DANISH EMERGENCY MANAGEMENT AGENCY

ITEC

14–16 May 2019
Stockholmsmässan. Sweden

Virtual Reality
Simulation-based Training

An overview and analysis of the use of simulation training in the Fire & Rescue services and Civil Defence in Europe
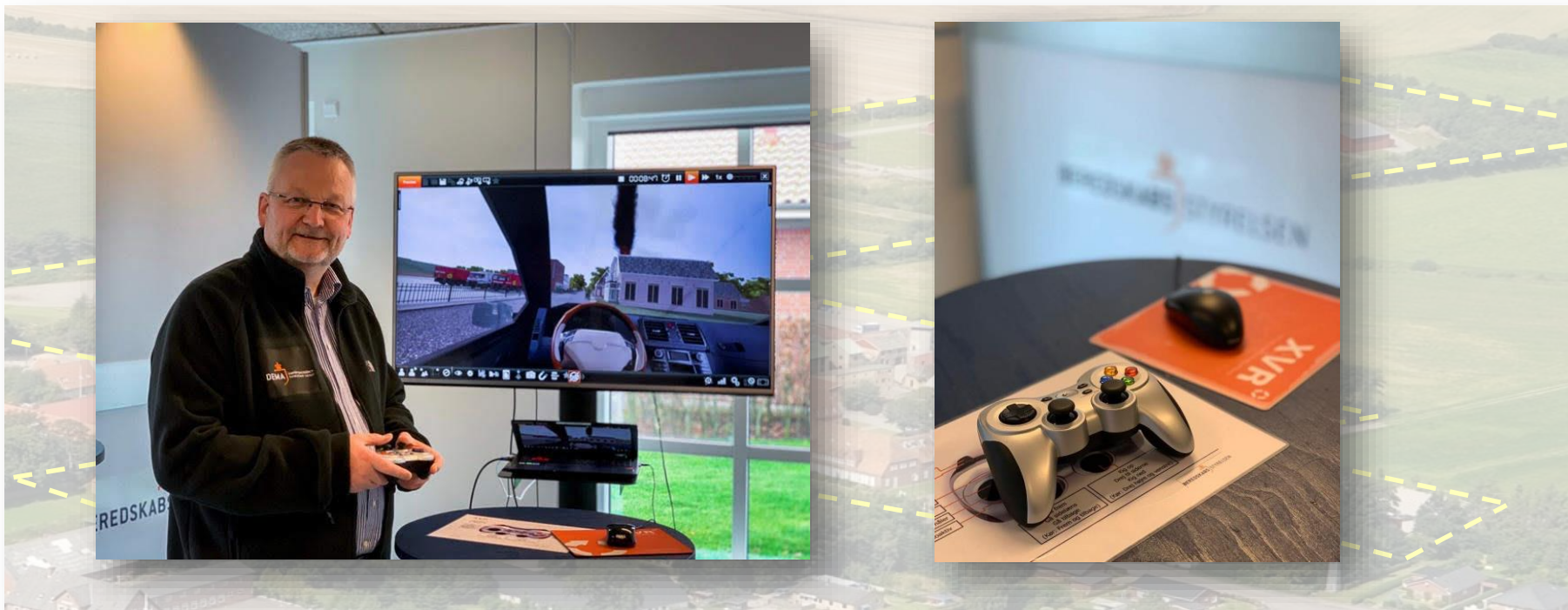
Wednesday 15th May 2019

Colonel Martin THOMSEN, R.[1]
Danish Emergency Management Agency
Head of DEMA Emergency Services College

Mr. Thomas VAN'T WOUT
CrisisSim
Virtual Simulation Consultant

DEMA Emergency Services College

DEMA Emergency Services College

The training of Danish emergency services personnel

✓ Multi-level emergency management in Denmark

✓ The Danish Education and Training System

- Manual Level (firefighter – rescue specialist)

- Sub-officer Level (non-commissioned)

- Officer Level (commissioned)

✓ Refresher training and exercises

✓ International training

Emergency management and terrorism preparedness

- Denmark has a well-functioning day-to-day emergency management system which is also geared to handle major incidents – including acts of terror

- The Danish Security and Intelligence Service performs regular assessments of the current terror threat against Denmark. This assessment forms the basis for the Danish authorities' emergency management level

- The fundamental principle of emergency management is sector responsibility. This means that the authority or organisation with the day-to-day responsibility for a certain area also has the responsibility for that area in case of a terrorist act.
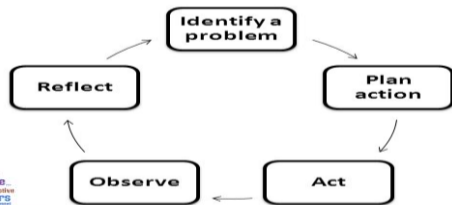
Virtual Simulation Based-Training (SBT)

- Our vision at DEMA Emergency Services College is to enhance and supplement the already known learning methods to our educations.

