

## Application

Programme	Erasmus+
Action Type	KA220-HED - Cooperation partnerships in higher education
Call	2023
Round	Round 1

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## Context

Field	Higher Education			
Project Title	SUustainable Disaster and Emergency Management processes digitization			
Project Acronym	SUDEM			
Project Start Date (dd/mm/yyyy)	Project total Duration	Project End Date (dd/mm/yyyy)	National Agency of the Applicant Organisation	Language used to fill in the form
01/11/2023	24 months	31/10/2025	BG01 - Human Resource Development Centre (HRDC)	English
Project lump sum	250 000,00 €			

For further details about the available Erasmus+ National Agencies, please consult the following page: [List of National Agencies](#).

## Project Summary

Please provide a short summary of your project. Please be aware that this section (or parts of it) may be used by the European Commission, Executive Agency or National Agencies in their publications. It will also feed the Erasmus+ Project Results Platform.

Be concise and clear and mention at least the following elements: context/background of project; objectives of your project; number and profile of participants; description of activities; methodology to be used in carrying out the project; a short description of the results and impact envisaged and finally the potential longer-term benefits. The summary will be publicly available in case your project is awarded.

In view of further publication on the Erasmus+ Project Results Platform, please also be aware that a comprehensive public summary of project results will be requested at report stage(s). Final payment provisions in the contract will be linked to the availability of such summary.

### Objectives: What do you want to achieve by implementing the project?

1. Generating a common European pool of adequately prepared disaster management experts of the future.
2. By implementing the SUDEM approach - to reach a higher disaster management preparedness on a national level within the partner organisations and beyond - through digitization.
3. Free access to the open-source learning platform will ensure the achievement of a broad impact among future, ongoing and current experts in the relevant domains.
4. Reduce disaster victims

### Implementation: What activities are you going to implement?

The main activity is the launch of a digital educational platform including relevant courses which will assist in reaching a higher disaster management preparedness - in HED and LLL. It involves the foresight analysis and development of a suitable curriculum as well as a feedback system serving as a means for the continued improvement of the courses. Additionally, communication and dissemination activities are planned so interested sides can track the progress and achievements of the project.

### Results: What project results and other outcomes do you expect your project to have?

The most important result for this project is the improvement of disaster management preparedness, by the learnign package envisaged. A consequent result of this will be the decrease of victims due to the betterment of many aspects and systems inside disaster management. Other outcomes include the increased digitalisation of this field and the improvement of decision-making capabilities, as well as the creation of a larger shared pool of highly capable European experts in this area.

## Applicant organisation

OID	Legal name	Country	Region	City	Website
E10103255	Space Research and Technology Institute, Bulgarian Academy of Sciences	Bulgaria	София (столица) (Sofia (stolitsa))	Sofia	<a href="http://www.space.bas.bg/">www.space.bas.bg/</a>

## Partner organisations

OID	Legal name	Country	Region	City	Website
E10154317	HOCHSCHULE OFFENBURG	Germany	BADEN-WÜRTTEMBERG	OFFENBURG	<a href="http://www.hs-offenburg.de">www.hs-offenburg.de</a>
E10212116	West Ukrainian National University	Ukraine	Ukraine	TERNOPIIL	<a href="http://www.wunu.edu.ua">www.wunu.edu.ua</a>
E10326291	Composite Information Technologies B.V.	Netherlands	Overijssel	Enschede	
E10029034	LVIV STATE UNIVERSITY OF LIFE SAFETY	Ukraine	Ukraine	LVIV	<a href="http://ldubgd.edu.ua/">http://ldubgd.edu.ua/</a>

## Workpackages summary table

Please note that it is recommended to split your projects in a maximum of 5 work packages, including the one on project management.

In this section, please do not add the work package project management already included in the previous section.

Work package id	Title	Number of activities	Grant (EUR)
1	Project Management		36 000,00
2	Foresight and Phase 1 of Learning Concept and Curriculum Development	2	18 000,00
3	Learning Concept and Curriculum Development	3	142 000,00
4	Digital Learning and Quality Feedback environment	2	34 000,00
5	Communication, Dissemination and Policy Recommendations	3	20 000,00
<b>Total</b>			<b>250 000,00</b>



## Project budget summary

This section provides a summary of the estimated project budget. The table is automatically completed taking into account the described work packages and their estimated cost.

Budget Items	Allocated amount (EUR)
Work package n°1 'Project Management'	36 000,00
Work package n°2 - Foresight and Phase 1 of Learning Concept and Curriculum Development	18 000,00
Work package n°3 - Learning Concept and Curriculum Development	142 000,00
Work package n°4 - Digital Learning and Quality Feedback environment	34 000,00
Work package n°5 - Communication, Dissemination and Policy Recommendations	20 000,00
<b>Total</b>	<b>250 000,00</b>

### Distribution of the grant amount among participating organisations

WP	Coordinator (EUR)	Partner 1 (EUR)	Partner 2 (EUR)	Partner 3 (EUR)	Partner 4 (EUR)	Total (EUR)
Work package n°1 'Project Management'	12 000,00	6 000,00	6 000,00	6 000,00	6 000,00	36 000,00
Work package n°2 - Foresight and Phase 1 of Learning Concept and Curriculum Development	6 000,00	5 000,00	2 000,00	3 000,00	2 000,00	18 000,00
Work package n°3 - Learning Concept and Curriculum Development	29 000,00	51 000,00	20 000,00	26 000,00	16 000,00	142 000,00
Work package n°4 - Digital Learning and Quality Feedback environment	2 000,00	24 000,00	2 000,00	4 000,00	2 000,00	34 000,00
Work package n°5 - Communication, Dissemination and Policy Recommendations	5 000,00	3 000,00	6 000,00	4 000,00	2 000,00	20 000,00
<b>Total</b>	<b>54 000,00</b>	<b>89 000,00</b>	<b>36 000,00</b>	<b>43 000,00</b>	<b>28 000,00</b>	<b>250 000,00</b>
<b>Project lump sum (EUR)</b>						<b>250 000,00</b>



## Participating Organisations

To complete this section, you will need your organisation's identification number (OID). Since 2019, the Organisation ID has replaced the Participant Identification Code (PIC) as unique identifier for actions managed by the Erasmus+ National Agencies.

**If your organisation has previously participated in Erasmus+ with a PIC number, an OID has been assigned to it automatically. In that case, you must not register your organisation again.** Follow this link to find the OID that has been assigned to your PIC: [Organisation Registration System](#)

You can also visit the same page to register a new organisation that never had a PIC or an OID, or to update existing information about your organisation.

### Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG)

Organisation ID	Legal name	Country
E10103255	Space Research and Technology Institute, Bulgarian Academy of Sciences	Bulgaria

#### Applicant details

Legal name	Space Research and Technology Institute, Bulgarian Academy of Sciences
Country	Bulgaria
Region	София (столица) (Sofia (stolitsa))
City	Sofia
Website	<a href="http://www.space.bas.bg/">www.space.bas.bg/</a>

#### Profile

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	National Public body

## Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

The Space Research and Technology Institute (SRTI) conducts fundamental and applied research in the field of space physics, remote sensing of the Earth and planet and aerospace systems and technologies.

For more than 40 years of its history, SRTI-BAS has achieved significant results in the field of space research: more than 150 scientific instruments and apparatus have been created and used in orbit and the airspace, and dozens of experiments under various international and national have been conducted.

Main areas of research and doctoral studies are:

- Unmanned Aerial Systems development, integration, operation and evaluation, incl. foresight analysis. Applications for disaster management, goods and passengers transportation, observation etc.
- Solar-Terrestrial and Space Physics (solar wind, magnetospheric and ionospheric physics, high and middle atmospheric physics, space weather);
- High-energy astrophysics, galactic cosmic rays;
- Medico-biological studies, space biotechnologies, heliobiology, telemedicine;
- Design, development and transfer of methods, instrumentation and technologies for remote sensing of the Earth, regional and global monitoring of the environment and security;
- Research in the field of obtaining and application of new superhard materials.
- Development of innovative aerospace instrumentation and technologies, as well as their transfer to economy.

The Space Research and Technology Institute at the Bulgarian Academy of Sciences (SRTI-BAS) has many years of tradition and success in the inventive and patent activities. This is largely motivated and provoked by the object and methods of aerospace research and technology, the need to apply non-traditional methodological and technical solutions, and last but not least the affinity of our scientists and specialists for innovation.

SRTI has institutional accreditation for the training of doctoral students under the following programs:

- Astrophysics and stellar astronomy;
- Physics of the ocean, the atmosphere and the Earth's space;
- Remote sensing of the Earth and Planets;
- Dynamics, ballistics and flight control of aircrafts;
- Automated information processing and management systems

Currently, over PhD students are trained at SRTI.

Specialized PhD courses on "Fundamentals of Remote Sensing" and "Natural Disasters and Environmental Disasters" and specialized courses in theoretical and practical training of operators of unmanned aerial vehicles have been developed and implemented.

The "Space School" educational initiative is being held to familiarize students and professionals interested in space-related science and Earth observation with modern advances in aerospace research and technologies.

The main line followed by SRTI-BAS in the context of education is to offer its accredited doctoral program incl. Unmanned Aerial Systems design and application, terrestrial observation, as well as classical airspace engineering. In addition to that, SRTI operates its own LifeLong Learning center, focused on educating and training existing and ongoing professionals in the field of drones design, system integration, as well as application and operation. The LLL education and training centre successfully operate for over a decade and offers special courses to various private and public organisations, with a serious focus on disaster events observation and monitoring, where the SRTI team has advanced expertise.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

SRTI has performed various developments and implementation projects regarding system engineering and innovations in/for disaster management.

SRTI has recently developed its own systemic solutions for surveillance and monitoring of disaster events, and their consequences, based on Unmanned Aerial Systems (UAS). The well-recognized institute on national and international level, and its relevant working group for Unmanned Aerial Systems (aerial drones and communication /navigation systems) in particular, is active in following three focus fields: A. unmanned aircraft development, B. communication systems development and integration, as well as C. systemic application scenario development, validation and verification. The majority of the educational and lifelong learning activities of SRTI are nowadays focusing on earth and settlements observation, as well as application of novel aeronautical systems, such as drones.

SRTI has established its own Lifelong Learning centre, focusing on multidisciplinary courses on UAS development, and mainly UAS operations.

The Institute has a major role within the National U-space coordination group, aiming the sustainable integration of drone operations within the novel overall airspace system.

Prof. Dr.Sc. Dr. Dimo Zafirov leads the Working Group on UAS at SRTI, as well as the project team here. He's graduated in Aircraft Engineering from the Technical University of Sofia. He has been a professor at the Technical University of Sofia, as well as SRTI, and also in the industries - as team leader of an R&D division for UAS at the Bulgarian Military Technologies Institute, and afterwards at his own commercial company holding. He has elaborated and applied various learning courses for the HED and LLL, as well as aircraft design books. His work focuses on unmanned aircraft and systems design, as well as related foresight studies regarding their future integration.

