GEFÖRDERT VOM
Bundesministerium
für Bildung
und Forschung



Universität Potsdam

An Interdisciplinary Research Project to Optimize Natural Disaster Management Using Augmented Reality

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http://www.uni-potsdam.de/okat-sim/

Project goals

- *Use **GIS-based modeling** of natural disasters + **Augmented Reality** (AR) to train and support local administrative authorities in **disaster preparation, response, and management***
- *Increase geohazard awareness*
- *Improve response to natural disasters*



Main project components

- *Define training objectives*
- *Natural disaster modeling - floods and landslides in Germany*
- *Development of AR simulation environment/interface*
- *Parallel development of associated e-learning module*
- *Stress measurement & cognitive assessment*

Academic Partners

Universität Potsdam

Universität Potsdam Kognitionswissenschaften

FILMUNIVERSITÄT BABELSBERG KONRAD WOLF

UNIVERSITÄT ZU LÜBECK
Institut für Multimediale und Interaktive System

up TRANSFER GmbH

Non-academic/Regional Partners

MEIN ZUHAUSE LANDKREIS GÖRLITZ
WOKRJES ZHORJELC

HKC Hochwasser Kompetenz Centrum e.V.

Stadt Leverkusen

SFSG Staatliche Feuerwehrschule Geretsried

TBL

Industry Partners

DELPHI IMM

KSK

nxtBase technologies

Advisory Board

LfU Landesamt für Umwelt

CLIMATE MEDIA FACTORY

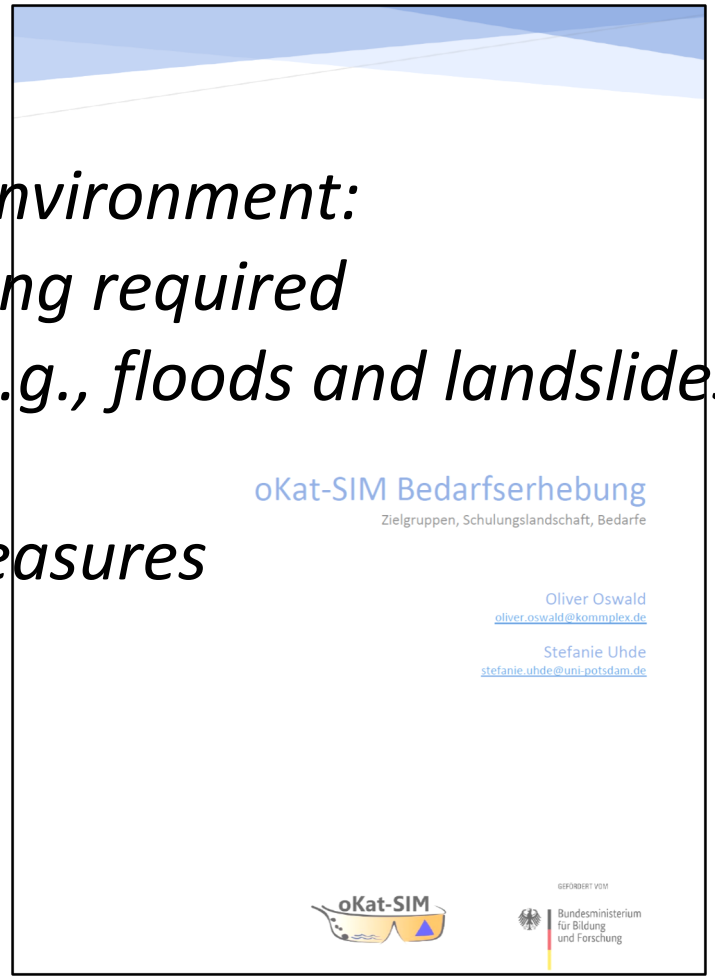
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Define training objectives

- *Interviews with non-academic/regional partners*

- *Define specific needs, target groups, and training environment:*
  - *Crisis management team hazard response training required*
  - *Better understanding of local natural hazards (e.g., floods and landslides)*
  - *Define natural hazard "hot spots"*
  - *Identify appropriate prevention and reaction measures*

