance Indicators; three pillars: triage, care measures, evacuation

- Two exercise runs

Pretriage
Traige

Triage
Category

- Information on spatial planning, alerts + requests

- Stabilization/ Position
- Consciousness
- Hemorrhage
- Supplemental oxygen
- Ventilation
- Warmth preservation
- Attendance

Versorgungsbewertungskarte

Deutsches Rotes Kreuz

Pat.-Nr. Name		PatAnhänge Kartennr.	

Zeitlicher Verlauf (Uhrzeiten eintragen)

Ausgelegt	:	Uhr

Sichtung

			Vorsichtungs-ergebnis	I	II	III
Vorsichtung	:	Uhr				
Sichtung	:	Uhr	Sichtungs-ergebnis	I	II	III

Maßnahmen:

Erste Maßnahme durchgeführt um	:	Uhr
Durchgeführt ? (zutreffendes ankreuzen)		X
• Stabilisierung der Halswirbelsäule		
• Bewusstseinskontrolle		
• Blutungskontrolle/ Blutstillung		
• zusätzliche Sauerstoffgabe		
• Beatmung		
• Wärmeerhalt		
• kontinuierliche Überwachung/ Monitoring		
Abtransport: (Status 7)	:	Uhr

3. Exercise-Support Experience from the field

Why do we need an exercise concept?

How many exercises do we need per year?

3. Exercise-Support

Exercise Rottendorf, 21. June 2014	
Scenario	• Traffic accident • rural area • two vehicle involved • 9 patients
Base of operation	Haus der RK Gemeinschaften Rotkreuzweg 1, 97228 Rottendorf
Docu-mentation	• Capturing exercise data using the CRISMA software; • Mime evaluation sheet • Go Pro camera/ camera/ pictures • Evaluators

Testing the CRISMA-application in a real exercise set up for the first time!

3. Exercise-Support

Exercise Bad Reichenhall, 12. July 2014	
Scenario	• Traffic accident, • rural area • bus + two vehicle involved • 25 patients
Base of operation	BRK-Haus Bad Reichenhall, Riedelstraße 18, 83435 Bad Reichenhall Bundeswehr, Hochstaufen Kaserne, Nonner Str. 23, 83435 Bad Reichenhall
Docu-mentation	• Capturing exercise data using the CRISMA software; • Mime evaluation sheet • Go Pro camera/ camera/ pictures • Evaluators

3. Exercise-Support

Exercise Kitzingen 25. April 2015	
Scenario	• 2 scenarios • Accident at airport hangar + CBRNE • 40 patient actors
Base of operation	connekT Technologiepark im Gewerbegebiet (former US Airfield), Kitzingen
Docu-mentation	• Capturing exercise data using the CRISMA software; • Mime evaluation sheet filled out by evaluaotrs • DLR (national aeronautics and space research centre of Germany) satelite/ camera/ pictures • Evaluators

Pilot E
Final
Demonstration

3. Exercise support
Triage: Challenges

- Working under stress during the mission
- Different Triage Systems in Europe
- Data quality ?!
  - Handwritten notes, missing data etc.
- System difficult to handle
  - When is the triage red or green, or…. ?!
- Laptops unsuitable
- No common standards for data-transfer etc.
- Not in daily use
  - Different systems for rescue missions and disasters

3. Exercise support
Triage: Possible Solution

- Unified system
- Bavarian Red Cross uses one system
  - Today: for Rescue Service
  - Future: for Disaster-Triage
- Special computer
- Standard Operating Procedere
- Quality Management
- Data-Transfer to the command centre and hospital
- Data Warehouse
  - Important for planning and evaluation