Prof. Dr. Petar Getsov is also involved. He has led the Scientific Council of SRTI, initiated, coordinated and performed over 100 applied research projects in the field of aeronautic engineering - predominantly in the civil application areas. Prof. Getsov has initiated and realized several crucial initiatives and undertakings, such as the participation of SRTI and Bulgaria within the ESA joint framework programme, as well as various other key international cooperations and projects. His professional focus, besides the scientific and academic management, is the strategic planning and system design in the context of space and airborne systems, and the control systems. In the relevant project field of SUDEM he has been the pioneer in Bulgaria, with the project initiated and coordinated by him "Strengthening and Expansion of the Aerospace Technology Transfer Office in the Field of Protection of Citizens' Health in Disasters" – BG161PO003-1.2.02.

Dr. G. Georgiev, completes the team's capabilities by outstanding expertise in international interdisciplinary strategic project design & management.

In the context of multidisciplinary disaster management - the main topic of the envisaged learning concept, curriculum and finally project - several relevant fields are covered by the team of SRTI with a high level of expertise and experience:

1. Complex interdisciplinary system engineering in the context of distant monitoring of disasters and extraordinary social events
2. Foresight analysis in terms of innovation integration in the field of aeronautic engineering incl. disaster management involving all capabilities of the modern (unmanned) aviation, space technologies, communication technologies, disaster situations safeguarding coordination
3. Training of ongoing and established professionals in the police, military and other public domains with focus on drones application and integration
4. Planning and coordination of large-scale projects in the field of astronautics and aviation.

Action Type	As Applicant		As Partner or Consortium Member	
	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships for higher education (KA203)	0	0	1	0
Newcomer organisation		Yes		
Less experienced organisation		Yes		
First time applicant		Yes		

Would you like to make any comments or add any information to the summary of your organisation's past participation?

Since 2004 SRTI-BAS is organizing an annual conference "Space, Ecology, Safety" which proceedings (ISSN ) can be found on the SRTI-BAS website. Few more workshops and conferences were organized by STIL-BAS before the reform in 2010. Their proceedings can also be found in the 'Publishing activity' section of SRTI-BAS website.

The Aerospace Research in Bulgaria journal was founded in 1978 under the name Space Research in Bulgaria. Its founder and first editor was Acad. Kiril Serafimov (1978–1990). Over the years, editors were Prof. Boris Bonev (1991–1996), Prof. Nikola Georgiev (1996–2006), and Prof. Garo Mardirossian (2006–until now). The Journal has been changing its name two times. Firstly, it was issued under Space Research in Bulgaria (ISSN 0204-9104, No. 1–8), from No. 9 to No. 15 its name was changed to “Аерокосмически изследвания в България” (ISSN 0861-1432) continuing the policy from the first issues to publish in Bulgarian, Russian, and English. Since 2001, the journal name was changed to Aerospace Research in Bulgaria (No. 16-, ISSN 1313-0927, eISSN 2367-9522) and its content is entirely in English, with summaries in Bulgarian or Russian.

Prof. Zafirov and his team are intensively involved in the European Initiative for Urban Air Mobility, aiming to develop the European ecosystem for aerial drones integration and applications within populated areas. Dr. G. Georgiev from the team is acting as elected Ambassador of the initiative, led by Airbus, for Bulgaria.

The key person from SRTI who is involved in the project is Prof. Dr. Dimo Zafirov. He is a prominent member, and a scientific PhD director, of the Space Research and Technology Institute at the BAS, and together with his team have demonstrated strong skills in systemic Foresight analysis, and a rich experience in training and practice for/with disaster management organisations, as well as in projects for defence and security. Furthermore, he possesses understanding when it comes to aerial monitoring using both drones and satellites, and has also had the leading role within the national U-space definition Working group. In addition to that, has expertise in drone operations happening in complex environments, which includes GNSS-free zones, and has knowledge in systems architecture design. The organisation itself has a 50 years old history of remote monitoring, cosmic, aerial, and terrestrial, on Bulgarian territory. Other relevant involved experts include Prof. Petar Getsov - an expert in programs for astronaut training and preparation, as well as projects for defence and security, Prof. Georgi Jeleu - an expert in drone monitoring, and Prof. Garo Mardirosian who has experience and know-how in remote monitoring and risk analysis. SRTI has long experience in PhD education and brings relevant knowledge on detailed curriculum development.

## Partner Organisations

Organisation ID	Legal name	Country
E10154317	HOCHSCHULE OFFENBURG	Germany
E10212116	West Ukrainian National University	Ukraine
E10326291	Composite Information Technologies B.V.	Netherlands
E10029034	LVIV STATE UNIVERSITY OF LIFE SAFETY	Ukraine

### HOCHSCHULE OFFENBURG (E10154317 - DE)

#### Partner organisation details

Legal name	HOCHSCHULE OFFENBURG
Country	Germany
Region	BADEN-WÜRTTEMBERG
City	OFFENBURG
Website	<a href="http://www.hs-offenburg.de">www.hs-offenburg.de</a>

#### Profile

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	Higher education institution (tertiary level)

#### Accreditation

Accreditation Type	Accreditation Reference
Erasmus Charter for Higher Education	D OFFENBU01

## Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

The University of Applied Sciences Offenburg was founded in 1964 and from there it was continuously growing with regard of campuses, buildings, faculties and courses. The faculties of Electrical Engineering, Medical Engineering and Computer Science (EMI), Mechanical and Process Engineering (M+V), and Media and Information Technology (M+I) are located on the Offenburg campus. There are five buildings in Offenburg, the latest of which was completed in 2014. They house more than 50 laboratories. In Gengenbach, the Faculty of Business Administration and Industrial Engineering (B+W) is located in the former Benedictine monastery of Gengenbach and in the educational campus, which was inaugurated in 2013. The four faculties of the Hochschule Offenburg offer 26 Bachelor's programs and 21 Master's programs.

The Institute for Reliable Embedded Systems and Communication Electronics (ivESK) at the University of Applied Sciences Offenburg (HS Offenburg) is a leading research institution in the field of research and pre-development of communication solutions for the Internet of Things. The currently 12 full-time staff members have deep know-how in the design, implementation and validation of secure, reliable, modular and efficient IoT applications from many third-party funded projects. Prof. Dr.-Ing Axel Sikora heads the institute. He is a proven expert in the field and experienced project manager. The Internet of Things is increasingly pervading industrial and personal applications, including, for example, smart meters and smart grids, industrial and process automation, Car-to-Car and Car-to-X communication, home and building automation, telehealth and telecare applications. Wired and wireless networks of embedded systems, as well as their interconnection in "cyber-physical systems" (CPS) are playing an increasingly important role in this context. As more and more systems perform functionally critical tasks autonomously, their reliability and security are also continuing to gain in importance. Consequently, data security and privacy aspects need to be addressed. The Institute of Reliable Embedded Systems and Communication Electronics (ivESK) at Hochschule Offenburg (HSO) was formed to focus on these issues. We are especially active in the following areas:

- + Conception and implementation of efficient and modular, wired and wireless communications protocols using embedded systems e.g. 6LoWPAN, 5G/NB-IoT/5.xG/6G, LPWA (LoRa/LoRaWAN, SIGFOX, MIOTY), Wireless M-Bus, TSN-Ethernet, TSN-over-anything
- + Conception and implementation of integrated security architectures for communications solutions using embedded systems e.g. embedded TLS1.2, PKI solutions for distributed applications, blockchain technologies for industrial applications
- + Conception and implementation of efficient and secure, embedded computing platforms e.g. Embedded Linux (SpeedBoot, virtualization)
- + Testing and verification of communications solutions e.g. with automated physical testbed (APTb) e.g. with network simulation and emulation
- + End-to-end security solutions between resource-restricted devices and powerful components, and connection to a cloud ecosystem

ivESK has a team consisting of more than a dozen researching and teaching members, covering the areas of expertise described above. ivESK focuses its teaching activities within professional and dual higher education courses, as well as Lifelong Learning.

ivESK has performed contract activities for relevant governmental organisations from the field of Disaster Management in Germany, related to remote sensing, edge computing, sensor data fusion, sensor data handling etc.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

HSO and its key involved persons bring a lot of expertise and skills from subjects highly relevant to the project as well as to the modern IoT and process digitization. The experience is in the state-of-the-art areas of Intelligent IoT, Communications & Security, and Distributed computing. They also bring knowledge on Machine Learning and more specifically federated learning, fog computing, etc. Furthermore, Digital transformation, and User experience are also part of HSO's know-how. The ivESK team of Prof. Sikora has been involved in various applied research and education projects on national and international level. It has been also involved in several large-scale undertakings for supporting the local and regional economy in the geographical area of the institute, by offering training, education and consultancy in the cross-over field of digital transformation technologies and entrepreneurship. Prof. Sikora has supported various undertakings for bringing innovation, higher and LLL education, as well as industries to working together and generating high added value for professionals, companies and economy.

Prof. Dr.-Ing. Dipl.-Ing. Dipl. Wirt.-Ing. Axel Sikora has been at the University of Applied Sciences Offenburg since 2011 and has headed the Institute for Reliable Embedded Systems and Communication Electronics (ivESK), which he founded in 2015. He is author and co-author of more than 200 professional articles and several books and is a member of numerous program committees. Among other things, he is a scientific advisor to the annual Wireless Congress and deputy chairman of the embedded world Conference, the world's largest conference on the subject. For many years he has been in charge of several cooperations, among others with universities in India, Russia and Tunisia, as well as further research and teaching cooperations with partners in France, Israel, South Africa and China.

ivESK has supported also projects of strategic importance on regional and national level, related to cyber security and industry 4.0, being invited by different levels of Governments in Germany and the EU.

Mr. Jubin Sebastian E - an involved highly experienced expert from the ivESK team - is an experienced Wireless IoT /5G Researcher and Test Engineer with over 10 years of professional experience in research and development, project management, and teaching. He is currently pursuing his Ph.D. in Test and Verification of Wireless Communication Systems for IoT and Industry 4.0 at Offenburg University, Germany, and has authored and co-authored over 10 research articles and given presentations at various conferences. Jubin has extensive knowledge of wireless IoT systems and mobile communication technologies and has worked on projects related to use cases around IoT, Industry 4.0, Car 2 Car & Car 2X, smart waste management, and home/building automation. In addition to his research work, he also has experience as a lecturer & program coordinator in Electronics and Communication Engineering Departments at engineering colleges in India and as a Tech Lead in the 5G/IoT Academic Portfolio at DADB - German Academy of Digital Education GmbH, where he designed and developed 5G and Industrial IoT online training portfolios for the international market.

Ms. Julia Junker works as an administrative staff at the Institute for Reliable Embedded Systems and Communication Electronics (ivESK) at the University of Applied Sciences Offenburg. She mainly takes care about international cooperation and exchange programs.

ivESK and its team are a solid knowledge and know-how carrier on various topics related to Disaster management and have performed relevant contracted activities for governmental organisations towards setting and improving the flood events awareness, respectively with focus on remote sensing, low-energy-consuming distant sending, edge computing, sensor data fusion and handling, as well as developing and integrating relevant sensor technologies.

