

**BUILDING SOCIETAL RESILIENCE
TO HAZARDS THROUGH
IMPROVING CAPACITY
IN HIGHER EDUCATION**



**IZGRADNJA OTPORNOSTI DRUŠTVA
NA HAZARDE KROZ
UNAPREĐENJE KAPACITETA
U VISOKOM OBRAZOVANJU**

Knowledge FOr Resilient soCiEty

**DESETO NAUČNO-STRUČNO MEĐUNARODNO SAVETOVANJE
OCENA STANJA, ODRŽAVANJE I SANACIJA
GRAĐEVINSKIH OBJEKATA I NASELJA
Vršac, jun 2017.**

Mirjana Laban, Vlastimir Radonjanin
UNIVERSITY OF NOVI SAD, FACULTY OF TECHNICAL SCIENCES



Co-funded by the
Erasmus+ Programme
of the European Union



The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



THE HYSTORY OF THE IDEA - ABOUT STUDIES

- *DISASTER RISK MANAGEMENT AND FIRE SAFETY STUDY PROGRAM STARTED IN 2011 AT FACULTY OF TECHNICAL SCIENCES (4-YEAR ACADEMIC BACHELOR AND 1-YEAR ACADEMIC MASTER STUDIES)*
- *THE IDEA FOR CREATING THE PROGRAMS WAS INITIATED AND REALIZED BY DISASTER RISK REDUCTION RESEARCH CENTRE TEAM:*



Dušan Sakulski Đorđe Ćosić Srđan Popov Mirjana Laban





THE HYSTORY OF THE IDEA - RESEARCH AREA

- 2013 - **DISASTER RISK MANAGEMENT AND FIRE SAFETY** research area was established at **Chair of Building Materials, Assessment and Repair of Structures**, Department of Civil Engineering and Geodesy
- *DRM&FSE study programme was modernized and reaccredited*



Suzana
Draganić



Ivan
Lukić



Mirjana
Malešev



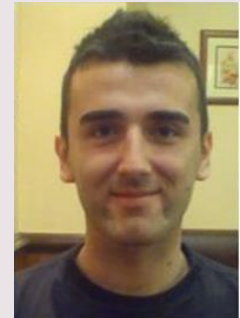
Vlastimir
Radonjanin
Head of Chair



Miroslava
Radeka



Jovana
Bondžić



Slobodan
Šupić



Co-funded by the
Erasmus+ Programme
of the European Union



THE HYSTORY OF THE IDEA



- *PRELIMINARY SURVEY (2015): VERY FEW SIMILAR STUDY PROGRAMMES AT ALL BOLOGNA LEVELS IN SERBIA, ONLY FEW MODULES IN WESTERN BALKANS AND SE EUROPE, NOT ENOUGH AVAILABLE RECOURCES TO IMPROVE EXISTING OR ESTABLISH NEW STUDY PROGRAMMES*
- *NO DOCTORAL STUDY PROGRAMME = NO SUSTAINABILITY OF STUDIES*
- *WE NEED ASSISTANCE FROM MORE DEVELOPED HEIs AND EU*