movie

4. Ressource planning

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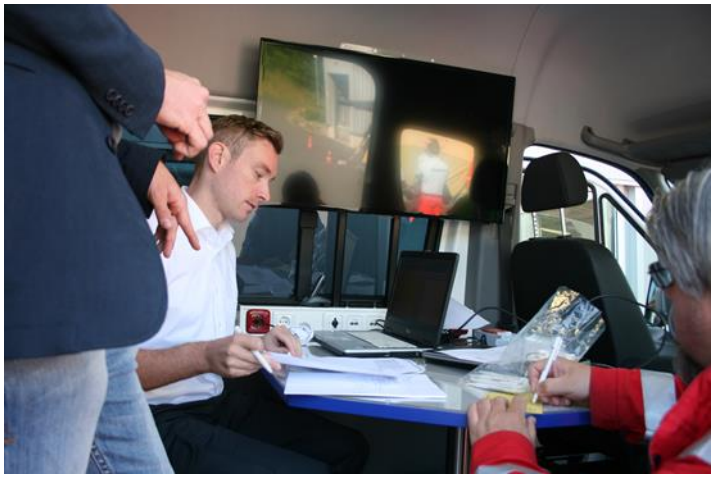
4. Ressource planning
Simulation Tool

- no common definition; connotations: 3D-models, virtual reality, gaming
- Usually conducted by experts;
- Often used in the field of civil protection

(Quelle: www.e-semble.com)



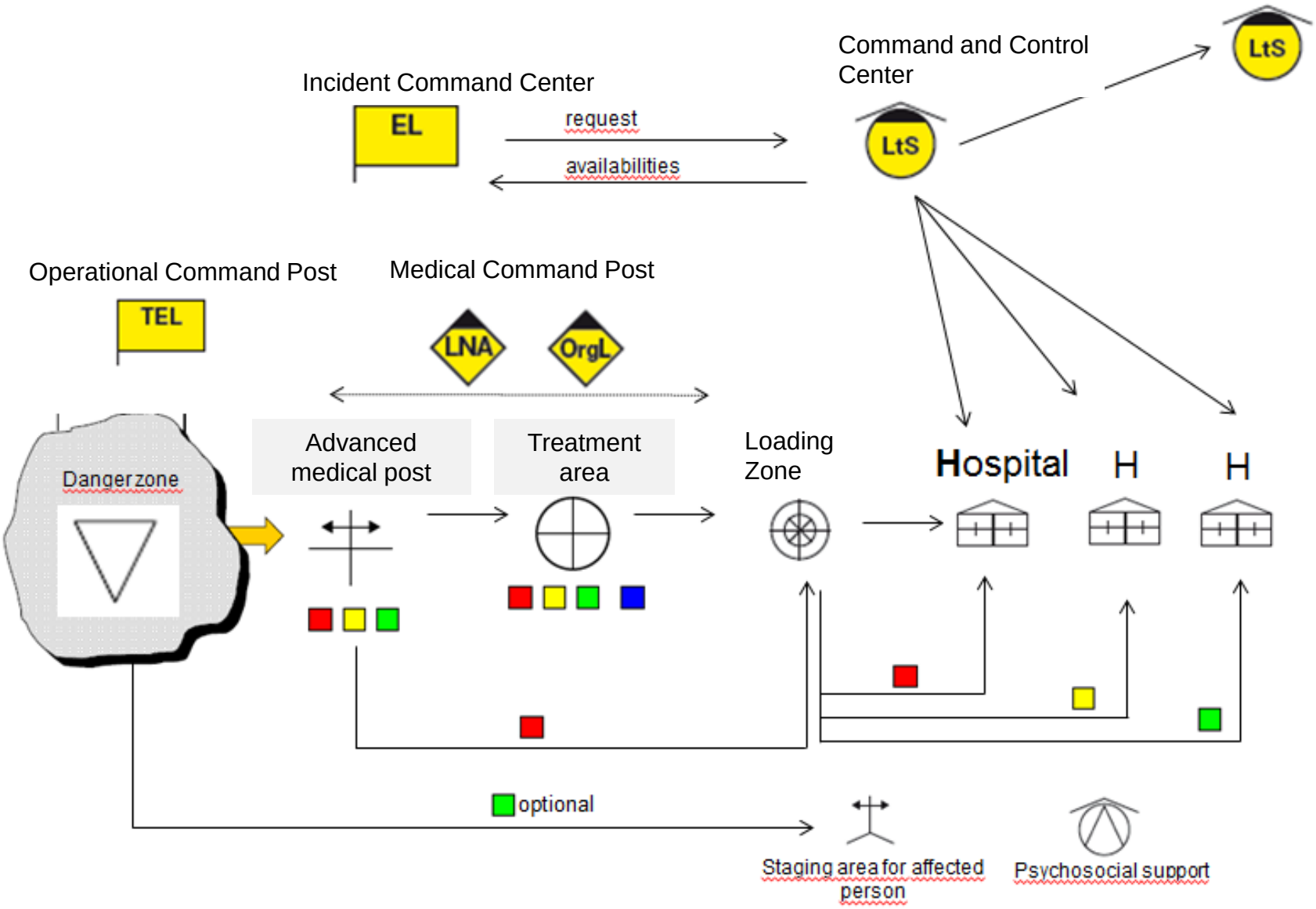
Pilot E: Enhance voluntary helper/ responders to conduct regional specific simulation