Action Type	As Applicant		As Partner or Consortium Member	
	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships for higher education (KA203)	1	0	5	2
Cooperation partnerships in higher education	0	0	1	1
Newcomer organisation	No			
Less experienced organisation	No			

Would you like to make any comments or add any information to the summary of your organisation's past participation?

ivESK-HSO has successfully participated at 1 ERASMUS KA203 project, called EREMI, focusing on developing and implementing a novel concept and curriculum for higher education and Lifelong Learning on Resource Efficiency in the Manufacturing Industries, involving sensor technologies, artificial intelligence and other specialities from its portfolio.

Numerous research and development projects have been pursued at ivESK at HSO:

#### 1. Current projects

- + PKI in Infrastrukturen für Industrielle Automatisierungstechnik mit 5G - PIA5G - BSI 01MO23005C - (2023-2024)
- + Private 5G-Netzwerke für die Industrie; Teilvorhaben: Synchronisierung und Integration industrieller und sicherheitsrelevanter Kommunikationsprotokolle - stig5G - BMWK 01MJ22018A - (2022-2025)
- + Entwicklung, und Konfiguration von TSN-basierten User-Plane-Functions für 5G-Campus-Netzwerke - CampusTSN - ZIM KK5189603ER1 - (2022-2024)
- + Konzeptionierung, Implementierung und Validierung eines hybriden Wired and Wireless OPC UA über TSN-Protokollstacks für Deeply Embedded Systems - WiWiOPT - ZIM KK51896604MS1 - (2022-2024)
- + Toolset zur niederschweligen Partizipation der mittelständischen Industrie am Energiemarkt der Zukunft - FlexGuide - BMWi 03EI6065C - (2022 - 2024)
- + Applied Research, Development & Teaching on Internet of Things for Sustainable, Secure, and Safe Communities - ARTISSS - DAAD 57625476 - (2022)
- + Verbundprojekt: Eindeutige Identifizierbarkeit für vertrauenswürdige Hybrid-Sensorelektronik mit Hilfe additiver Fertigung - SensIC - BMBF 16ME0303 - (2021 - 2024)
- + Distributed IoT-Platforms for Safe Food Production - in Education, Research and Industry - DIPPER - DAAD 57557211/BMBF 01DG21017- (2021 - 2024)
- + Prozesse und Kommunikationsprotokolle für ein Security Lifecycle Management in industriellen Feldbusgeräten und -systemen - FieldPKI - AIF/DFAM 21752N - (2021 - 2023) + Education for Resource Efficiency in Manufacturing Industries - EREMI - ERASMUS+ - (2021 - 2023)
- + Cooperation to Learning Internet of Things - Cool-IoT - DAAD 57598399 - (2021 - 2022)
- + Entwicklung eines modularen Managementframeworks für verteilte Echtzeit-Anwendungen auf Basis von TSN und OPC UA - ControlTSN - ZIM ZF4253610MS9 - (2020 - 2022) + Inklusives Smart Meter: Künstliche Intelligenz zur Unterstützung der proaktiven Steuerung des Energieverbrauchs durch Endnutzer - Smart Meter Inclusif - INTERREG - (2019 - 2023).
- + Integriertes Testbed für die ubiquitäre, durchgängige, echtzeitfähige und zuverlässige Kommunikation für Industrie 4.0 - TestKomm - AIF/ZVEI 21639N- (2021 - 2023)
- + Entwicklung einer Industrie 4.0-tauglichen Technologie zur funktionalen und prozessualen Ausgestaltung prädiktiver und intelligenter Instandhaltungssysteme - Predictive Maintenance - (2019 - 2023).

#### 2. Past projects

- + Flexible, erweiterbare und offene LoRa-Technologien im 2,4 GHz-ISM-Band - LongRange24 - (2020 - 2022)
- + Sichere Elektronik für die digitalisierte und vernetzte Produktion - SichEL - (2019 - 2022).



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**West Ukrainian National University (E10212116 - UA)****Partner organisation details**

Legal name	West Ukrainian National University
Country	Ukraine
Region	Ukraine
City	TERNOPIIL
Website	<a href="http://www.wunu.edu.ua">www.wunu.edu.ua</a>

**Profile**

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	Higher education institution (tertiary level)

## Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

West Ukrainian National University (WUNU) is a classical university of Ternopil, one of a leading modern educational institution in Ukraine. It has a multidisciplinary scope of majors and among them Computer Science, Cybersecurity, Project Management, Software Engineering play a significant role. The WUNU is an important partner when it comes to providing expertise and insight in the areas of AI, Data handling, Cyber Security and importantly in Disaster management and its digitization.

The Research Institute for Intelligent Computer Systems(ICS) was founded in 2004 on a basis of Branch Research Laboratory of Automated Data Acquisition and Processing Systems, established in 1984. Since 2007, the ICS is under joint supervision of WUNU and the Glushkov Institute of Cybernetics, National Academy of Science, Ukraine. During its history, the ICS staff has got more than 150 invention certificates of the former USSR and 66 Ukrainian patents, published more than 1100 scientific papers and defended 44 DSc and PhD theses, The main mission of ICS is an intensification of research and development in Advanced Computing on the intercorporate and .international basis. The ICS counts the 18 Research Groups with activities in following areas:

- Information Security,
- Intelligent Cyber Security & Defense and Design,
- Testing of FPGA Component for Safety Related Systems
- Wireless Systems Security
- Virtual Instruments for IoT
- Big Data and Data Science
- Hybrid Systems of Computational Intelligence
- Human-Computer Interaction
- Intelligent Distributed Systems,
- Intelligent Sensor Data Acquisition,
- Intelligent Robotic Systems,
- Neural Networks and Parallel Computing,
- Knowledge Bases and Ontologies,
- Information Technology and Specialized Computer Systems,
- Image Processing and Pattern Recognition,
- Cybernetics of Complex Systems,
- Project and Program Management based on IT and Knowledge,
- Metrology of Information Measuring Systems.

The ICS' worldwide reputation is proved by winning since 1997 more than 20 international grants and followed projects within the Horizon 2020, Erasmus+, FP7, INTAS, CRDF, NSF, NATO, STCU and bilateral international programs. ICS researchers are organizing the IEEE International Intelligent Data Acquisition and Advanced Computing Systems (IDAACS) Conference since 2001 every two years, and they are co-organizing the International Symposia on Wireless Systems within the IDAACS Conference since 2012. Since 2002, the ICS is issuing the International Journal of Computing indexed by Scopus.

A part of WUNU is represented by the ICS team, consisting of over 20 researching and academic members, covering the areas of expertise described above. The ICS focuses its teaching activities within professional and dual higher education courses for national and international students, in the field of safety and security management, with a special focus on nuclear power stations safety and security.

Subjects currently taught by ICS-WUNU: Fundamentals of Cyber Security, Cyber Security, Computer Network Security, Blockchain and Digital Currencies, Security Testing, Computer Penetration Testing, Research Methodology

Research interests of ICS-WUNU:

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

Prof. Anatoliy Sachenko was graduated in Electrical Engineering from Lviv Polytechnic Institute and got PhD in Electrical Engineering from Physics-mechanical Institute, NAS of Ukraine, and DSc Degree in Electrical and Computer Engineering from Leningrad Electro technical Institute. He is a Full Professor in Computer Engineering since 1991. He has been a Dean of the Faculty for Computer Information Technologies, WUNU in 1994-2005 and a Dean of American-Ukrainian School for Computer Science in 2007-2009. He currently is a Professor of Department for Information Computer Systems and Director of Research Institute for Intelligent Computer Systems, He was a Leader of a team completing more than 20 international projects within Frame 7, Horizon, NSF, CRDF, NATO Programs, Erasmus+ , DAAD, and WUNU Coordinator of projects: DAAD project " Virtual Master Cooperation on Data Science (ViMaCs)" . He was a Fulbright Professor in USA: University of Maine (2002-2003) and University of New Hampshire (summer semester of 2010-2011). He had the three-month work placement in Northern Telecom, Toronto, Canada in 1993, one-month internship at University of Siegen, Germany in 2015, and two-month internship at University of Applied Science, Berlin, Germany in 2019. He is General Chairman of regular IEEE IDAACS Conferences since 2001, and he got the IEEE I&M Award for outstanding organization of the 4th IDAACS'2007 Conference, Dortmund, Germany, 2007.. He is Editor-in-Chief of International Journal of Computing. Among

his main area interests are Computational Intelligence in Applications, Cyber Security, IoT intelligent devices, Wireless Sensors Networks. In this area, he published a significant number of papers and got patents applicable to critical infrastructure. He is a Honorary Chairman of IEEE IDAACS Symposia on Wireless Systems (IDAACS-SWS) since 2012, and he was Co-Chairman of the International Summer School on Wireless Networks in 2011. He was the WUNU Coordinator of project "Internet of Things: Emerging Curriculum for Industry and Human Applications ALIOT" (2016-2020), and Co-Chairman of NATO Advanced Research Workshop "Home-and Cybersecurity", Gdansk, Poland, 2004. Prof. Anatoliy Sachenko is a key person, a coordinator of WUNU team. Prof. Vasyl Yatskiv is involved into project as well. He is a head of the Department for Cyber Security. He holds a PhD for cyber security. His teaching and research activities focus on the domains Fundamentals of Cyber Security, Cyber Security, Computer Network Security, Blockchain and Digital Currencies, Security Testing, Computer Penetration Testing, Research Methodology. His major scientific fields of interest are Wireless sensor networks, Cybersecurity, IoT, Residual class system, Distributed storage systems. Dr Pavlo Bykovyy has PhD in Computer Engineering with area of interests in Cyber Security and IoT. He has been a manager of several international projects, and he developed a website for several IDAACS conferences.

Action Type	As Applicant		As Partner or Consortium Member	
	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships for higher education (KA203)	0	0	2	1
Newcomer organisation		No		
Less experienced organisation		Yes		

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**Composite Information Technologies B.V. (E10326291 - NL)****Partner organisation details**

Legal name	Composite Information Technologies B.V.
Country	Netherlands
Region	Overijssel
City	Enschede
Website	

**Profile**

Is the organisation a public body?	Yes
Is the organisation a non-profit?	No
Type of Organisation	Research Institute/Centre

## Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

Composite Information Technologies BV (CIT) is an enterprise with an over 25 years history. It has been established and continuously developed by Prof. Dr. Mehmet Aksit. Prof. Aksit has been a Full Professor for Formal Methods and Tools at the University of Twente in The Netherlands.

The company has focused on applied research and Lifelong Learning activities, incl. novel curriculum development and Train-the-Trainers approaches.

Prof. Aksit and CIT has an official liaison with AFAD - Disaster and Emergency Management Presidency of the Republic of Türkiye (The coordination authority for disaster management workflows in Türkiye) - and is currently establishing the applied research and innovation centre there, aiming to significantly enhance AFAD's activities in future, by automating data handling and decision making support preparation. Prof. Aksit and his team have been actively involved in AFAD's activities during the recent month, after the two major earthquakes in the East of Turkey. CIT is representing also AFAD here, since they have shared goals and activities.

Turkey ranks third in the world in terms of earthquake-related casualties and eighth with regard to the total number of people affected. Every year, the country experiences at least one 5 magnitude earthquake – which renders the proper management and coordination of disasters absolutely crucial.