➢ *Development of oKat-SIM training concept*



Natural Disaster Modeling

1) *Garmisch-Partenkirchen - landslides*
2) *Görlitz (lowlands) - flooding*
3) *Leverkusen (urbanized) - flooding*



Garmisch-Partenkirchen





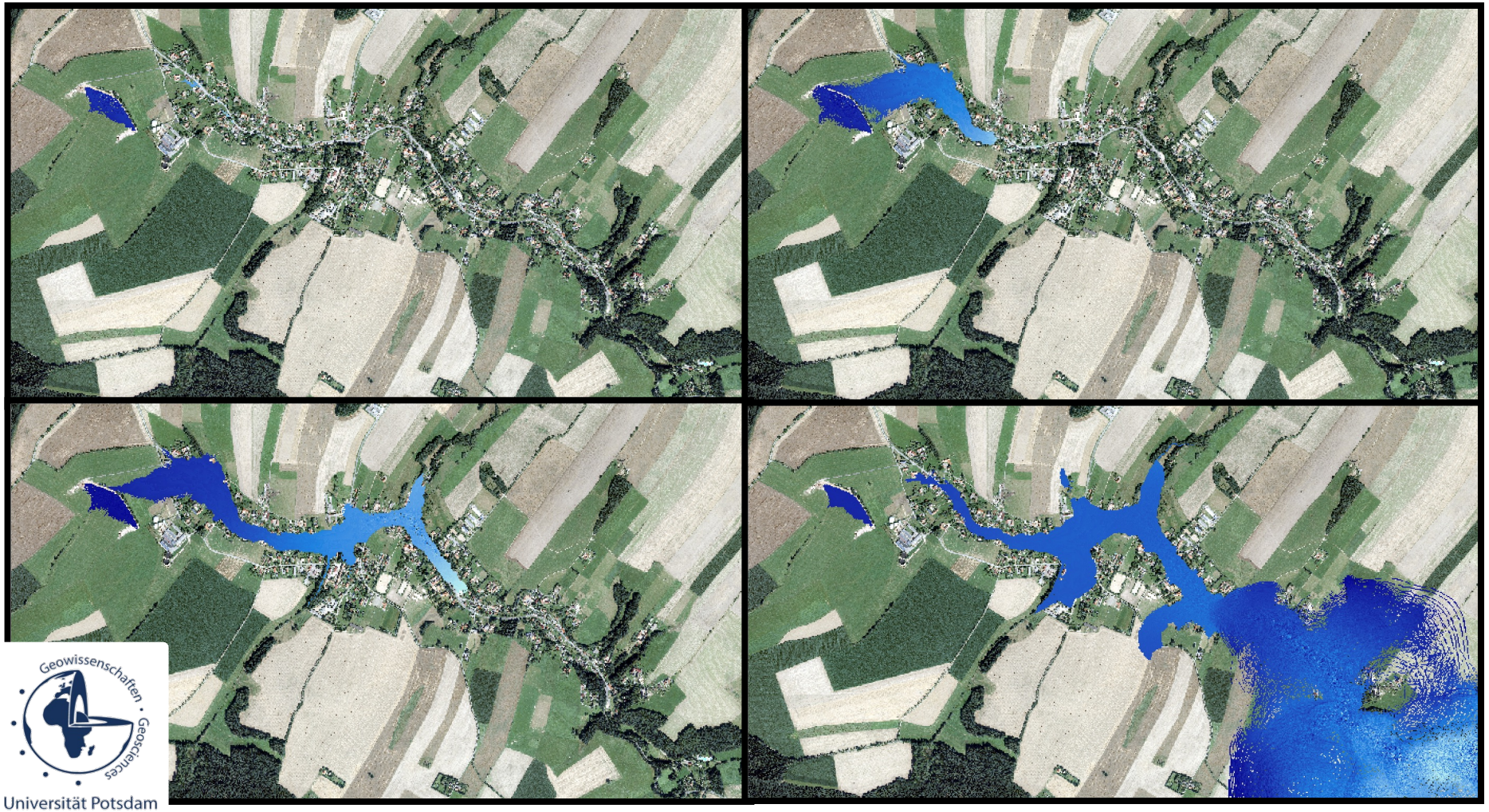
Rhein River Flooding, 1995
Leverkusen *(TBL)*