4. Ressource planning
Vision

Vision: Regional Ressource Planning for Mass Casualty Incidents

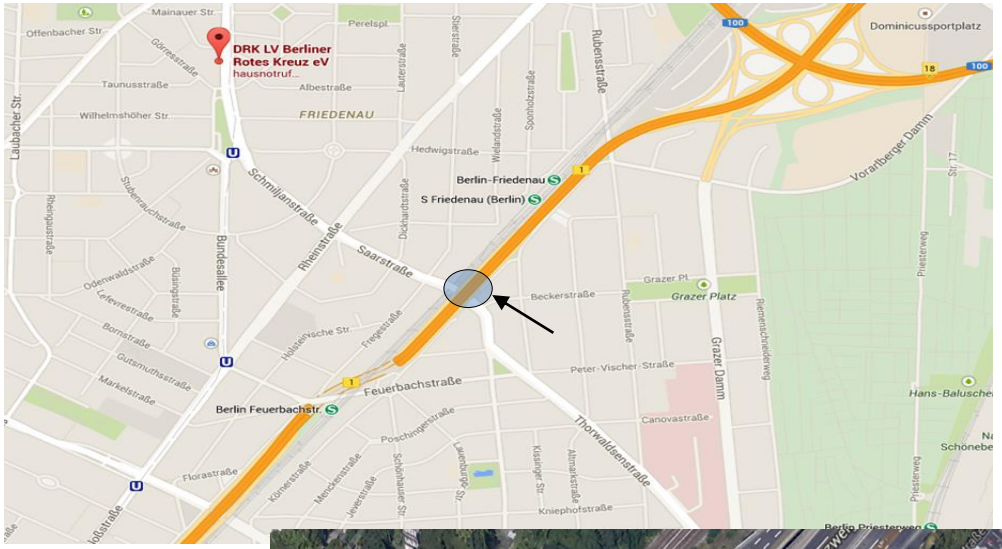
- Deployment of local-specific mission tactics and recommendations during planning
  - Steady update of ressource and capacity planning
  - Preliminary discussions on core issues like evacuation, alarm and response times
- Simulation system for support
  - Usage of real exercise data
  - Indicators for evaluation of MCI performance

4. Ressource planning Tactical requirements on site



4. Ressource planning

Sample Scenario



How does immediate alert of GRC protection unit change the outcome of the overall performance?