Turkey's disaster policy dates back to the aftermath of the 1939 Erzincan earthquake, which claimed nearly 33.000 lives and left at least 100.000 injured. Two decades later, the Turkish Parliament adopted the Law on Precautions to be Taken due to Disaster Affecting Public Life and Assistance to be Provided (No.7269) in order to fill the long-existing legal void. The legislative effort on disaster continued with the 1988 by-law on the Principles of the Organization and Planning of Emergency Assistance Regarding Disasters.

The 1999 Marmara earthquake, however, marked the turning point in the area of disaster management and coordination.

This devastating disaster clearly demonstrated the need to reform disaster management and compelled the country to establish a single government institution to single-handedly coordinate and exercise legal authority in cases of disaster and emergencies. In line with this approach, the Turkish Parliament passed Law No.5902 in 2009 to form the Disaster and Emergency Management Authority (AFAD) under the Prime Ministry and abolish various agencies under whose jurisdiction the issue previously fell. Turkey adopted a presidential system of governance after a referendum that took place on April 16, 2017. And the new executive presidential system entered into force with the June 24 elections. Presidential Decree No. 4 which was published in the Official Gazette on July 15, 2018 and the Disaster and Emergency Management Authority (previously an agency under the office of Prime Ministry) re-formed as an agency under the Ministry of Interior.

Over the past seven years, the Disaster and Emergency Management Authority successfully coordinated to Turkey's response to a number of devastating earthquakes and floods, among others, and helped survivors get their lives back on track. At the international level, AFAD completed successful missions to provide humanitarian assistance to over 50 countries in 5 continents including Somalia, Palestine, Ecuador, Philippines, Nepal, Yemen, Mozambique, Chad and many others.

AFAD is undergoing a serious digitization process, crucial for the future success in handling complex multidisciplinary and international disaster management situations and processes. AFAD has over 15.000 staff members, structured in several major departments, incl. R&D, and Education. Highly relevant for the SUDEM team is the experience and expertise of AFAD's team - both in the practice and education area, where AFAD offers a unique experience in centralized coordinated disaster management, as the practice elsewhere in Europe is different.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

Prof. Mehmet Aksit has been actively carrying out on new generation disaster management systems, and has developed new concepts, system architectures and key performance indicators for this purpose. From 2000 until 2014, Prof. Aksit was the principle responsible for the Software Education Program at the University of Twente. He took the major role in establishing the Computer Science, Software Education Master program in 2002. After 2014, the Software Engineering Master Program has been called Master Program for Software Technology. Examples of courses that he has given at the University of Twente are: Advanced Programming Concepts, Aspect-Oriented Programming, Concepts of programming Languages, Design of Software Architectures, Software Engineering Models, Product Line Engineering, Software Management, Patterns of Software Development, Object-Oriented Systems.

Furthermore, when it comes to curriculum development, CIT has valuable experience with in-company courses, external training programs and conference tutorials. Within the Post Academic Course Organization, Prof. Aksit's professional courses have been among the highest rated courses in the Netherlands. Special in-company training programs have been organised for large organisations. In the following countries, more than 120 professional courses have been given on system design, digitization and maturation, from 1990 to 2019: Belgium, Canada, Denmark, France, Germany, Hungary, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, United States.

Other relevant experience of Prof. Aksit comes from his work as the chair of the sub-department Software Engineering of the Faculty of Electrical Engineering, Mathematics and Computer Science (EWI). There he was responsible for the following

tasks and activities. Determining the short term and long-term research strategy. Assuring that the Software Engineering Bachelor and Master education program fulfils the expectations. Renewal of the program if necessary. Assuring that the research results are qualified as excellent. Assuring that the education activities are qualified as excellent. Motivate, supervise, assist, and evaluate the personnel including the permanent staff (assistant and associate professors). Provide sufficient financial resources through project acquisition. Financial management. Control and authorise the spending of the resources of the sub-department. Technology transfer to industry through joint projects and professional courses. Consulting activities so that our expertise and knowledge can be exploited by industry.

Additionally, and as importantly, Prof. Mehmet Aksit is currently affiliated with the AFAD Presidency in Ankara Türkiye, where he carries out research and education activities. The approach is based on the novel application and composition of promising areas of research such as: IoT technologies, Critical infrastructures, Big data analytics, Machine learning and ontologies, Task generation, optimization and scheduling, Digital twins, Conflict and inconsistency management and tracking. As for software engineering topics, the work is focused on product-line architectures, Digital ecosystems, and Systems of systems.

The Disaster and Emergency Management Authority (AFAD), to which CIT is affiliated and work together, is a Governmental institution in Türkiye working to prevent disasters and minimise disaster-related damages, plan and coordinate post-disaster response, and promote cooperation among various government agencies. In this regard, the Disaster and Emergency Management Authority introduced a novel disaster management model which prioritises Turkey's transition from crisis management to risk management – which came to be known as the Integrated Disaster Management System. AFAD currently has 81 provincial branches across Turkey in addition to 11 search and rescue units.

Action Type	As Applicant		As Partner or Consortium Member	
	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Newcomer organisation			Yes	
Less experienced organisation			Yes	

Would you like to make any comments or add any information to the summary of your organisation's past participation?  
no

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**LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)****Partner organisation details**

Legal name	LVIV STATE UNIVERSITY OF LIFE SAFETY
Country	Ukraine
Region	Ukraine
City	LVIV
Website	<a href="http://ldubgd.edu.ua/">http://ldubgd.edu.ua/</a>

**Profile**

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	Higher education institution (tertiary level)



## Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

Lviv State University of Life Safety is a leading institution of higher education in Ukraine in the field of human safety, recognized as a leader in national education and the consolidated All-Ukrainian ranking of higher education institutions in Ukraine. The University is a member of the European Union Association of Higher Education Institutions Working in the Field of Human Security (EFSCA).

Lviv State University of Life Safety, as an educational and scientific institution, works to mitigate the man-made load on the environment and prevent emergencies, trains specialists in the field of human safety. That is why the advanced nature of education is the basis of the educational institution.

The university is a kind of educational research and educational center that provides the principles of gradual, continuing education.

The Lviv State University of Life Safety prepares and trains specialists, and conducts research related to the following areas. Increasing the level of safety of objects and settlements. Development, research, testing and implementation of fire detection and extinguishing systems, search for new flame retardants, combustion inhibitors and phlegmatizers, methods and devices for their supply. Fire research, development and improvement of means and tactical methods of extinguishing fires. Methods of information analysis and synthesis of phenomena that occur during man-made and natural emergency situations, and the development of technologies for their elimination. Development of state and organisational-management measures in the field of civil defence and fire safety. Formation of moral and psychological qualities of an officer of the operational rescue service of civil protection of the State Emergency Service of Ukraine. Pedagogical aspects of educational activities in the field of human safety. Research and development of methods to improve the ecological situation of polluted areas. Analysis and development of innovative software for information protection. Development of occupational health and safety. Improvement of methods of social work, introduction of innovations in the field of social services and professional training of social workers. Modern philology in the aspect of international communication and security linguistics.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

Within the framework of the project, the university can carry out expertise on research and protection of critical infrastructure objects of various types using management tools, protection of the population and territories, management of projects and programs for liquidation of the consequences of emergency situations, safety-oriented management, crisis and risk management, etc. As a higher education institution of the State Emergency Service of Ukraine, the University has the practice of conducting research on nuclear power plants operating in Ukraine, expertise in the study of the evacuation process from infrastructure facilities such as the Arena-Lviv Stadium and the international airport named after Danyla Halytskyi, Lviv during their design for the European Football Championship Euro-2012, etc.

The key involved persons from the university are bringing the following relevant expertise to the project.

Firstly, ZACHKO Oleh Bohdanovych is a Doctor of Technical Sciences, professor, Honoured Worker of Science and Technology of Ukraine (Lviv State University of Life Safety). Author of more than 150 scientific works, including 5 monographs, 6 textbooks. Scientific achievements. The developer of a new safety management methodology in projects for the creation of objects with a mass presence of people and infrastructure projects, which allows modelling the critical parameters of the project product at the planning stage. The author of the method of index assessment of life safety of the regions of Ukraine and, on their basis, the justification of projects and programs of regional development. Supervisor of dissertation works of applicants protected under this direction.

Next, RATUSHNYI Roman Tadeyovych is a doctor of technical sciences, professor. Field of scientific interests "Methodology of portfolio-hybrid management of the development of territorial safety systems".

Furthermore, KOBYLKIN Dmytro Serhiyovych is a candidate of technical sciences, scholarship holder of the Cabinet of Ministers of Ukraine (Lviv State University of Life Safety). Author of more than 85 scientific works. Participant in international projects and programs on academic mobility ERASMUS+ at Kingston University, London, Great Britain and Exchange of Experts at the Academy of Fire Safety in Arnhem, Kingdom of the Netherlands. Field of scientific interests. Safety project management, infrastructure projects and programs.

Action Type	As Applicant		As Partner or Consortium Member	
	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Newcomer organisation			Yes	
Less experienced organisation			Yes	

Would you like to make any comments or add any information to the summary of your organisation's past participation?

no

## Relevance of the project

### Priorities and Topics

All project proposals under the Erasmus+ Programme should contribute to one or more of the programme's policy priorities.

Please select the most relevant priority according to the objectives of your project.

HORIZONTAL: Addressing digital transformation through development of digital readiness, resilience and capacity

If relevant, please select up to two additional priorities according to the objectives of your project.

HE: Supporting Higher Education institutions in their cooperation with Ukrainian counterparts to respond to the war in Ukraine

HORIZONTAL: Environment and fight against climate change

How does the project address the selected priorities ?

The project addresses in the first line the highly necessary future resilience in cases of natural and/or anthropogenic disaster events, which shall be reached through digitizing the overall process and workflows, beginning with the earth observation, going through disaster prediction and monitoring, and coming to the crucial point - preparedness for fast decision making support for the relevant public bodies and decision makers, based on Internet of Things (IoT) incl. sensor technologies, as well as Big Data fusion and handling, and primarily - Artificial Intelligence (AI).

The recent events in the Ukraine and Turkey, as well as previously in Germany and other countries, show how both types of disasters find the European society unprepared for understanding and handling the consequences of such events in an adequate, prepared manner. The best way for reaching the needed preparedness is the digitization of all relevant processes and workflow steps within the disaster management. Highly relevant is the digitized decision making support, which shall be enabled by the involvement of sensor technologies and AI for the data handling incl. simulations and experience benchmarks comparison, so the best scenarios for reaction to disasters can be designed and offered to the decision makers as a decision making base.

Before the decision making support, the precise awareness of the current situation is crucial, therefore sensor technologies on ground and in the air/space shall be involved, and the data from these collected, correctly handled. Also Edge computing for distant sensing units with local assessment are possible.

In order to adequately educate and train the necessary multidisciplinary disaster management experts and build up a common European pool for those, the SUDEM team overtakes the responsibility to firstly establish a relevant curriculum for the HED and LLL domains related to SUDEM, and test implement the curriculum, improve it and launch it as a freely accessible learning content in English, possible to be used by any students and learners among Europe and beyond.