MAY 2014

Floodwaters in Balkans covered an area larger than 22,000 km²

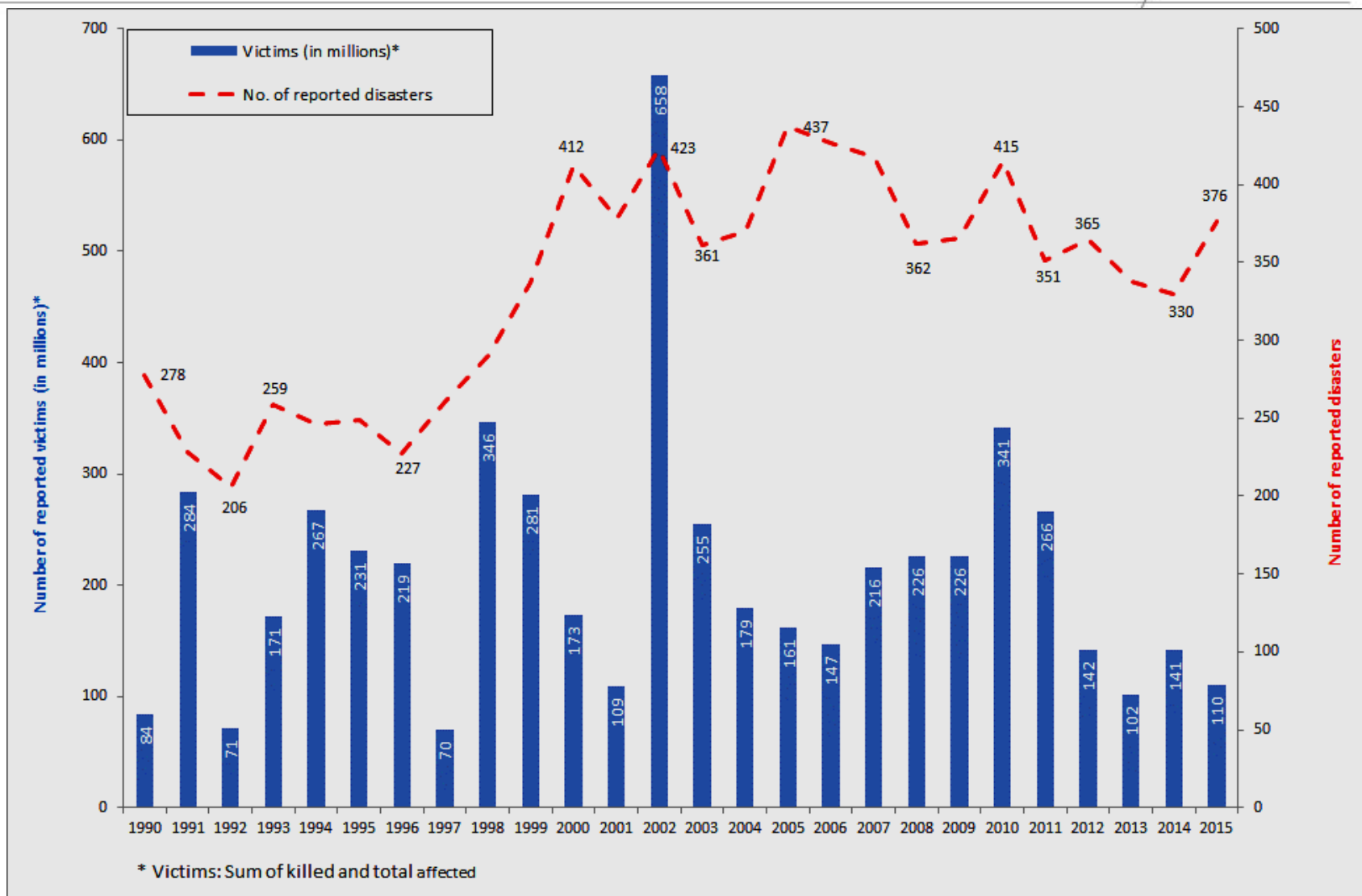
Dozens of killed

Estimated damage was 3 billion euros



Centre for Research on the Epidemiology of Disasters (CRED)

Trends in occurrence and victims





SURVIVAL

FLOODS
EARTHQUAKES
LANDSLIDES
FIRES
DROUGHTS
.....

COMMON REGIONAL NEEDS TO IMPROVE THE RESILIENCE OF THE REGION TO HAZARDS ARE RECOGNIZED AS THE NEEDS FOR EXPERTS CAPABLE TO IMPROVE REGIONAL CAPACITY/COOPERATION IN RISK PREVENTION AND RESPONSE

It took two years, dozens of meetings, telephone calls and hundreds of e-mails, many working hours, lots of efforts and truly good will to come to this point,