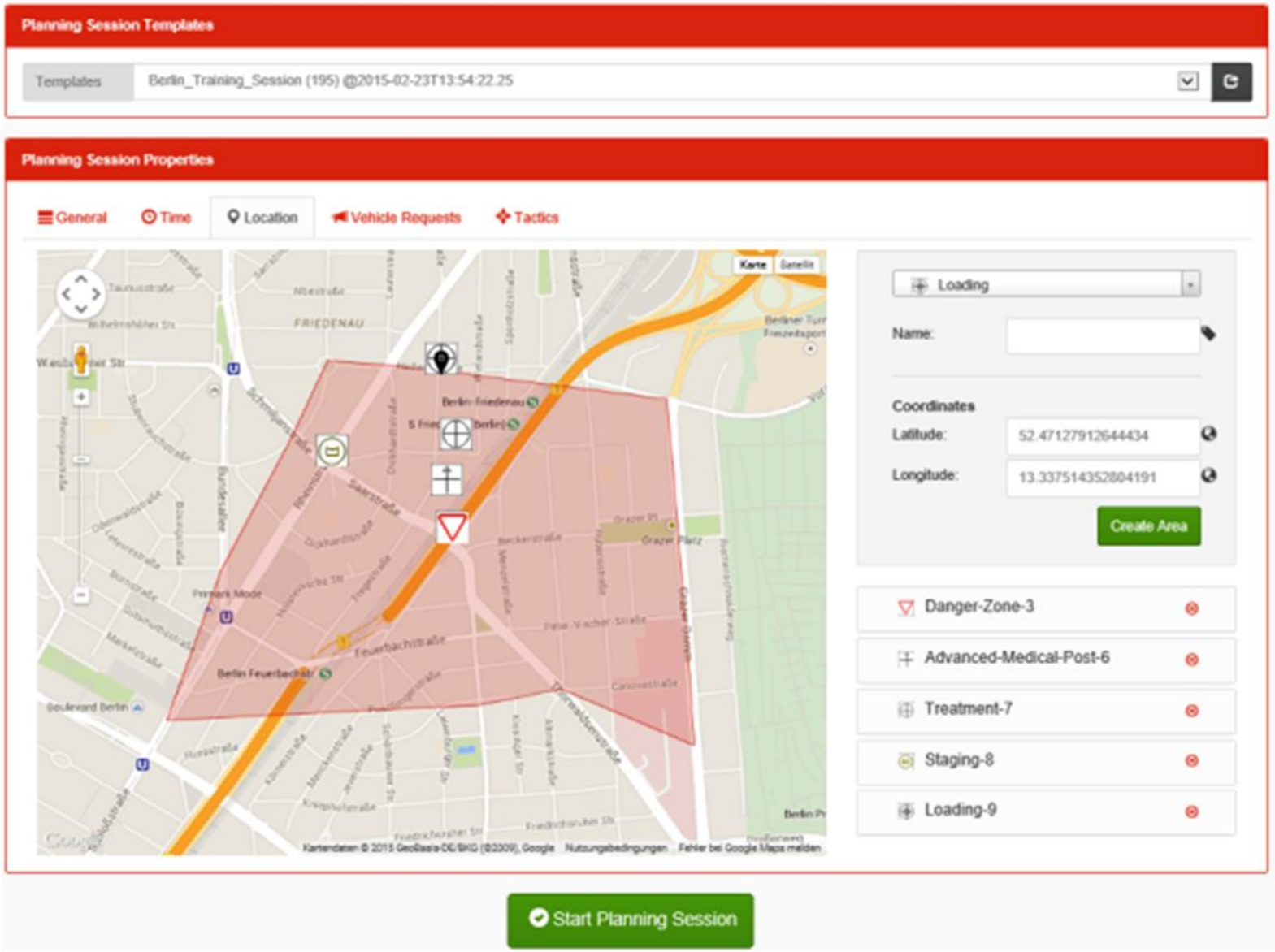
- Accident with approx. 200 injured/ involved 200
- Fire brigade calls for support