The project team especially involves partner organisations from the Ukraine and Turkey. The partner organisation from the Ukraine - LULS - is a unique know-how carrier in the field of nuclear disaster management, started to establish in the time during and after the . CIT by itself and its indirect affiliation to AFAD is a solid knowledge carrier on AI application and overall digitization of disaster management processes on the one side, and earthquake consequences management on the other side, referring to its vast experience and package of lessons learned from the recent earthquake events in Turkey.

The consortial partner organisations will contribute to significantly increasing the preparedness among the relevant expert organisations in Europe by providing a complex HED and LLL curriculum and a digital knowledge transfer platform, and a policy recommendations package.

Please select up to three topics addressed by your project

Artificial Intelligence (AI) and data usage

Digital content and pedagogical practices

Creating new, innovative or joint curricula or courses

## Project description

Please describe the motivation for your project and explain why it should be funded.

The idea and objective of the project is to provide opportunity for lifelong learning in the area of disaster management and to allow professionals in this field to upgrade their skills with emphasis on skills concerning the use of digital systems in the context of disaster management. This is an important topic for this field as systems in this area can benefit tremendously from the integration of new digital technologies into the various relevant processes. As with many other social, industrial and scientific fields, here too state of the art digital technologies and knowledge about them can bring value to both the disaster management experts and to the communities they serve. The coordinating partner CIT, which is strongly connected to Turkey's AFAD organisation, has set a goal to provide LLL opportunities to AFAD's staff via the SUDEM project with the main goal being the provision of learning opportunities in subjects of the digital domain. This is an important step for Turkey as they have a lot of experience in dealing with earthquakes and being in touch with the modern digital world will open new opportunities for even more efficient disaster management and the creation of highly-trained and experienced professionals. The partner country of Germany has had to deal with intensive floods in the past few years which only highlights the need for a modern digital upgrade to the whole disaster management system. Germany can also provide invaluable expertise in the realm of digital technologies, especially IoT, sensor technology and communications. The Bulgarian partner comes with invaluable knowledge for the disaster domain which comes in the form of having experience and insight on the use of UAVs in dangerous and complex environments. Lastly, the partners from Ukraine have the experience, knowledge and skills to provide the project with information on how to effectively act and deal with nuclear disasters which comes as an increasingly important topic both politically and when it comes to the changing global climate.

An excellent example for the potential of digitalisation in the context of disaster management can come from the massive negative consequences after the vast earthquakes in the East of Turkey. The management of every aspect in situations like this one can be substantially improved by implementing better coordination through digitization of the on-demand decision making within minutes, based on simulations, impact foresight for the disasters and immediate scenario-based action suggestions, including all existing regional, national and international response mechanisms. A combination of rapid situation snapshotting, evaluation and immediate response through well-designed actions and digital systems can lead to superior response in crisis situations and overall vastly better outcomes for the affected communities.

What are the objectives you would like to achieve and concrete results you would like to produce? How are these objectives linked to the priorities you have selected ?

The idea and objective of the project is to provide opportunity for lifelong learning in the area of disaster management and to allow professionals in this field to upgrade their skills with emphasis on skills concerning the use of digital systems in the context of disaster management. Example: AFAD (CIT aff. org.) has set a goal to provide LLL opportunities to its staff via the SUDEM project with the main goal being the provision of learning opportunities in subjects of the digital domain. This is an important step for Turkey as they have a lot of experience in dealing with earthquakes and being in touch with the modern digital world will open new opportunities for even more efficient disaster management and the creation of highly-trained and experienced professionals. The partner country of Germany has had to deal with intensive floods in the past few years which only highlights the need for a modern digital upgrade to the whole disaster management system. Germany can also provide invaluable expertise in the realm of digital technologies, especially IoT, sensor technology and communications. The Bulgarian partner comes with invaluable knowledge for the disaster domain which comes in the form of having experience and insight on the use of UAVs in dangerous and complex environments. Lastly, the partners from Ukraine have the experience, knowledge and skills to provide the project with information on how to effectively act and deal with nuclear disasters which comes as an increasingly important topic both politically and when it comes to the changing global climate. The SUDEM project has set for itself important objectives aimed at the increased demand for highly skilled disaster management professionals. Firstly, it aims towards Generating a common European pool of adequately prepared disaster management experts of the future, with a broad view, systemic understanding, and who are well-prepared to face the operative and decision-making challenges in the sector. Secondly, by implementing the SUDEM approach the objective is to reach a higher disaster management preparedness on a national level within the partner organizations and beyond. Additionally, there will be free access offered to the SUDEM learning platform via a link from the project's website which will direct learners to the Moodle open-source educational framework. This will ensure the achievement of a broad impact among future, ongoing and current experts in the relevant domains. Furthermore, a book is planned to be published along with relevant academic articles, so the academia can be well-covered as target groups, and also the SUDEM learning concept and contents can be well-documented and explained, in terms of approach, lessons learnt, etc. Another objective is for the project to involve as much as possible relevant stakeholder groups in the field. An example for this are AFAD's internal target groups with their great level of multidisciplinary in Disaster Management.

What makes your proposal innovative?

SUDEM's novel approach focuses on interconnecting the expertise from several heterogenous fields, needed for the efficient disaster events management: process management, AI, IoT, Remote sensing and data fusion, Edge computing, Big Data Management, Earth Observation, Unmanned Aerial Vehicles, complex decision making support. Especially unique the project approach is being made by the involvement of practice-trained and experienced partner organisations, such as CIT and LULS. CIT has been involved in a close cooperation together with AFAD in Turkey in the digitisation and efficiency increase of disaster management actions. LULS' involved team has been involved for decades in

training and education on Nuclear Safety and Disaster Management.

The current developments on Global level make the SUDEM team needing to be optimally able to respond to the multiple needs of the disaster management domain, both in the context of natural and anthropogenic disaster events and the adequate reaction of relevant stakeholders, and hopefully in near future international collaboration approaches in training and disaster management directly.

How is this project complementary to other initiatives already carried out by the participating organisations?

CIT has been working on preparing a strategy for the digitisation of all workflow processes within AFAD – the Turkish umbrella organisation for the entire domain of disaster management.

LULS has been working in the field of project and disaster management in the context of nuclear power plants operations and control. It already trains its scholars in the field of special situations management.

SRTI has intensively worked for the last 1 decade on the topic of sustainable and smart UAS (Unmanned Aerial Systems) development and application. It has developed various courses for LLL in the field.

HSO has been training various target groups representatives in the field of IoT, edge computing, AI and data handling. It has implemented a LLL programme on this. It will be namely extended within SUDEM.

WUNU's team in SUDEM has been teaching with focus on AI and Big Data management. This role it will play also in SUDEM, and will build on this foundation, with focus on disaster events monitoring and data evaluation towards decision making support for the relevant decision makers involved in such processes.

How is your proposal suitable for creating synergies between different fields of education, training, youth and sport or how does it have a strong potential impact on one or more of those fields?

The project is envisaged in a way that promotes active collaboration between the involved partners and also each of them plays a crucial role to the realization of SUDEM. Starting with WUNU, they play a crucial role in developing parts of the content for the courses, especially in the fields of IoT, Nuclear and Security. In addition to that, they are leading the elaboration and publishing of the book containing the SUDEM approach and curriculum. The next partner, HSO, plays a role in developing information for the courses containing knowledge about AI, IoT, sensing and edge computing. They are also hosting the Moodle educational platform needed for the distribution of the courses to learners. The SRTI-BAS partner will provide the course expertise in the fields of aerial levels of monitoring, Aerial monitoring data management, system design, and foresight. Furthermore, ICT will provide content on the topics of terrestrial sensing & monitoring, disaster management, system development & management, AI, risk mitigation strategies & processes, and multi-agent decision-making support. Lastly, AFAD has experience in earthquake and risk reduction, disaster response, sheltering and construction, administration, and R&D.

As previously described, SUDEM unites the forces and expertise of quite heterogeneous, but highly complementary academic and practical domains. The direct post-disaster event reaction, the monitoring before and after it, the decision making support, involving all available and upcoming cutting-edge technological fields and solutions, combined with a deep knowledge on human-involved process management, is the core value resulting of this project. Namely the synergies between SRTI, HSO, WUNU, CIT and LULS are making out of the approach and team a uniquely strong solution, able to solve all relevant situation in Europe, by preparing the relevant teams and individuals on dealing in such situations.

The synergetic effects and actions will look as follows: SRTI and HSO will lead the academic curriculum development and knowledge transfer framework design, where WUNU and CIT will support with knowledge and expertise from the practical side. LULS offers a unique combination of both, and will serve both as an example for the targeted SUDEM approach, as well as a unique knowledge package on Nuclear Safety and Disaster Management.

All the above combined result into the unique added value of SUDEM and its expected results towards enabling the emergence of a novel European Disaster Management pool of experts, trained on the multidisciplinary level SUDEM is aiming to deliver and offer.

How does the proposal bring added value at European level through results that would not be attained by activities carried out in a single country?

- + By developing standardized approaches in the training on the highly multidisciplinary topic of disaster management, with all its variations and subtypes, based on real-life situations and decision-making and disaster response use cases
- + By involving various areas of relevant expertise and developing a learning concept and curriculum for ongoing and established professionals from the Disaster Management domain
- + By uniting country-specific disaster types expertise into a unique SUDEM learning package, which will enable scholars to become universally applicable within the EU and beyond, having graduated the SUDEM learning courses
- + By addressing the relevant decision makers and operations managers in DM in the public sector, at all involved countries, and uniting forces on elaborating a unique curriculum for the future DManagers and decision making support team members.

In the specific SUDEM area of expertise the especially selected partner organisations are carriers of specific unique expertise, originating from the particular countries of those, corresponding with specific „typical“ or characteristic disaster events, where the specific partner organisations have developed a highly efficient response strategy and workflow management process to.

The main added value that the SUDEM project team will generate and provide for the sake of the common European

resilience increase with regards to disaster events, will be the elaboration of the envisaged interdisciplinary learning courses package (12 courses, with ca. 10 lectures and/or exercises each), and its publicly accessible provision over the envisaged SUDEM digital learning platform. The Train-the-Trainers course, as part of the curriculum, will enable the generation of the first universal SUDEM trainers, who will spread the SUDEM contents and spirit all around Europe, so its impact can be even increased, for the sake of the common European disaster events response preparedness growth.