**BU WE DID IT!!! WELCOME TO
K-FORCE PROJECT!**



Co-funded by the
Erasmus+ Programme
of the European Union



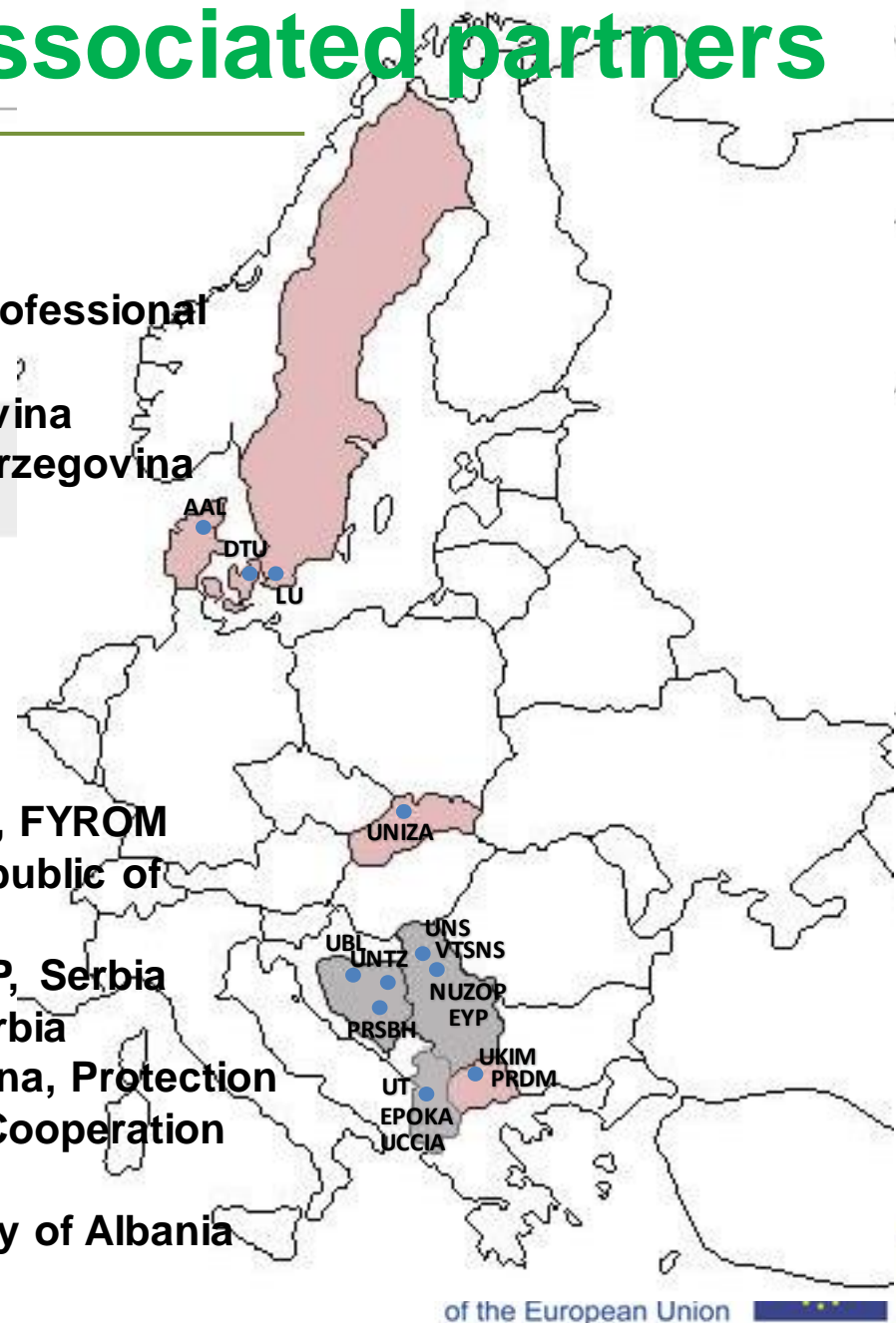
The Project CV

Project Title	Knowledge FOr Resilient soCiEty	
Project acronym	K-FORCE	
Project Number	573942-EPP-1-2016-1-RS-EPPKA2-CBHE-JP	
Project Website	http://kforce.uns.ac.rs/	
Project duration	3 years	
Start	15 th October 2016	
Programme	ERASMUS+	
Key Action	Cooperation for innovation and the exchange of good practices	
Action	Capacity building in the field of higher education	
Total cost of the project	1.237.129,00 EUR	
	Grant for Project Activities:	985.474,00 EUR
	Additional Grant for Special Mobility Strand:	251.655,00 EUR
Coordinator	University of Novi Sad	



Consortium 14 + 2 associated partners

- University of Novi Sad, Serbia
- The Higher Education Technical School of Professional Studies, Serbia
- The University of Tuzla, Bosnia and Herzegovina
- The University of Banja Luka, Bosnia and Herzegovina
- The University of Tirana, Albania
- Epoka University, Albania
- Technical University of Denmark, Denmark
- Aalborg University, Denmark
- The Lund University, Sweden
- The University of Žilina, Slovakia
- Ss. Cyril and Methodius University in Skopje, FYROM
- Protection and Rescue Directorate of the Republic of Macedonia, FYROM
- National Fire Protection Association – NUZOP, Serbia
- European Youth Parliament Serbia – EYP, Serbia
- Ministry of Security of Bosnia and Herzegovina, Protection and Rescue Sector, Sector for International Cooperation and European Integrations
- Union of chambers of commerce and industry of Albania