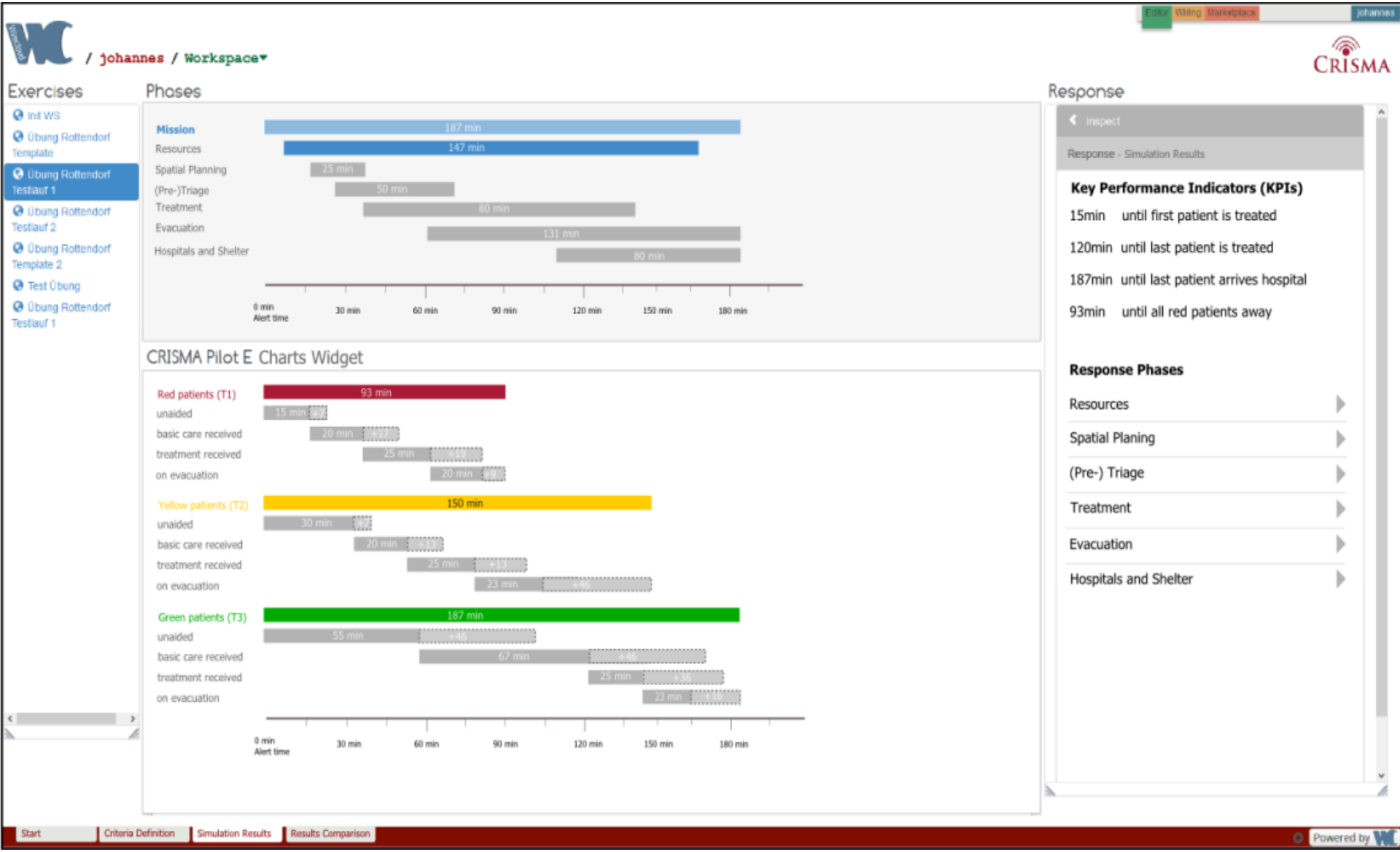
Decisions:

- Tactic Options?
- Tasks?
- Spatial Planning?