## Needs analysis

### What needs do you want to address by implementing your project?

Disasters, even in our modern age, continue to threaten our societies and the way we live, from natural hazards to dangers arising from the activities of humanity, these forces are still a formidable challenge that requires flexible and innovative solutions. Examples for this can come from the partners' countries, where natural disasters such as earthquakes and floods have been a major issue for their societies. In Bulgaria and Turkey especially, earthquakes pose a major threat to the way of life. With Turkey sitting on an active tectonic fault line, it is highly prone to earthquakes disrupting its way of life, with many notorious earthquakes recorded throughout its history.[1] Another notable disaster for partner countries Germany and Bulgaria is floods, which are with ever increasing intensity, and a lack of preparedness both in terms of monitoring technologies and response workflow management, cause a lot of issues in the face of these challenges. In just the last few years there have been severe flood cases in these countries, with the flood in Germany's Ahr valley and the one in Bulgaria's Plovdiv region claiming many victims and causing tremendous amounts of material damage both to infrastructure and people's homes. Another type of disasters are the ones coming from manmade activities, with the most notorious one being nuclear incidents. One of the project partner's countries is Ukraine which has a specific demand and experience in nuclear disasters, with the most notable one being the Chernobyl incident, and now with the Russian military invasion in the Ukraine, this is a contentious topic once more.[4] This only goes to show the importance of developing strong and innovative disaster management (DM) solutions that can react adaptively to the ever-present challenges.

A brief overview of these needs looks as follows:

1. Lack of adequately educated and trained multidisciplinary applicable experts, able to be involved in the disaster management and response coordination, by utilizing cutting-edge digital tools and methods for computation and decision making support, based on distant monitoring and sensing, fixed sensors data, AI, IoT involved, as well as aerial drones for multiple uses in the emergency actions.
  - 1.1. Strong shortage of relevant multidisciplinary DM experts among Europe
  - 1.2. Need of a structured educational framework on DM
2. Develop more DM abilities on a country basis, so a shared pool of expert on Europe level can emerge and be actively operated and considered in all relevant situations, for the sake of reducing the negative consequences' scale, and improve the DM service quality.

If disaster management is being operated highly efficiently, it is possible to run the process even on a viability basis. DM shall mean not only disaster events reaction, but the monitoring, prevention and awareness raising among all relevant target groups – society, professional etc.

### What are the target groups of the project?

- + established professionals in relevant single fields of expertise
- + ongoing professionals/scholars from the field of disaster management
- + Lifelong Learners: from relevant institutions, such as AFAD etc.
- + Young people marching for career orientation support
- + Ongoing professionals from the AI, IoT, aviation, safeguarding, management and many other professional domains
- + Staff members and decision makers from the relevant public authorities and organisations in the involved project countries.

### How did you identify the needs of your partnership and those of your target groups?

- + By having performed an in-depth study in the relevant field and its subdomains
- + By having involved fresh information from the most recent disaster events in the Ukraine, Turkey and Germany
- + By having studied the needs in the relevant fields together with the involved partner organizations representatives
- + by having identified overlapping, since determined by the geographically determined needs of society and respectively the directly involved DM organisations from the particular countries.

By having recognized the significance of the project approach and expected results and impact, the Bulgarian Ministry of Transport and Communications has decided to support the SUDEM team after the project starts, in order to support the projects results development and implementation and the long-term sustainability of the project action, for the sake of the National and European safety and security in the next years.

Transport and communications - the field of responsibility of the Ministry - are the most vulnerable infrastructural and service domains in case of disaster events, but these are also the keys for the success in DM.

### How will this project address these needs?

- + By having envisaged particular learning concept and curriculum elements, focusing on each of the needs
  - + By having developed a unique novel package of knowledge, relevant to all subdomains and fields of expertise and actions in the context of all phases of the disaster management process: identification, monitoring, decision making, response, results evaluation.
  - + By having developed a flexible package of a learning concept, interactive learning platform, and its contents/curriculum, able to be used in different forms and combinations by different user groups on different occasions, depending on the application domain, users profile, time availability, financial framework etc.
- The project will respond with practical solutions to this needs, mainly by enabling the collective development of a beneficial

novel curriculum, not only relevant, but emerging from the needs of the involved organisations, which themselves are directly involved in DM in their countries. By this, the countries will be able to collectively educate a common pool of relevant experts, so hereby the overall disaster resilience in Europe will be immensely increased.

## Partnership and cooperation arrangements

### Partnership composition

Organisation ID	Legal name	Country	City	Organisation type	Newcomer
E10103255	Space Research and Technology Institute, Bulgarian Academy of Sciences	Bulgaria	Sofia	National Public body	Yes
E10154317	HOCHSCHULE OFFENBURG	Germany	OFFENBURG	Higher education institution (tertiary level)	No
E10212116	West Ukrainian National University	Ukraine	TERNOPIL	Higher education institution (tertiary level)	No
E10326291	Composite Information Technologies B.V.	Netherlands	Enschede	Research Institute/Centre	Yes
E10029034	LVIV STATE UNIVERSITY OF LIFE SAFETY	Ukraine	LVIV	Higher education institution (tertiary level)	Yes



## Cooperation arrangements

How did you form your partnership? How does the mix of participating organisations complement each other and what will be the added value of their collaboration in the framework of the project? If applicable, please list and describe the associated partners involved in the project.

Each involved partner organisation is a carrier of a unique expertise on geographical and demographical level, and the combination of those results into a unique knowledge transfer concept for the HED and LLL, and a responding curriculum, all-in-all offered through a digital knowledge transfer platform. CIT and HSO will unite forces on developing the supporting AI domain, SRTI and CIT will provide knowledge and experience on the terrestrial observation area, as well as earthquake disaster management. HSO, CIT and WUNU will focus together on the IoT applications in the curriculum. LULS will provide unique expertise to all in the field of nuclear safety, security and disaster management. The overall digitization of the disaster events reaction decision making support, as well as the environmental monitoring, will be collectively covered by all partner organisations and their particular sub-expertise-areas.

AFAD from Turkey will be involved in the project as an affiliated party to CIT and will tightly collaborate as a strongly interested highly relevant stakeholder and practical knowledge, know-how and experience carrier, with a long history in dealing with highly dangerous and sensitive disaster situations. Their expertise comes both in the field of decision making and management, and technical equipment and high-tech involvement within disaster management processes.

The Bulgarian Ministry of Transport and Communications supports actively the SUDEM undertaking and wills to introduce the SUDEM overall approach, incl. its curriculum and learning platform, into its LLL agenda, in order to perfectly prepare its entire staff for the future and make it able to adequately act in disaster situations, and prepare the country in the long term for such, by education, equipment and integrated systems implementation. A Letter of Support was provided by the Ministry, s. attached.

What is the task allocation and how does it reflect the commitment and active contribution of all participating organisations (including the associated partners, if applicable) ?

In this project, SRTI will have the role of coordinator responsible for the implementation of the project as per their leadership role in WP1. They will ensure the smooth operations, communication between partners, and that the project stays on track. They will be actively involved in each work package and will support the partners in their responsibilities and tasks. In addition to that they also have the leading role in WP2 & 3 and are tasked with the actions corresponding to the Foresight, and the development of the Learning and Quality Feedback system concepts into their usable format. SRTI will also elaborate the following subject: "Disaster monitoring: system of systems, subsystems, interrelations".

For the project, HSO will have the leading role in WP4 revolving around the development and deployment of the digital systems for the SUDEM learning platform. They will ensure the proper implementation of the digital tools needed for the smooth operation of the educational platform and the quality back loop system. In addition to this, HSO is tasked with elaborating the initial version of the Learning Concept and Curriculum which will act as the foundation for the final version. Also, they will have the responsibility to develop further the SUDEM curriculum with the support of the involved partners. Moreover, it is their task to develop and implement the Improvement back loop for the curriculum and learning concept. The subjects which HSO will develop are the following: "IoT principles", and "Edge Computing".

WUNU is tasked with managing WP5 in the project, and more specifically, they are tasked with elaborating the communications plan with the involvement of all the partners. Also, they will be the ones to deploy the SUDEM project website, which will have all the relevant project information and will act as a gate to the digital educational platform.

Furthermore, WUNU will elaborate on the following subjects: "IoT in disaster monitoring and response management", and "System resilience".

In this project, besides providing support to the rest of the partners on various matters, LULS is also tasked with elaborating the dissemination plan which will shed more light on exactly how and when information and lessons learnt from the project will be shared. In addition to that, due to their expertise in the field, they will elaborate the following subject: "Nuclear safety and disaster management".

In this project, CIT will have the role of assisting all of the involved partners with the support of AFAD from Turkey. They are also tasked with delivering the policy recommendations package at the end of the project. In addition to that, they will elaborate on the following subjects: "Disaster Management workflow & Risk Mitigation: Systemic approach", "Data-driven decision-making support", "Disaster Risk Management with AI: Transforming current processes towards full automation", "Multi-Agent Decision making processes", and "SUDEM train-the-trainers course".

Describe the mechanism for coordination and communication between the participating organisations (including the associated partners, if applicable)

Continuous communication between partners will be done through video and telephone conferencing to ensure proper project schedule management.

Project management, including individual activities, timing, budget allocation and control rules, will be part of the Partnership Agreement signed by all partners.

Compliance with the timetable will be reported through "implementation and monitoring tables" (provided by the coordinator), which will be used to control the proper implementation of the activities in all project steps. The tables will be updated throughout the project lifecycle: all partners can log in to them and write directly the tasks completed and the costs involved.

That way all the documentation will be available at any time to anyone interested.

In accordance with the planned project schedule, quarterly activity and financial statements will be prepared by all members of the consortium and will collect, checks and controls the administrative coordinator of the project coordinator.

Accompanying documents will be required along with the financial statements forms so that the entire project life cycle can be monitored on an ongoing basis. Budget and time management will be provided by the internal tracking system activities and events.

Document sharing and group processing will be provided through an adequate online platform solution accessible to all partners and used to ensure good project documentation management.

The funds will be spent to pay for the work of the project coordinator and accountant, as well as to ensure the publicity of the project beyond the planned information events and a final conference-publication of information on the partners' sites, development of the project logo and creation and maintenance of a website.

There will be in total 5 project meetings (predominantly physical, at each organizations location), serving as main project communication and decision making venue, besides the planned regular monthly consortial meetings:

1. Kick-off (organized by SRTI, Sofia, Month 3)
2. intermediate consortial meeting (HSO, Germany, Month 9)
3. intermediate consortial meeting (CIT, the Netherland/Türkiye, Month 15)
4. Final project meeting & dissemination event (SRTI, Sofia, Month 23)

Describe the extent to which the involvement of a participating organisation from a third country not associated to the Programme brings an essential added value to the project (if this condition is not fulfilled, the participating organisation from a third country not associated to the Programme will be excluded from the project proposal at assessment stage).

The participation of the Ukrainian partners brings essential added value to the project with their extensive experience and know-how in the areas of digitalization and disaster management, especially in the field of nuclear threats. The country as a whole has a history of educating highly-skilled and capable ICT professionals who provide various fields of life and industry with enormous value from their work. In addition to that, due to past events, the country has invaluable experience when it comes to dealing with nuclear related disasters and has a vast pool of experts on the topic.

The one partner from Ukraine, WUNU, brings strong expertise in the highly complex digital field of cyber security, from which the whole consortium will learn. This topic grows increasingly in notoriety as cyber attacks on critical infrastructure especially during disasters continue to grow in numbers. This is of huge concern when it comes to various public, non-profit and private organizations trying to provide adequate disaster management and response in emergency situations of any kind. Thus cyber security plays an important role in providing system resilience to digital attacks of different description, and allowing for the various organizations to fulfill their duties to the communities they serve.