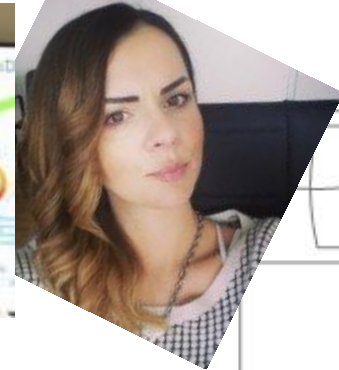


KNOWLEDGE FOR RESILIENT SOCIETY TEAM

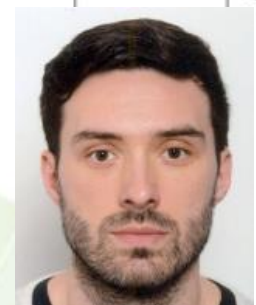


PROJECT MANAGEMENT TEAM

k-force.pmt@uns.ac.rs



TEAM MEMBERS



Co-funded by the
Erasmus+ Programme
of the European Union





THE AIM OF THE K-FORCE PROJECT:

- to **improve regional resilience to hazards** and capability for regional cooperation in risk prevention and response and
- to ensure national professional resources and regional capacities in order to build regional-based disaster preparedness and a culture of safety and resilience at all levels according to EU Integration Strategies and National relevant strategies.

The overall broader objective to which K-FORCE project will contribute is to ensure national professional resources and regional capacity for resilient society.

In order to achieve this, K-FORCE project will create effective, contemporary and sustainable Study Programs in the field of Disaster Risk Management and Fire Safety Engineering (DRM&FSE).

Contemporary needs for disaster risk management and fire safety engineering higher education

- European Parliament Resolution (2010) entitled a "Community approach on the prevention of natural and manmade disasters,,
- European and Mediterranean Major Hazards Agreement (EUR-OPA)
- South East Europe 2020 Strategy -
Jobs and Prosperity in the European Perspective
- Decision No 1313/2013/EU on a Union Civil Protection Mechanism, in view of the significant increase in the numbers and severity of natural and man-made disasters in recent years and in a situation where future disasters will be more extreme and more complex with far-reaching and longer-term consequences as a result, in particular, of climate change and the potential interaction between several natural and technological hazards, emphasize an integrated approach to disaster management as increasingly important.

Knowledge FOR Resilient soCiEty



Kick-off meeting, Novi Sad, October 2016

Co-funded by the
Erasmus+ Programme
of the European Union





SPECIFIC OBJECTIVES OF THE PROJECT

- SO1.** *Modernization of DRM&FSE master study programme and development and implementation of new Master programmes/modules in WBC partners HEIs, according to regional needs and contemporary EU trends.*
- SO2.** *Development and implementation of DRM&FSE Doctoral study programme in accordance to available resources, regional needs and European partners' expertise, in aim to ensure regional capacities and sustainable education and research in the field.*
- SO3.** *Continuous professional development of employees in DRM&FSE sector in WBC through creation and implementation of certified LLL courses for practitioners.*
- SO4.** *To improve cooperation between project partners in order to modernize teaching and training process on novel technical and technological solutions, exploiting the ICT application.*