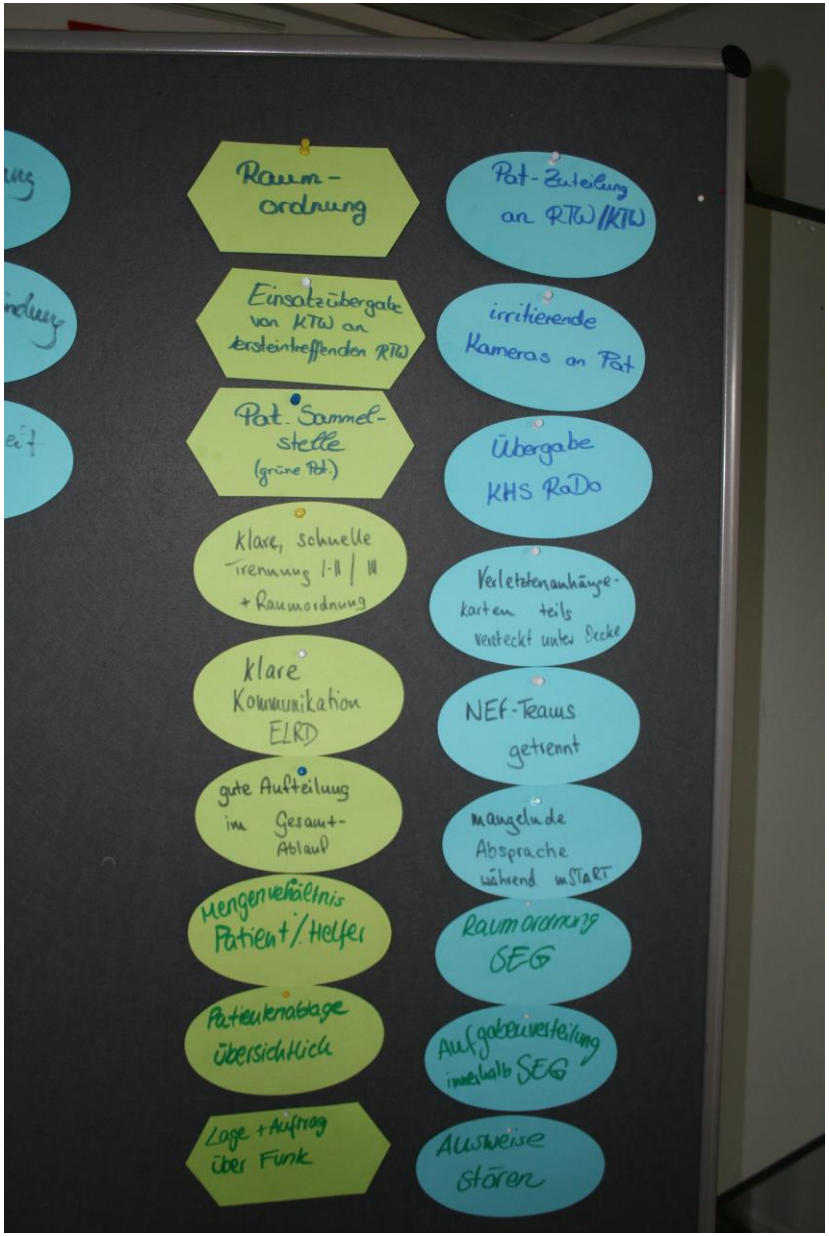
Etc.

CRISMA


Planning Session Templates
Templates
Berlin_Training_Session (195) @2015-02-23T13:54:22.25
Planning Session Properties
General
Time
Location
Vehicle Requests
Tactics
Karte
Satellit
Loading
Name:
Coordinates
Latitude:
52.47127912644434
Longitude:
13.337514352804191
Create Area
Danger-Zone-3
Advanced-Medical-Post-6
Treatment-7
Staging-8
Loading-9
Start Planning Session


/ johannes / Workspace
Editor Wiring Marketplace johannes
CRISMA
Exercises
Init WS
Übung Rottendorf Template
Übung Rottendorf Testlauf 1
Übung Rottendorf Testlauf 2
Übung Rottendorf Template 2
Test Übung
Übung Rottendorf Testlauf 1
Phases
Mission
Resources
Spatial Planning
(Pre-)Triage
Treatment
Evacuation
Hospitals and Shelter
187 min
147 min
25 min
50 min
80 min
131 min
80 min
0 min Alert time
30 min
60 min
90 min
120 min
150 min
180 min
CRISMA Pilot E Charts Widget
Red patients (T1)
unaided
basic care received
treatment received
on evacuation
93 min
15 min
20 min
25 min
20 min
Yellow patients (T2)
unaided
basic care received
treatment received
on evacuation
150 min
30 min
20 min
25 min
23 min
Green patients (T3)
unaided
basic care received
treatment received
on evacuation
187 min
55 min
67 min
25 min
23 min
Response
Inspect
Response - Simulation Results
Key Performance Indicators (KPIs)
15min until first patient is treated
120min until last patient is treated
187min until last patient arrives hospital
93min until all red patients away
Response Phases
Resources
Spatial Planing
(Pre-) Triage
Treatment
Evacuation
Hospitals and Shelter
Start
Criteria Definition
Simulation Results
Results Comparison
Powered by

Wrap-up


Raum-ordnung
Pat-Zuteilung an RTW/KTW
Einsatzübergabe von KTW an ersteintreffenden RTW
irritierende Kameras an Pat
Pat.-Sammel-stelle (grüne Pat.)
Übergabe KHS RaDo
klare, schnelle Trennung I-II / III + Raumordnung
Verletztenanhänge-karten teils versteckt unter Decke
klare Kommunikation ELRD
NEF-Teams getrennt
gute Aufteilung im Gesamt-Ablauf
mangelnde Absprache während mSTaRT
Mengenverhältnis Patient/Helfer
Raumordnung SEG
Patientenablage übersichtlich
Aufgabenverteilung innerhalb SEG
Lage + Auftrag über Funk
Ausweise stören

Thank You!