The other partner from Ukraine, LULS, brings extensive experience and practical know-how in areas such as fire protection, safety and security, civil protection, and nuclear power plants safety and security, among a plethora of related topics. This expertise is of tremendous value, especially in the light of the events and situation in the country and the threat of a nuclear disaster. Such practical know-how can be a deciding factor into how well an emergency situation is handled as well as the risk management and prevention of natural and anthropogenic disasters.

Therefore, for the SUDEM team it is of great importance to have WUNU and LULS on board, since these both teams bring a unique expertise for Europe, and it shall be implemented by working together on the strategically important project SUDEM.

## Impact

How are you going to assess if the project objectives have been achieved?

Having concrete and clear Key Performance Indicators (KPIs) showing the exact progress and the level of achieved results is an integral part of the project. This is important as the topics involve complex engineering systems and societal relations of huge significance. The selected KPIs revolve around collecting valuable feedback from all involved stakeholder groups and using it as a solid means to improve the provided educational environment. Another important factor is the transparency when it comes to communicating the progress, achievements and lessons learnt from this endeavour. Next, an important role also play the long-term results towards which the partners aim. These are the increased number of highly capable European experts in the field of disaster management and consequently the better response towards various disasters, and the significant decrease in the effects caused by them.

KPIs for the project runtime:

- KPI 1: Achieved planned number of courses and volume of the SUDEM curriculum.
- KPI 2: Quality Feedback from students, scholars, trainers and trainees.
- KPI 3: Visibility of project achievements: a. Website views - 500; b. Social media pages views (LinkedIn, Facebook) - 500; c. Access to publicly accessible curriculum - 100;
- KPI 4: Two performed Train-the-Trainers workshops at SRTI.
- KPI 5: 10 SUDEM trained trainers

KPIs in long-term:

- KPI 6: Generation of a European pool of at least 200 high-level disaster management experts within 10 years.
- KPI 7: Decreasing the disaster reaction and safeguarding time by 30%.
- KPI 8: Decreasing the consequences of disaster events in terms of human and infrastructure losses by 50%

The Bulgarian Ministry of Transport and Communications, which expects and supports the activities and works of the SUDEM tam, as stated in the attached Letter of Support, will be an important sparing partner for the evaluation of the impact during the development of the project results, by having a broad experience in DM from the particular perspective - transport and communication safety and their role for DM success.

Explain how you will ensure the sustainability of the project: How will the participation in this project contribute to the development of the involved organisations in the long-term? Do you plan to continue using the project results or implement some of the activities after the project's end?

The project has the enormous potential to contribute to the further development of the involved organisations. It is expressed that the project will be valuable for the partners and that it is a major topic for their ongoing research and studies. For LULS, the SUDEM curriculum can be implemented in the educational and scientific process as part of the inclusion of the educational-professional and educational-scientific program "Management. Project and program management" and be practised directly in theoretical and practical classes. For CIT, SUDEM will be a valuable tool for problem and project oriented education, as well as provides perspectives on technological developments and digitization. The partners find the project to be extremely valuable for ensuring and improving the safety, management, and protection of critical infrastructure facilities. Moreover, the project's lessons and impact will stretch towards the affected by disasters communities. In addition to that, the project will provide value to companies and professionals on the topic of digitization.

HSO will implement SUDEMs relevant courses into its masters programmes and its own LLL centers courses. Since HSO is regularly involved in projects on disaster management digital preparation, HSO will be able to involve its authorities' partner ' staff into the LLL courses, as part of their career development, needed in order to be able to implement SUDEM's strat

The project has several steps set in its timeline to ensure the sustainability of the planned work. Firstly, the most important aspect of SUDEMs sustainability is the strategic approach of the project, with the aim to generate a pool of future experts on the strongly multidisciplinary topic of disaster management, who will carry the SUDEM spirit and "corporate culture" to the next generations, ensuring lifelong learning for the future. Next, the project's website is planned to be hosted locally at WUNU which will also continue after project ends. This ensures that the project and the data gathered from it remains viable even after its end, which ensures the sustainability of the achieved objectives and lessons learnt. In addition to that, the Moodle platform will be linked on the project's website and will continue to be available as part of HSOs daily teaching & learning environment. This ensures that the learning contents of SUDEM will remain accessible for the future. Furthermore, a book on the SUDEM approach and curriculum is envisaged to be elaborated and published by the entire team, led by WUNU. This is another way to bring the knowledge gathered by the project closer to the relevant audiences. With that, the publication of academic papers within SUDEM will also ensure the long-term sustainability of the project's activity.

Please describe the potential wider impact of your project: Will the impact be equally spread among the involved organisations? What is the potential impact of the project on each participating organisation as a whole? Are there other groups or organisations at local, regional, national or European level that will benefit from your project? Please explain how.

The SUDEM project will strive to achieve impact on many different levels. Starting with improving the disaster management preparedness which is the main topic in the context of the project. Another important impact will be the decrease of the number of victims of disasters, due to improved search-and-find approaches, enabled by the combined effort of several

technologies and methods such as sensing, monitoring, reliable data transfer and handling, as well as adequate decision making. Additionally, it will prepare sensitive regions towards facing and well-managing particular natural and anthropogenic disasters, such as the events in Ukraine, but also Turkey and other countries and regions in Europe and globally. The project will, moreover, increase the decision-making support efficiency among the project partner countries as well as reinforce and catalyse digitization among relevant organisations and stakeholder target groups.

Please describe your plans for sharing and promoting the project results: How do you intend to make the results of your project known within your partnership, in your local communities and in the wider public? Who are the main target groups you intend to share your results with?

The project will make use of the hosting of its own website where it will have information and linkage to the Moodle educational platform, as well as important information about SUDEM, the partners and contacts. With that comes the use of social media, which is a natural step when it comes to the highly digital and connected modern environment. The SUDEM project will use LinkedIn and Facebook to post news, accomplishments and reached milestones. Complimenting that will be the use of academic publications where important lessons learnt can be shared with the relevant academia fields. Lastly, a publication on the SUDEM approach and curriculum is planned to be elaborated and published by the entire team, led by WUNU. This will further solidify the knowledge and experience gained during the project's duration.

The kick-off and final project consortial meetings/events (Sofia, SRTI) will be simultaneously used as dissemination events, inviting at least 50 relevant key decision making stakeholders for each.

Target groups for the dissemination activities:

+ DM relevant public authorities

+

## Workpackage activities

In addition, subcontracting of services is allowed as long as it does not cover core activities on which the achievement of the objectives of the action directly depends. In such cases, the amount budgeted for subcontracting must be included in the description of the activities covered by the subcontract.

### Work package n°1 Project Management

How will the progress, quality and achievement of project activities be monitored? Please give information about the involved staff, as well as the timing and frequency of the monitoring activities.

During the implementation of the project, it will be essential to monitor and evaluate the whole process and the achievement of planned results, to indicate progress, to identify problems immediately and to record positive results in stages.

The persons directly responsible for monitoring and evaluation on behalf of each partner are the project managers for each partner. They will carry out internal and external evaluation of project implementation. The Boards are directly responsible for the external evaluation of the project activities.

The monitoring (internal evaluation) process will aim to:

- gathering reliable information to measure the effectiveness of results and goals in accordance with what was planned
- Ensure that each partner has access to project progress information
- Ensuring transparency and good partnership

The evaluation process will aim to:

- assisting the project implementation step by step by validating its results, products and publicity.

Monitoring and evaluation activities will be carried out both during the implementation of the project (on-going evaluation) and after its completion (ex-post evaluation).

The on-going evaluation will evaluate the selected instruments in relation to the effective implementation of the project, the quality of the project, and may also suggest changes in the methods of performance in case of inefficiency.

The monitoring and evaluation activities will be carried out every three months and will be led by the German partner as a leader in project quality assurance. It will be committed to collecting the data and summarizing it in a report that will be provided to the partners for discussion and approval. The partners will discuss and determine the appropriate technique (interviews, questionnaires, observation, focus group, audio and video evidence) for the various elements to evaluate different activities, intellectual products and results.

An interim and final internal evaluation report will be provided.

During the project lifecycle, the following types of indicators will be monitored:

- quantitative indicators - number of participants in the project - lecturers (30 in total for all participating partners), number of team meetings held (5 on international level and once every 3 months on national level), strict and effective adherence to the financial plan and timetable of activities, number of informative meetings, number of press releases, publications and interviews, number of single visits to the platform, number of followers on social media project pages, meeting project reporting deadlines, etc. indicators.
- Resource indicators - the real costs compared to the planned ones - a maximum of 5 % deviations expected, of course between the cost positions and partners, by keeping the overall budget same;
- Outcome indicators - the direct and immediate effect of the project
- Quality indicators - information and feedback on the results and sustainability of the project

How will you ensure proper budget control and time management in your project?

For the successful project management the following organizational structure will be active, and valid for all partners:

- Project Coordination Teams - 1 project coordinator for each country, responsible for overall management on behalf of the organization and communication with all project participants. - Finance team - one financial officer from each partner responsible for proper budget management

- A Management Board composed of 1 or 2 members from each partner will be designated as an internal evaluator of the project for monitoring and control of the implementation of the activities and adherence to the timetable and, if necessary, decision-making and adjustments.

- A dissemination team composed of members from each partner, who supports the planning and control of project dissemination activities.

Continuous communication between partners will be done through video and telephone conferencing to ensure proper project schedule management.

Project management, including individual activities, timing, budget allocation and control rules, will be part of the Partnership Agreement signed by all partners.

Compliance with the timetable will be reported through "implementation and monitoring tables" (provided by the coordinator), which will be used to control the proper implementation of the activities in all project steps. The tables will be updated throughout the project lifecycle: all partners can log in to them and write directly the tasks completed and the costs involved. That way all the documentation will be available at any time to anyone interested.

In accordance with the planned project schedule, quarterly activity and financial statements will be prepared by all members



of the consortium and will collect, checks and controls the administrative coordinator of the project coordinator. Accompanying documents will be required along with the financial statements forms so that the entire project life cycle can be monitored on an ongoing basis. Budget and time management will be provided by the internal tracking system activities and events.

Document sharing and group processing will be provided through an adequate online platform solution accessible to all partners and used to ensure good project documentation management.

The funds will be spent to pay the work of the project coordinator and accountant, as well as to ensure the publicity of the project beyond the planned information events and a final conference-publication of information on the partners' sites, development of the project logo and creation and maintenance of a website. the project on social networks.

Each 6 months there will be a project meeting with the full consortium, once at each EU organisation. If for some reasons the location must be changed, it will be considered. At each consortial meeting it is envisaged each organisation to be represented by at least 1 person, if the situation allows it. The travel costs will be distributed by WPs, depending on the phase happening

#### What are your plans for handling risks for project implementation (e.g. delays, budget, conflicts, etc.)?

The potential risks could be more related to project management. These could be:

1. Unexpected change of key project management staff
2. Some project activity should be delayed due to some serious obstacles
3. Inability of some experts to participate in the project when planned
4. Financial difficulties caused by unexpected changes in the costs of certain activities compared to their estimates in the project budget

The envisaged activities of the team and coordinating partner, to mitigate and deal with such risks and resulting situations are:

1. All partners agreed to identify from the start of the project additional experts with the necessary capacity and experience to be able to replace the core staff as needed.
2. Since the delay of an activity could delay the implementation of the whole project, implementation of the other activity will be accelerated, thus the whole the project follows the preliminary schedule.
3. The partners have an additional pool of experts available when needed, thus ensuring the replacement of experts in the event of an emergency. the situation.