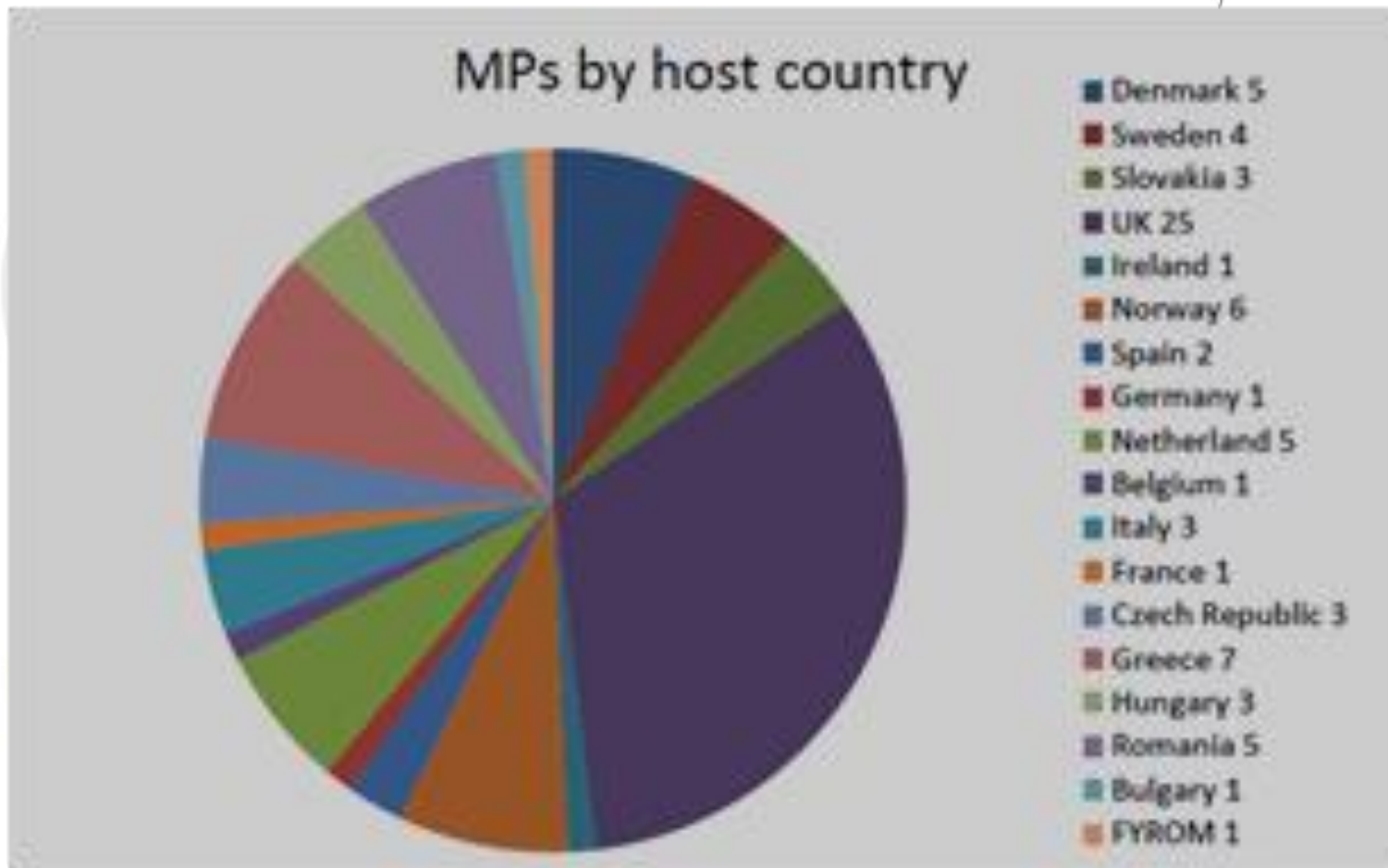
Available DRM & FSE study programs in Balkan region

Country, Higher Education Institution	Bologna I level	Bologna II level
Serbia, University of Novi Sad, Faculty of Technical Sciences, Novi Sad http://www.ftn.uns.ac.rs/	Disaster and Fire Risk Management Academic studies, Bachelor, (240 ETCS)	Disaster and Fire Risk Management, Academic studies, Master (60 ETCS)
Serbia, University of Nis, Faculty of Occupational Safety, Nis http://www.ni.ac.rs/	n/a	Occupational safety - Fire Protection, Academic studies, Master (60 ETCS)
Serbia, University of Nis, Faculty of Occupational Safety, Nis http://www.ni.ac.rs/	n/a	Environmental Protection Eng. - Emergency Management, Academic studies, Master (60 ETCS)
Serbia, University of Nis, Faculty of Occupational Safety, Nis http://www.ni.ac.rs/	n/a	Environmental Protection Eng. - Emergency Management , Academic studies, Master (60 ETCS)

Available DRM & FSE study programs in Balkan region

Country, Higher Education Institution	Bologna I level	Bologna II level
Serbia, Higher Engineering School of Professional Studies, Zemun	Occupational safety - Fire Protection and Rescue, Professional studies, Bachelor, (180 ETCS)	Occupational safety - Fire Protection and Rescue, Professional studies, Specialist, (60 ETCS)
Serbia, Higher Technical School of Professional Studies in Novi Sad http://vtsns.edu.rs/	Occupational Safety – Fire Protection, Professional studies, Bachelor, (180 ETCS), Also available as on-line studies	Environmental Protection Engeneering - Fire Protection and Rescue in Emergency Situations , Professional studies, Specialist, (60 ETCS)
Serbia, Higher Technical School of Professional Studies in Novi Sad http://vtsns.edu.rs/	Environmental protection Eng. - Civil Protection and Rescue in Emergency Situations, Professional studies, Bachelor, (180 ETCS)	
Serbia, Higher Technical School of Professional Studies, Zvecan http://vts-zvecan.edu.rs/	Occupational safety - Fire Protection, Professional studies, Bachelor, (180 ETCS)	Occupational safety - Fire Protection, Professional studies, Specialist, (60 ETCS)

RISK STUDIES IN EUROPE





In 3 years we plan to modernize/develop/implement 7 curricula at 6 WBC HEIs:

- DRM&FSE academic master programmes/modules (UNS, UT, UBL, EPOKA),*
- DRM&FSE PhD programme (UNS),*
- Protection Engineering vocational master programme (VTSNS)*
- Economic and Financial Resilience vocational module (UT).*

Study programmes will be interdisciplinary and created and implemented in a way that enables continuation of the studies for a number of different profiles of engineers.