Braunsbach flash flood, 2016
Photo: Christoph Schmidt (dpa)

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Natural Disaster Modeling



Flood Modeling - Kemnitz Landkreis Görlitz

LISFLOOD-FP:
2D hydrodynamic modeling software (U Bristol - UK)

Modeling floods in flat rural and urban areas

Seamless ArcGIS integration

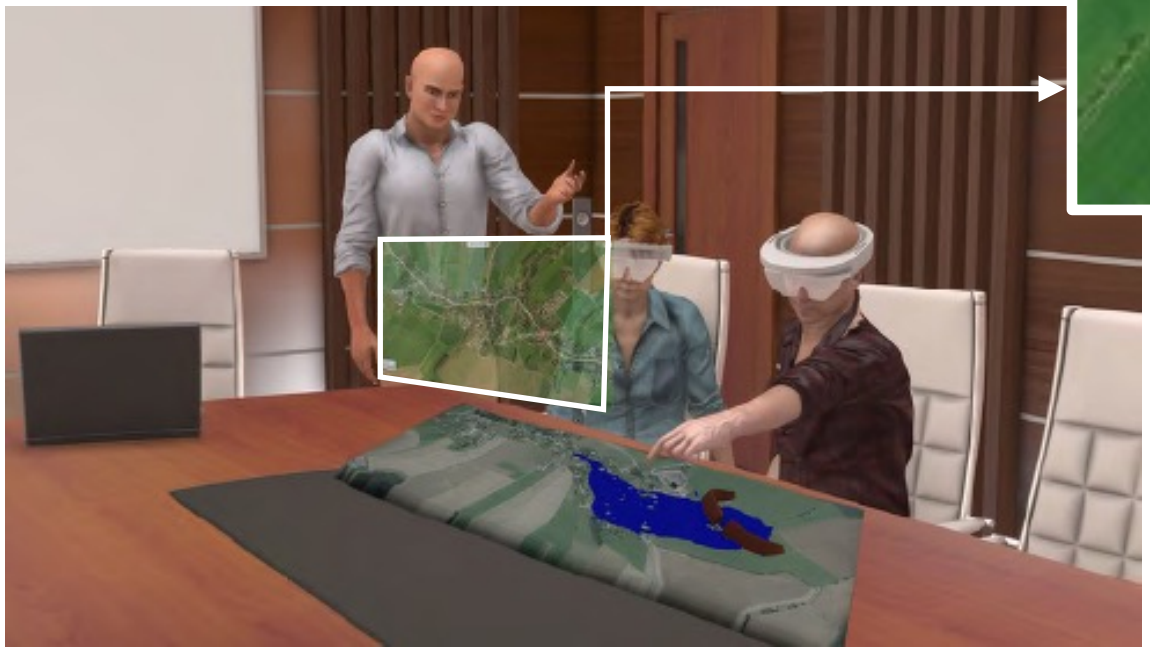
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Augmented Reality Simulation Environment

- *Translate GIS-based data and model into the AR environment using the **Unity** game engine with **HoloLens 2** and **Multi-Touch Table** integration*