… establishing a training environment where the participants in a flexible, dynamic and virtual training environment are challenged to make decisions in challenging technical as well as tactical environments.

Virtual Simulation Based-Training (SBT)

- PURPOSE:
  - To create an effective, credible and flexible education supplement and alternative to traditional education and training, at school as well as externally.

- BUSINESS CASE:
  - Efficiency in exercises through less time consumption, time for preparation and cleanup
  - More leadership training through more participants in the same scenario
  - More realism through "street perspective" and even bigger scenarios.
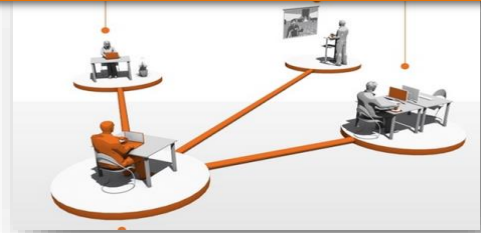
E-LEARNING
Step 6. ULTIMO 2019

EXAMINATION
FASE 7. 2020 (TEST)

**CO-TRAINING
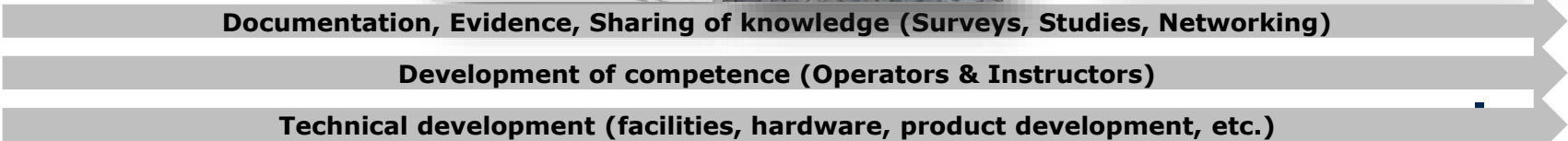TL/IC Level**
Step 5. ULTIMO 2018

WORKSHOP
Step 4. PRIMO 2016

**Classroom set-up
(Team leader)**
Step 2. MEDIO 2016

**INDIVIDUAL TRAINING
(Team leader)**
Step 3. ULTIMO 2016 (HAZMAT)

SBT **Project plan**

TEST
Step 1.
2015

Documentation, Evidence, Sharing of knowledge (Surveys, Studies, Networking)

Development of competence (Operators & Instructors)

Technical development (facilities, hardware, product development, etc.)

DANISH EMERGENCY
MANAGEMENT AGENCY

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SBT
Training concept

"HAZMAT"
TL-Tactical HAZMAT module

"Tactical handling"
TL-Tactical

"Situation assessment"
TL-Tactical

"Playground"

TL-Basic

Necessary for completion of the further course

L1

Set-up
Situation assessment training

Set-up
HAZMAT dynamic scenario

Portable equipment

Participant placed front to the screen
- Wireless controller
- Tactical material and textbooks

Instructor as IC and radio support

SBT operator in seperate room
- laptop with instructor license
- The maker of dynamic development

Stationary in-house facility

Participant placed front to the screen.
- Wireless controller
- Tactical material and textbooks
- Radio communication
- System for face-to-face communication

Instructor placed in separate room
- Laptop with facilitator set-up
- Radio communication (**IC**)
- System for face to face communication

SBT operator in separate room
- Laptop with operator license
- Radio communication (**crew**)
- System for face-to-face communication

SBT
Training concept

Fellow course participants follow the game on a separate screen

Experiences for the last two years

- *Strength by creating a dynamic, challenging training environment. (Refinery, airports, special buildings, challenging weather conditions, etc.)*

- *Strength in challenging the participants in making decisions with limited overview*

- *Strength by creating a natural development and a realistic time perspective in the event through dynamic input (Spread of waste, smoke color, flow, etc.).*

- *Strength in creating buildings in which complex conditions can be built.*

- *Strength by creating an event that can be "paused" if necessary.*

- The challenge of technical challenges along the way (PC capacity, graphics cards, etc.)