The LLL courses implementation enables continuing education of DRM&FSE oriented professionals.

Study programmes, LLL courses and learning material will be available in EN/SR/BH/AL

*Education material will be available in blended way (**ICT learning platform, e-Library, DRM&FSE Glossary**) as open source educational recourses.*



MEETING IN ALBANIA



Co-funded by the
Erasmus+ Programme
of the European Union





Interdisciplinary curricula include subjects from various academic disciplines:

- Engineering and engineering trades as the dominant academic discipline,
- Environmental protection,
- Architecture and Construction,
- Civil Protection,
- Fire Science,
- Rescue studies,
- Climatology,
- Hydrology,
- Seismology ,
- Economy,
- other disciplines (Health, Sociology).




IMPROVING QUALITY OF EDUCATION AND TEACHING

Educational ICT based laboratories (created in WBC HEIs with interoperability capacities), ***K-FORCE On-line Library***, ***Glossary of DRM&FSE key words and terms*** and ***ICT platform*** provide national/regional/international case-studies, integrated risk methodology assessment, hazard, risk and vulnerability cross-border/regional mapping and results publication.

That insures continuous common regional problem-based approach and knowledge/skills compatibility, also aligned with contemporary EU trends in DRM&FSE field.

BLENDED LEARNING

-an education program that combines **traditional classroom methods** with **online digital media**.



Face to face – attending classes, going on consultation, take a standard written and oral examination

- graphical and seminar papers

- printed materials for learning



Face to face – **LIVE STREAMING** (attending classes online in real time)

Flex – e-library (curriculum, audio and video recordings), teachers are available for face-to-face online consultation

Labs - All of the curriculum is delivered via a digital platform but in a consistent physical location.

Online driver – Students complete an entire course through an online platform with possible teacher check-ins



Co-funded by the
Erasmus+ Programme
of the European Union
of the European Union



CANVAS learning management system

www.canvaslms.com



CANVAS is a platform of the most modern 'interface', it is extremely easy to use and has all the digital tools and satisfies all the needs of online learning and courses.

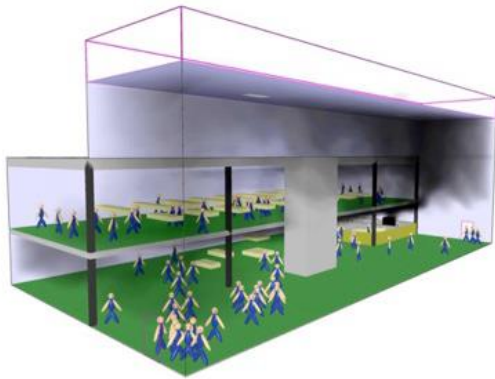
Since its launch in 2011 it has been used by more than 1800 universities, school districts and institutions around the world.

On one platform are associated features of all the previous platforms and popular social networks which has led to such an expansion in short time and made world universities convert from existing to canvas platform.

Selected by Cisco Networking Academy (global educational program for career development and IT skills) to power "the world's largest classroom".

SOFTWARE - Evacuation modelling

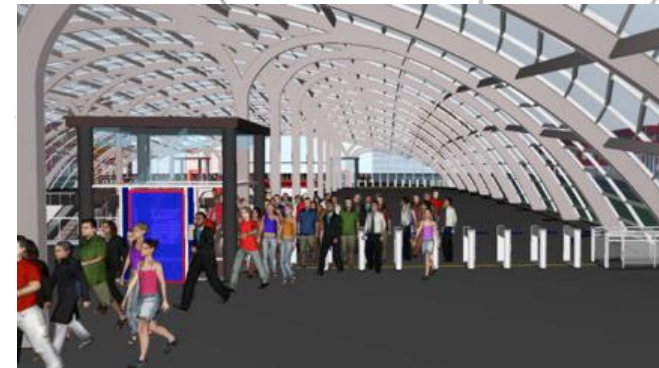
Most known models (Top 5)