Follow CRISMA in: www.crismaproject.eu

Fraunhofer IAO
ARTELIA
amra analysis and monitoring of environmental risk
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY
PSCEurope Public Safety Communication Europe
DAI
NICE
TALLINN UNIVERSITY OF TECHNOLOGY
INSTA DefSec
Pelastusopisto Emergency Services College
MAGEN DAVID ADOM IN ISRAEL
German Red Cross
FINNISH METEOROLOGICAL INSTITUTE
cismet
SPACEBEL
AIRBUS DEFENCE & SPACE
VTT

Back-Up

2. Pilot E – Mass Casualty Incidents

General Objectives

Idea: simulate the same rescue operation with different starting conditions

- Resources
  - Variation of absolute numbers of resources
  - Variation of the mix of resources
- Geography
  - Position of patient depot and/or vehicle queing areas

Objective: to study the impact on the mission performance

3. Exercise-Support

Support for Mass Casualty Incidents (MCI) Exercises

Exercise Data Steward

Responder - Management

++

Prepare exercises

+

Mime management

++

Setting exercise scenario

Mime + Responder registration

Capture exercise runs

++

Arrival of ressources on site

++

tactical areas

++

care measures

++

Alarm + ressources request

Compare exercise runs

Exercise Leader

Debriefing

++

Pre-Triage & Traige

++

Hazard analysis + spatial planning

++

Care Measures

++

Evacuation

++

Alarm + ressources

Index

- Tasks before an exercise
  during an exercise
  after an exercise run
- Tasks captured by CRISMA

Pilot V1 application ++

3. Exercise-Support

Common user story V1

Exercise Leader

Define exercise scenario:
Including no of patients + incident scene + available resources (dispatch plan)

Exercise Data Steward

Enter known data into CRISMA tool,
Mime-/ responder management, mime registration

STEP 1

Mime + Responder

Separate **Briefing** for mime & responder;
For mime: explanation of "evaluation sheet"

Exercise Leader

STEP 2

***Before* the exercise**
Step 1 +2

***During* the exercise**
Step 3

STEP 3

Mime + Responder

Exercise takes place + capturing data

Capture exercise data on
→ Alarms + resources request
→ (Pre-) Triage
→ Care measures
→ Arrival of resources on site
→ Tactical areas

***After* the exercise**
Step 4 + 5

Exercise Data Steward

Data steward enters captured data in the tool

STEP 4

Debriefing view includes information on
→ Alarms + resources request
→ (Pre-) Triage
→ Care measures
→ Arrival of resources on site
→ Tactical areas

STEP 5

Debriefing
Seperately for mime and responders; using the CRISMA-tool;
Information on pre-defined KPI

RETURN TO STEP 2

Assess exercise run 1 and start exercise run 2

Pilot E – Common user story V2

Choose training session containing Initial world state that contained Incident at specific location.

Initial data (pre simulation):
- Categorized Patients
- Available Ambulance stations
- Available hospitals + hospital capacity
- Incident location

Commands
- Dispatch
- Rescue
- Build Area
- Treat (incl. Pre-Triage + Triage)
- Evacuate
- Refill

Prioritization
- Dispatch
- Rescue
- Build Area
- Treat (incl. Pre-Triage + Triage)
- Evacuate
- Refill