Kemnitz Landkreis Görlitz



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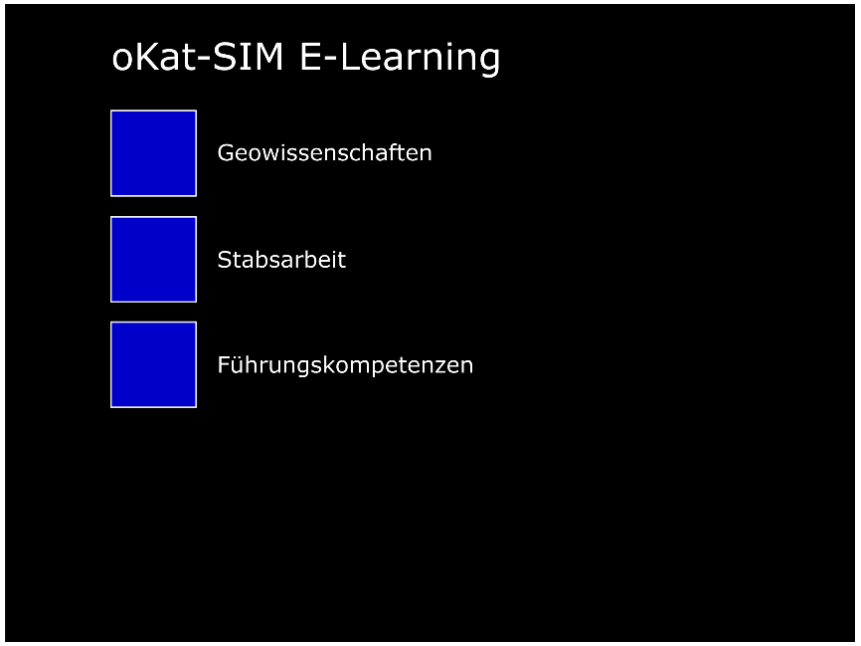
Augmented Reality Simulation Environment