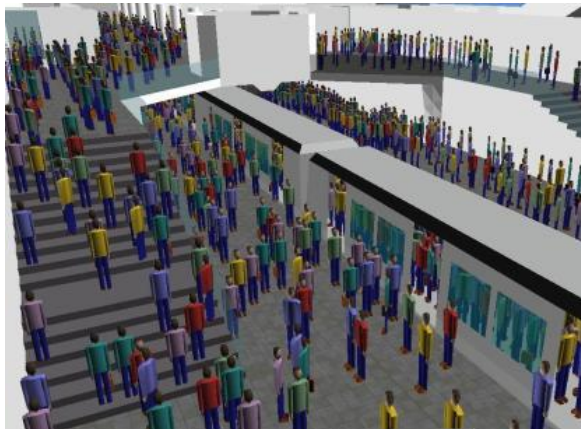
FDS + Evac (OpenSource)



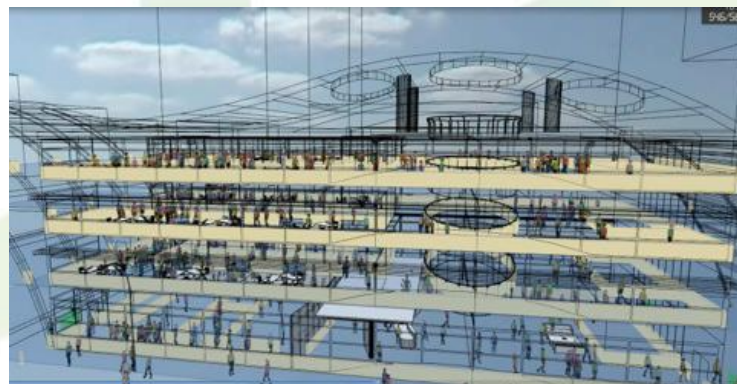
BuildingEXODUS (FSEG)



PathFinder (Thunderhead)



STEPS (MottMac)



Simulex (IES)

Ronchi E (2013). Testing the predictive capabilities of evacuation models for road tunnel safety analysis.

Safety Science Volume 59, pp.141-153

Co-funded by the
Erasmus+ Programme
of the European Union



Review of selected models

PyroSim

- Field Model / Miscellaneous
- A graphical user interface for the Fire Dynamics Simulator (FDS)
- It is used to create fire simulations that accurately predict smoke movement, temperature, and toxin concentrations during a fire

Licensing

- **Free Educational Licensing**
- **Standard Perpetual License:**

Node-Locked **\$2750**

Maintenance **\$550**

Volume Licensing Discounts

- **50% off all additional licenses**

PyroSim and Pathfinder orders can be combined for volume licensing.



User-exchangeable TG, TG/DTA or TG/DSC sample holders are available for this apparatus, shown in Figure 2



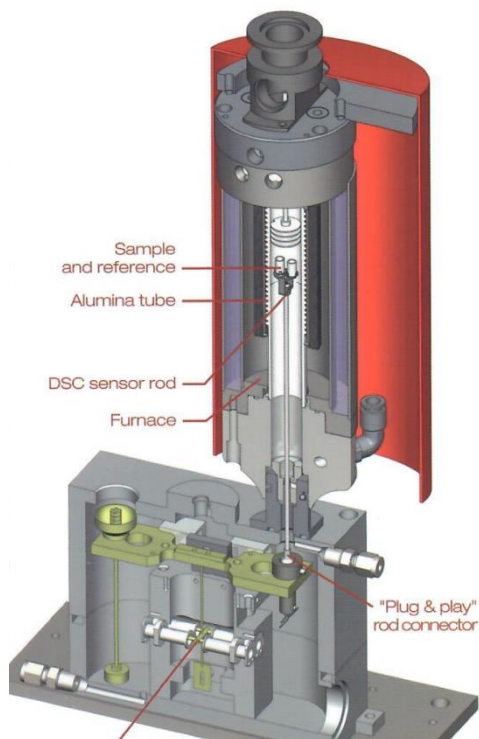
Hyphenated Thermal Analysis - FTIR Spectroscopy

Equipment for **Thermal Analysis (TA)** -simultaneous TG-DTA and TG/DSC analysis up to 1150°C and DSC rod for analysis up to 1600°C

TA-enables qualitative and quantitative information about the effects of various heat treatments on mainly solid materials

TG-allows monitoring of mass change as a function of temperature during heating and cooling

DTA /DSC-allows the determination of endothermic and exothermic processes (physical and chemical)



DSC plate rod



DTA rod



TGA rod

User-exchangeable sample holders



Co-funded by the
Erasmus+ Programme
of the European Union
of the European Union



UNMANNED AERIAL VEHICLE (UAV)

SenseFly SA is the creator of the lightweight, the sensor-rich **Albris** drone for civilian applications. Albris offering TripleView imaging and advanced situational awareness.