Decision makers

STEP 1

STEP 2

Decision makers

STEP 3

Simulation start

Decision makers

Auto Run

Simulation results:
Evaluate situation
→ Model results/ KPI analysis

Switch from simulation set up view into simulation result view

RETURN TO STEP 2

DECISION POINT

STEP 4

Decision makers

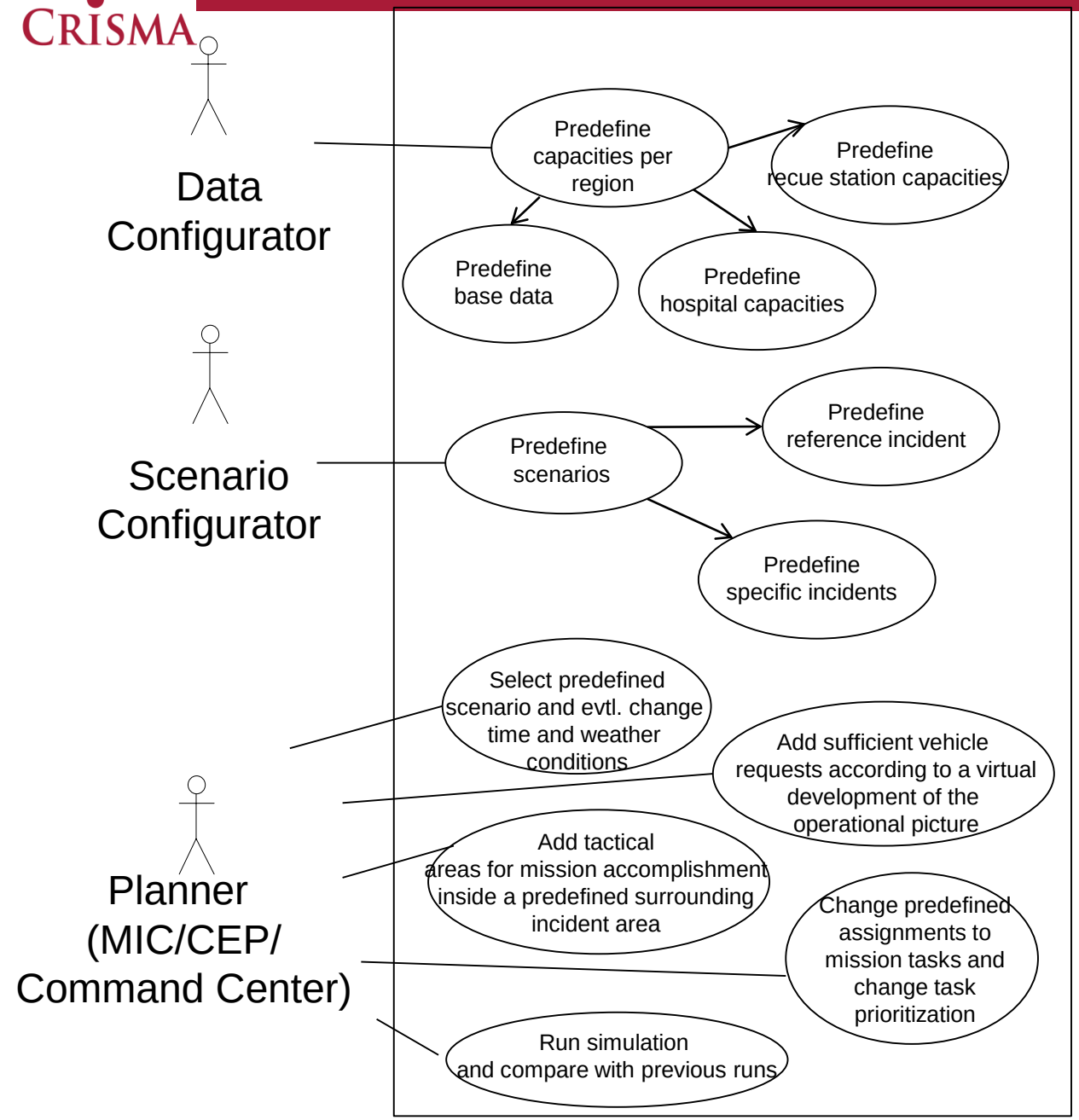
Second Run: Assess the situation and decide if additional resources needed

Model Results:
- Evacuation
- (Pre-)Triage
- Resources
- Spatial Planning
- Care Measures

Simulation completed

4. Ressource planning

Roles



- **Data configurator (evtl. command centre)**

  Add rescue station, vehicle locations, hospitals

- **Scenario configurator**

  Definition of MCI scenario,injury types, injury patterns etc.

- **Planner (crisis manager, LNA, NA, OrgL)**

  Tactical areas, tactical decisions, spatial planning, resuce device etc.