- The challenge of "finding out"… we are still working on the "final" technical set-up.

- The challenge for the students to operate the equipment.

- The challenge for the operators to create our wishes up from scratch.

- The challenge for the operator in handling tactical commands while providing dynamic input.

DEMA International Training

- The national education and training programme provides the basis for all international engagements

- Appointed personnel receives a supplementary training directed towards international operations

- Appointed personnel are taking part in EU- and UN-courses and training directed towards international operations

- DEMA staff members are cooperating with international staff in command, control and coordination exercises.

Research on the use of Simulation for Training European Emergency Services

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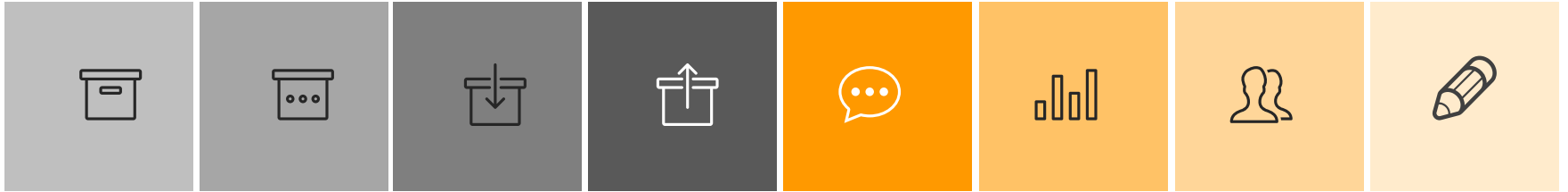
ABOUT THE PRESENTATION
What will we talk about ?

OBJECTIVES

This part of the presentation aims to show the results of the study done with various European Fire & Rescue and Civil Defence about Virtual Simulation for training.
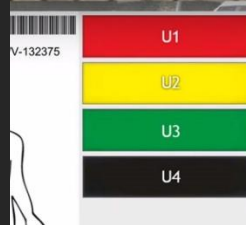
Methodology

How has been conducted this study ?

Questionnaire :

1. A questionnaire has been made with the objective to have both quantitative and qualitative datas about the reason, the type of use, the budget, the limit, the added value and the expectation of virtual simulation user all over Europe.

2. It has been sent by email to more than 100 Fire & Rescue and Civil Defence organizations in Europe.

3. Answers has been collected and aggregated in order to be analysed

4. Conclusions has been made based on the analysis

Interview

1. The objective was to understand how Fire & Rescue and Civil Defence are organizing their training using virtual simulation.

2. A number of three representative organizations has been selected around Europe.

3. Visits and interviews has been conducted on site and remotely.

4. Datas from interviews has been extracted and confronted to the questionnaire.
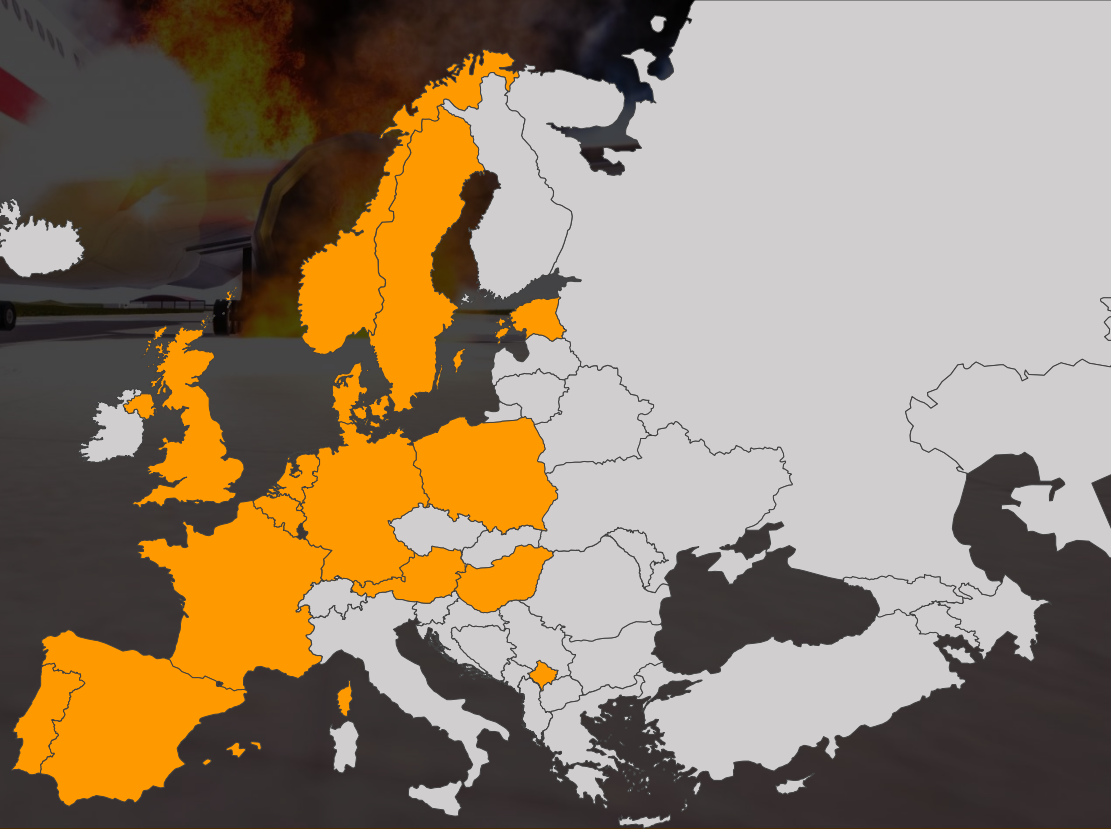
QUESTIONNAIRE