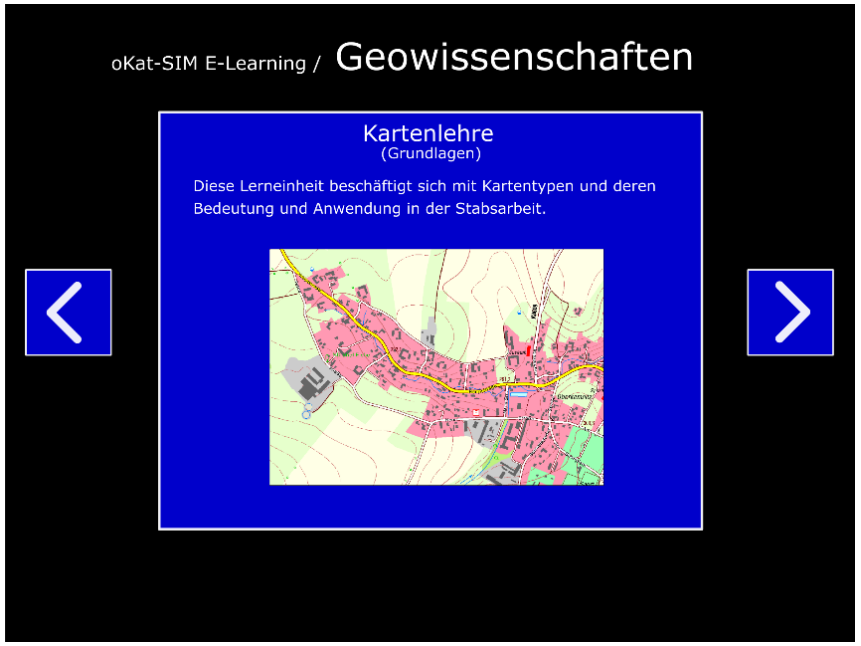
E-learning Module

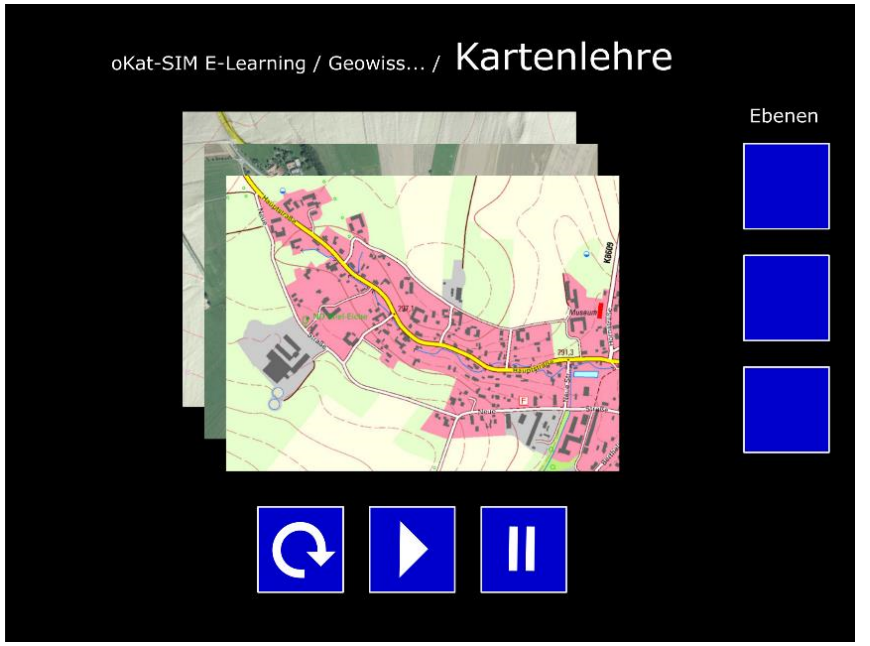
Content

- *Geoscience knowledge*
- *Crisis management*
- *Effective leadership*







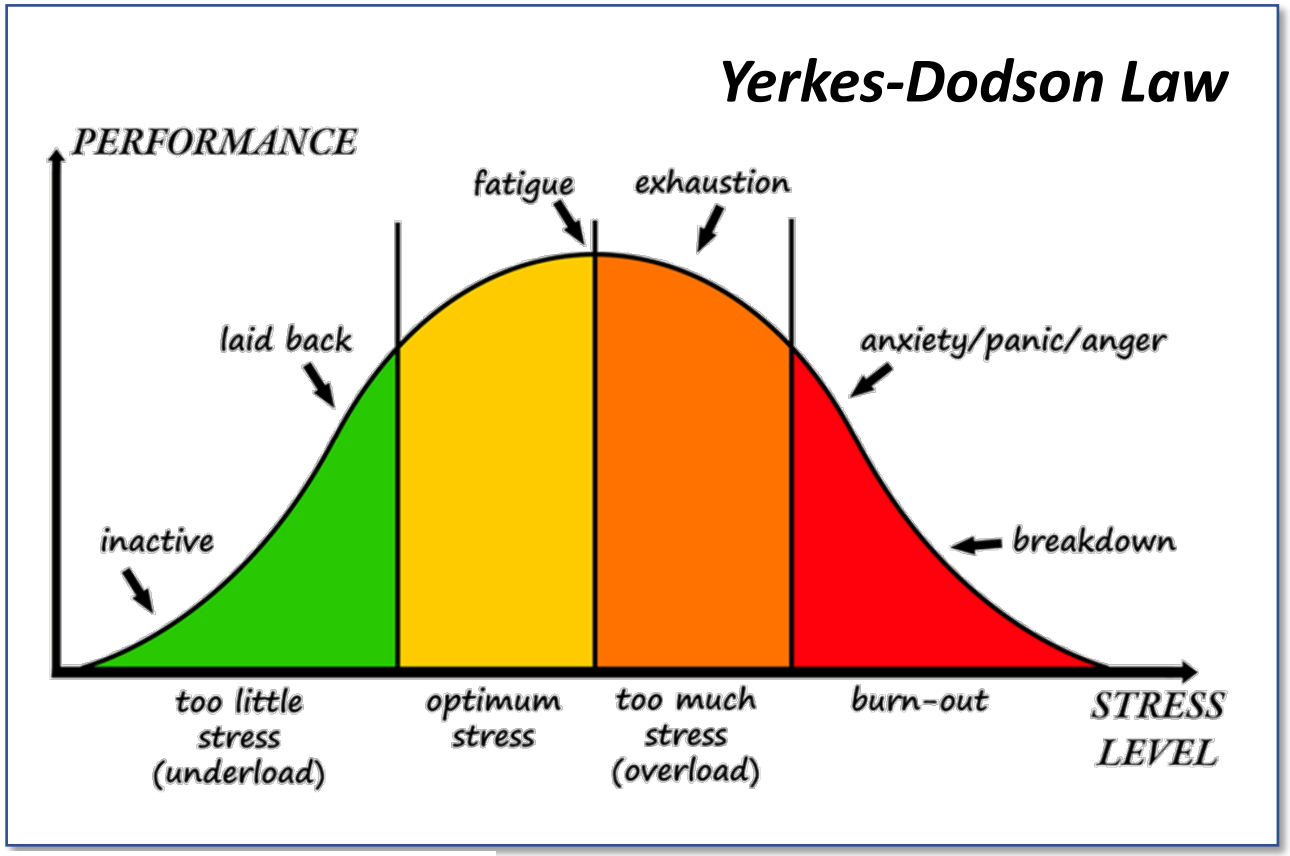


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E-learning tool mock-up

Stress Measurements & Cognitive Assessment

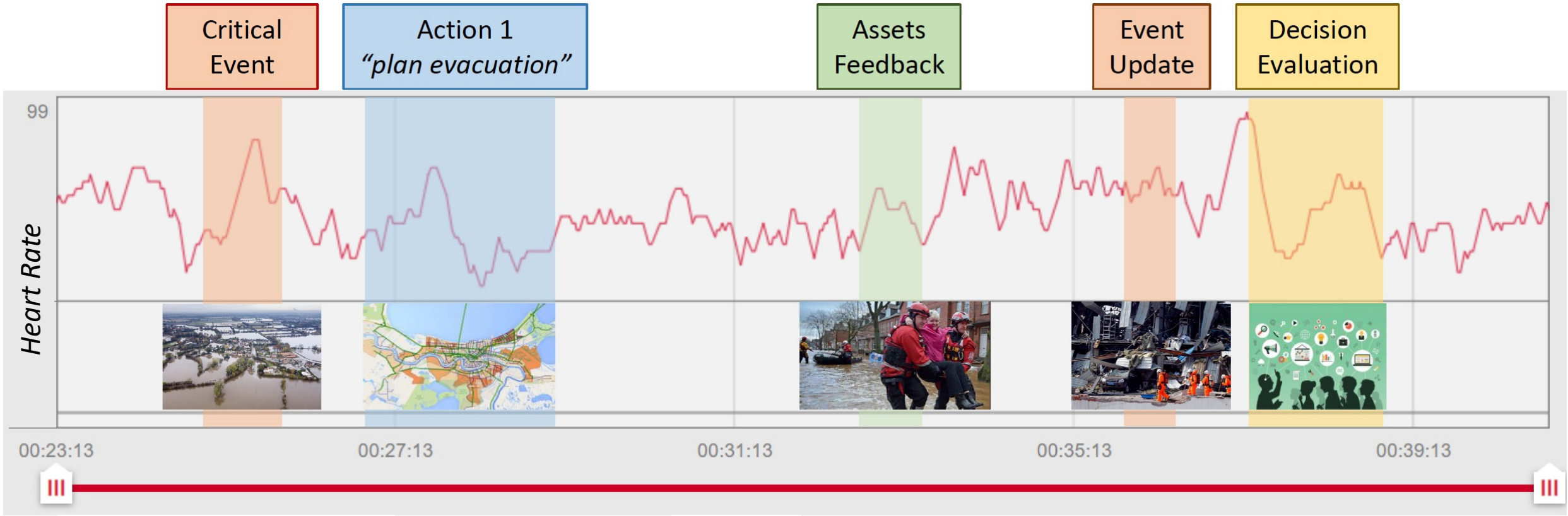
- *Training success evaluated by cognitive science methods*
- *Measuring stress levels throughout the training will determine the learning effect/success*
- *Results will be used to modify the training environment to achieve optimal learning results*



https://instituteofyou.org/

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Stress Measurements & Cognitive Assessment



Timeline



- *Monitor stress by measuring a participant's heart rate*

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oKat-SIM

Görlitz under water, 2010
Photo: Reuters



Görlitz under water, 2010
Photo: Reuters