Abilities:

- *high-res 2D mapping, 3D building mapping, construction monitoring, agricultural & archaeological mapping*
- *structural inspection & documentation, crack/defect detection, solar panel analysis, tower inspection etc.*



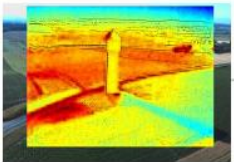
albris

senseFly

Albris senseFly FEATURES makes him unique in the world market:

1 flight, 3 types of imagery

Fully stabilised TripleView camera head allows you to switch between HD and thermal video imagery, live during your flight, plus you can capture high-resolution still images on demand, without landing to change cameras.



The TripleView head features a 180-degree vertical range of motion, 6x digital zoom, active gimbal stabilisation and, thanks to the albris' shrouding frame design, an unobstructed field of view allowing you to capture clear and stabilised imagery ahead, above and below the drone.



Meeting and training at EPOKA University, Albania

Co-funded by the
Erasmus+ Programme
of the European Union



Workplan



K-FORCE project is planned in three phases: preparation, development and implementation, and valorization phase, to be realized through 9 Work Packages (WPs):

- **WP1** Define directions for development of Master programs
- **WP2** Define directions for development of PhD programme
- **WP3** Improve teaching methodologies and embed the ICT in learning material
- **WP4** Implementation of Master Programmes
- **WP5** Implementation of PhD Programme
- **WP6** Implementation of LLL courses
- **WP7** Quality Assurance and Monitoring
- **WP8** Dissemination and Exploitation
- **WP9** Project Management





Meeting at EPOKA University, Albania

Co-funded by the
Erasmus+ Programme
of the European Union



MEETING IN AALBORG, DENMARK



unded by the
Programme
of the European Union



Special Mobility Strand



We have foreseen following SMS activities:


1. Students mobility between WB HEIs
2. Staff mobility from WB HEIs to Programme countries HEIs for the purpose of training
3. Staff mobility from project partner HEIs to WB HEIs for the purpose of teaching

Objectives of SMS activities are:

- Contribution to the improvement of Master programmes, Modules and PhD programme implemented in WB HEIs
- Creation of international learning experience for students at project partner HEIs,
- Development of cultural awareness among students
- Exchange of innovative teaching practices
- Learning about teaching methods and practices from Programme countries HEIs
- Development of complementary skills and competencies in the field of DRM&FSE
- Promoting international understanding and cooperation







Review of survey parameters:

- mass survey → as much subjects as possible
- short and easy to complete (5-10min)
- target groups were university and high school students from Albania, Bosnia and Herzegovina and Serbia

Three segments of the survey:

1. Previous experience
2. Personal opinions and attitudes
3. Education aspirations


Review of survey parameters:

- mass survey → as much subjects as possible
- short and easy to complete (5-10min)
- target groups were university and high school students from Albania, Bosnia and Herzegovina and Serbia

Three segments of the survey:

1. Previous experience
2. Personal opinions and attitudes
3. Education aspirations

Meeting in Aalborg University, Denmark

Expected impact of the project



- Students will be educated within an interdisciplinary and problem-solving framework, through acquiring theoretical, practical and applicable knowledge, skills and competences, according to National qualifications framework and European qualifications framework, WB countries' needs and EU trends, which will be well recognized by the national and regional labour market.
- Students on other HEIs study programmes will gain basic or improved knowledge of DRM&FSE issues, consequently resulting in raised awareness among student population.
- Implemented programs will enable regional and international mobility of students and teachers from WB and their horizon broadening in this specific field.



Expected impact of the project



- Teaching staff will have opportunity to upgrade their teaching experience, capacity to pass on the knowledge updated with novel trends both in the field and teaching tools and methodology.
- Teaching staff in other disciplines will be able to foster their knowledge and capacity to introduce and interconnect DRM&FSE issues into their disciplines.
- Non-profit NGOs will have opportunity to realize their own visions and missions in building national and regional capacities for safe and prospective WB societies, on the path towards EU.
- Professionals in DRM&FSE area will expand and upgrade their knowledge and skills through LLL courses.



Expected impact of the project



- Public bodies and administration in charge for civil protection will improve qualification structure and better act as liaison between the emergency sector and scientific and education institutions as well as liaison between educational institutions and stakeholders from the emergency sector.
- Employees in various industrial sectors will have an open access to created On-line Library, ICT portal and LLL courses database, through which they can gain knowledge on various DRM&FSE issues, thus raising their awareness about fires and disasters.



Knowledge FOR Resilient soCiEtY



Co-funded by the
Erasmus+ Programme
of the European Union



Thank you for your attention!

Write to us: k-force.pmt@uns.ac.rs

Follow us: <http://kforce.uns.ac.rs/>