Who answered ?

> ## 16 countries are represented in the questionnaire

For a total of 36 answers collected on Fire & Rescue and Civil Defence Organizations.

Half of them has started to use simulation less than 5 years ago.

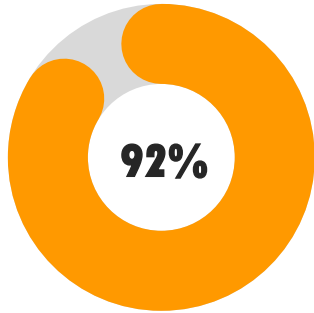The main reason (80,6%) was to put innovation in their training curriculum.

52,8% Training Institutions
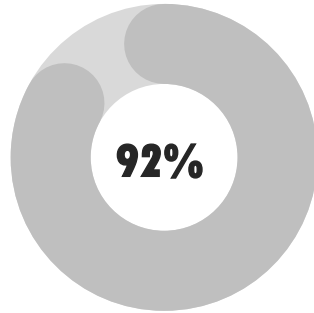
48,2% Operational and Emergency Services
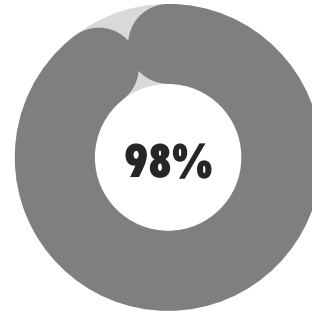
USAGE

What are they using simulation for ?

92%

XVR On Scene

XVR OS is the most used simulation software across Europe which means there is a monopolistic situation.
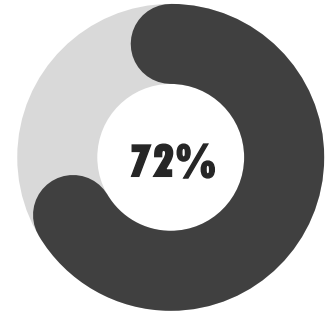
92%

Maintaining Competency

The most common use of virtual simulation for training is to train on daily incidents just before CBRN-e (61%) and Natural Disasters (53%)

98%

Daily Incident

The most common use of virtual simulation for training is to train on daily incident just before CBRN-e (61%) and Natural Disasters (53%)

72%

Own Staff

The majority is using virtual simulation to train their own staff. Only 63% are conducting multi-agency training.

A solution made for subordinate to higher command level

The use of virtual simulation is focused on higher command level which is understandable as it was the main goal of VR.

However, the use of VR in manual level training is still small even with the developments of VR google, interactive devices and AI.

Manual level
Crew

52 %

Subordinate command level
Crew/ Truck commander

83 %

Medium command level
Group commander

92 %

Higher command level
Battalion commander and above

78 %

Organisation

Staff and Expenditures

BUDGET

53% of the virtual simulation users are spending between 5000 and 50 000 € per year on hardware, software and staff.

FACILITIES

Fixed simulation centers are the most common (81%) and only a few are using remote learning (11%).

STAFF

Part-time staff is the most used (67%) for running virtual simulation training centers. 66% of them has a team sized from 1 to 6 people full time equivalent.
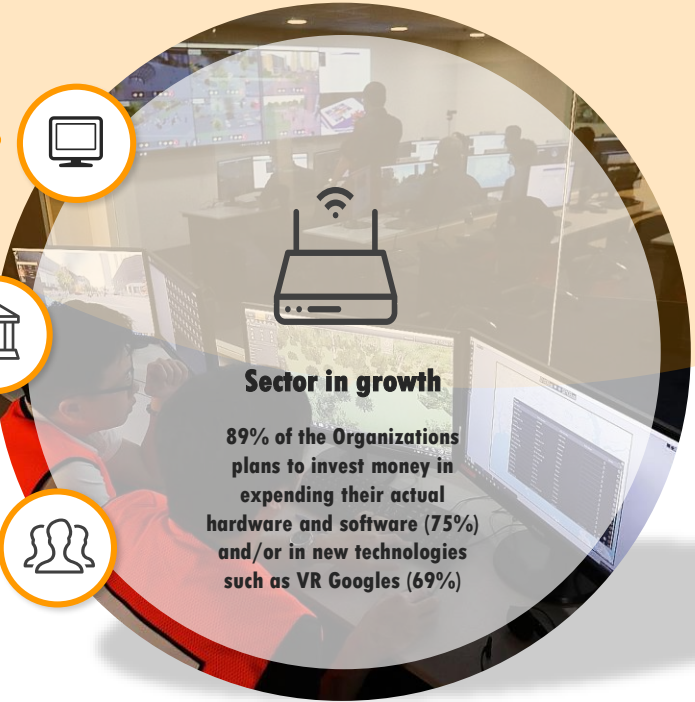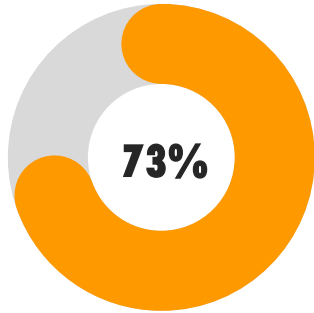
Sector in growth

89% of the Organizations plans to invest money in expending their actual hardware and software (75%) and/or in new technologies such as VR Googles (69%)
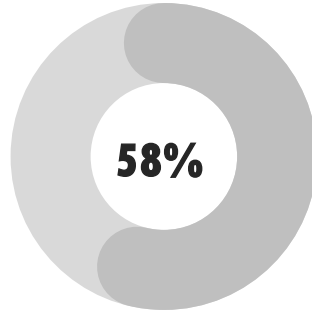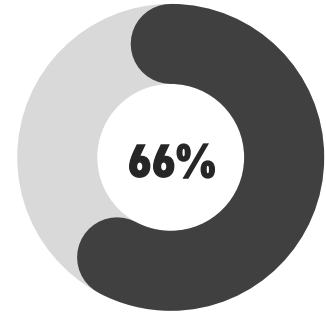
73%

58%

66%

Cost Effective

Most of the user thinks that simulation is cost effective

Covers the need

Most of the VR users thinks that it covers most of their needs. But there is a big room for improvement here.

Require the right amount of staff

If VR users admit that it could be staff intensive, if they compare it to the gain they found in majority that the use of VR for training is balanced from a staff point of view.

ANTICIPATED NEED

What does users wants for the future ?

Immersive Simulation

VR should include more features like VR Googles, interactive equipment

81%

Tailor-made 3D contents

It includes geographical datas such as streets and building as well as customized equipment parts and vehicles

78%

Remote Learning

VR technologies should be able to have the students come to a center to train.

61%

A realistic solution enjoyed by the student with many possibilities

94% of the organization that answered the questionnaire says that student enjoyrs VR simulation exercise.

We can imagine that the realism, the time won on the simulator instead to be on the field and the large capabilities has helped this feedback.

However, if it's satisfying some efforts could be done on the cost side.

Faster preparation
Trainees are ready faster after using VR training

86 %

Reduce costs
Simulation helps to reduce training costs

72 %

Require less resources
VR require less resources than live exercise

89 %

Could replace some live exercises
VR can replace some warm-up or procedure exercises

83 %

Realistic
VR simulation training is realistic

89 %

Wider possibilities than field exercises
Simulation allows to do exercise that are impossible in reality

100 %

Thank you for your attention!

Research on the use of virtual simulation for training European emergency services