4. The consortium partners are financially solid organizations. If needed, additional funding will be found or, if urgent measures are needed, some costs could be cut and some of the work would be done by volunteers.

In the event of major problems (such as lack of key personnel) that could potentially and materially disrupt the schedule, extraordinary triggers will be triggered.

Prepared are procedures that would lead to a reallocation of tasks between partners or adjusting the timetable, if needed in cases of extraordinary personnel gaps.

Finally, the coordinator and the leaders of the different phases of the intellectual product design process will have the responsibility to address any challenges encountered during the implementation of the project, and in the event that no agreement can be reached, the coordinator will identify the measures.

#### How will you ensure that the activities are designed in an accessible and inclusive way?

+ A high level of accessibility of the interactive learning platform and the curriculum will be reached by offering voice-over lectures and learning materials, presented through an easy-to-use, intuitive digital knowledge transfer platform, able to be comamnded by voice. Even Augmented Reality based lectures are expected to be demonstrated by HSO, where learners are being put into real-life situations and can directly percperet the challenging disaster situations, as well as the technologies and methods to apply for their

+ Openness to all demographic groups, since completely digitised learning model envisaged, so that travel to Universities and/or another educational centres would not be necessary. This is especially important for the students and learners in the Ukraine.

+ By uniting forces between EU and non-EU countries with specific needs and abilities, the SUDEM consortium will demonstrate the best way of inclusion, for the sake of the common safe and secure future of our common European society.

#### How does the project incorporate the use of digital tools and learning methods to complement the physical activities and to improve cooperation between partner organisations?

Following digital tools and learning methods are foreseen to be used within the SUDEM curriculum development, transfer, as well as future work of the SUDEM experts:

- + Interactive Learning Platform
- + Involved digital technologies within the courses and necessity of tool use
- + AI heavily involved
- + IoT heavily involved

+ Able to replace the envisaged physical train-the-trainers-actions with digital ones, if not possible in another way

#### How does the project incorporate green practices in different project phases?

The overall sustainability at SUDEM will be ensured by following these strategies, already planned by the SUDEM project consortium:

- + Optimal integration of digital tools for learning, disaster management processes etc. By this huge amounts of resource will be saved, making many physical operations and travels obsolete.
- + Enabling fully accessible learning platform, making the necessity of daily travel for studying or training completely obsolete.
- + Enabling the interdisciplinary learning in a digital environment, and hereby a revolutionary way to teach and learn within all different professional and expert domains under the general SUDEM topic, without the need to travel to different HED and LLL sites, distant regions and countries.

#### How does the project encourage participation and civic engagement in different project phases?

SUDEM is focusing exactly on disaster management as collective effort, aiming to plan and educate optimal disaster management and response practices, involving optimally the civil society in terms of knowing its needs, and involving it optimally in the operative sense in the workflow planning, as it shall be in disaster cases. SUDEM foresees the involvement of the civil society by the dissemination actions, and letting the Citizens to experience the SUDEM curriculum, learning platform, as well as validate together with Citizens groups the formulated Policy Recommendations in D5.3.

#### Grant amount allocated to Project management

36 000,00 €

### Work package

## Work package n°2 - Foresight and Phase 1 of Learning Concept and Curriculum Development

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

WP2 will take place during the first two quarters (6 months) of the entire project runtime. It includes a Foresight (analysis) part on how the challenges and demand will exactly be addressed, depending also on the current situation and developments in the project's relevant context, and the initial design phase of the SUDEM curriculum courses and their contents. This part also includes the completion of Phase 1 of the learning concept and contents development. In other words, objectives include an in-depth look of the challenges, solutions, and future picture. This will lead the project team to the better understanding of exact direction and contents of the envisaged courses elaboration, as well as their optimal correlation. This is the 1. specific objective of WP2.

Foresight analysis is not any kind of standard quantitative analysis, it is rather a qualitative method for strategic future planning, based on trends and cutting-edge solutions.

Phase 1 of the curriculum development consists of the initial version of the learning concept & contents development – architecture & interrelations, based on the identified needs, trends and goals. Specific objective here: to deliver the first draft of the curricular framework.

What will be the main results of this work package?

The main results of WP2 stemming from its set objectives will revolve around the initial setup of the project and creating a detailed look on each of its parts and needs as well as laying the foundations for the learning concept and the contents of the courses. The first result comes from the Foresight which will be done in the beginning of the project. This involves the active participation of all partners and their perspectives on every aspect of the project. The result will be a clear and detailed formulation of each step, big or small, every challenge in front of the team and their solutions, needs of the project, as well as identifying the demands in the disaster management field and its professionals. The second main result comes from the elaboration of the initial variant of the project's Learning concept and what contents will be present in the relevant selected courses. The result from that will be the laying down of the educational foundation on which the whole project will be built upon. This foundation will enable the team to know what specific contents should go into the curriculum as well as what practical exercises are to be implemented into the courses.

The SUDEM Learning concept will revolve around the following thematic domains: "Disaster management: systemic aspects", "Data INPUT: monitoring & sensing", "Data management", "Data OUTPUT: Decision making support", and "Big-data-driven decision-making support within disaster response". The thematic domains of the project revolve around the idea of providing a better and more structured understanding of how the disaster management system works, with all of its important aspects. On top of that, emphasis is put on the modern technologies, including digital ones, that can significantly improve the efficiency of the disaster management system.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

WP2 has several qualitative and quantitative indicators set in place for the easier tracking of achieved results.

- Sufficiently precisely delivered future picture of the European disaster management and its demand for expert education and training. This comes in the form of D 2.1 and will be an important step for the whole project and more specifically for the identification of the correct path in regards to areas with the highest demand.

- Well-defined general picture and structure of the envisaged SUDEM curriculum courses' contents in D 2.2 with regards to the outcomes of D 2.1. This will serve as a solid foundation on which the detailed structure and usable curriculum will be formed.

- High impact of the D 2.1 SUDEM foresight is expected as it is envisaged to be accessed by at least 200 relevant stakeholders and decision-makers in Europe and beyond.

- Development of the initial version of the envisaged SUDEM curriculum, covering, following 11 topical areas:

- Disaster Management workflow & Risk Mitigation: Systemic approach (CIT)

- Disaster monitoring: system of systems, subsystems, interrelations (SRTI)

- Data-driven decision-making support (CIT)

- IoT principles (HSO)

- IoT in disaster monitoring and response management (WUNU)

- Disaster Risk Management with AI: Transforming current processes towards full automation (CIT)

- Multi-Agent Decision making processes (CIT)

- Edge Computing (HSO)

- System resilience (WUNU)

- SUDEM train-the-trainers course (SRTI)

- Nuclear safety and disaster management (LULS)

each representing a course, consisting of min. 10 lectures/exercises.

Please describe the tasks and responsibilities of each partner organisation in the work package.

- The leading role in WP2, which will take place in Q1 and Q2, will be taken by SRTI together with all partners and especially with HSO on the second action of the package. Here the tasks are the SUDEM foresight and the initial version of



the Learning package.

- The SUDEM Foresight will be completed with D 2.1 in Q2 and is the responsibility of SRTI. It will provide a deep look on all of the project's details and will create a clear path forward.
- With D 2.2 in Q2 will be created the initial version of the SUDEM Learning package. This task will be elaborated by HSO and with it will be set the foundation on which the educational platform's curriculum will be built.

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

As in each WP at SUDEM, the budget distribution is related to the nationally specific daily rates for the involved team members, as well as the intensity of work in each Work Package and/or Activity: As orientation the former daily rates for each country were used here.

For WP2 in total 18.000 Euro are foreseen. The main workload of the Foresight elaboration will be carried out by SRTI-BAS, and the main one for the Initial Curriculum Concept & Version development will be carried out by HSO. Act. 2.1. will involve effort for 10.000 Euro led by SRTI, and Act. 2.2. will involve efforts for 8.000 Euro, led by HSO:

## Activities (2 - Foresight and Phase 1 of Learning Concept and Curriculum Development)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
Foresight	Virtual activity	01/11/2023	30/04/2024	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG)	HOCHSCHULE OFFENBURG (E10154317 - DE) , West Ukrainian National University (E10212116 - UA) , Composite Information Technologies B.V. (E10326291 - NL) , LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)	10 000,00	Foresight analysis = strategic public document on Education for Sustainable Disaster Management
Initial curriculum framework	Virtual activity	01/05/2024	30/09/2025	HOCHSCHULE OFFENBURG (E10154317 - DE)	West Ukrainian National University (E10212116 - UA) , Composite Information Technologies B.V. (E10326291 - NL) , Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) , LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)	8 000,00	Policy recommendations - text publication, publicly published
						<b>18 000,00</b>	

## Description of the activities

Describe the content of the proposed activities.

### Act. 2.1. SUDEM Foresight

In times of increasingly rapid change, growing complexity, and critical uncertainty, responsible governance requires preparing for the unexpected. Strategic Foresight is required whenever there is a high degree of uncertainty surrounding changes to the relevant future context. Foresight uses a range of methodologies, such as scanning the horizon for emerging changes, analysing megatrends and developing multiple scenarios, to reveal and discuss useful ideas about the future. Strategic foresight does not attempt to offer definitive answers about what the future will hold. Foresight understands the future as an emerging entity that's only partially visible in the present, not a predetermined destiny that can be fully known in advance (predicted). There are no hard facts about the future and the evidence base is always incomplete. The objective is not to 'get the future right', but to expand and reframe the range of plausible developments that need to be taken into consideration. Doing strategic foresight alone will not produce a strategy or plan. The task of developing strategies and plans is enhanced and supported, but not replaced, by the process of considering multiple alternative futures and their implications. Strategic foresight instead aims to pose key questions that might have gone unasked in developing a strategy, and to reveal and challenge potentially fatal assumptions and expectations built into current policies and plans. (OECD) Foresight is THE instrument for the challenging task before the SUDEM team, to understand deeply the overall picture and challenges before the efficient disaster management, and draw a future picture addressing these challenges by the foreseen technical and process management tools. SRTI will lead it, as it has performed it for foreseeing the general development of cutting-edge technological domains.

### Act. 2.2. Initial curriculum framework

Here HSO will deliver the initial curriculum concept.

Explain how this activity is going to help reach the WP objectives.

Activity 2.1. will help to reach the objective for better understanding the relevant highly interdisciplinary professional landscape, the demands of the sector, also regionally, and draw a future picture for the development of this sector, with the help of digitizing the workflows and significantly increasing the efficiency of disaster management. It will result in D2.1. SUDEM Foresight, in Month 6 of the project runtime. By this, the base for the development of the SUDEM knowledge transfer concept and the curriculum in particular, will be set. Hereby D2.2. will result in M6 of the project runtime.

Describe the expected results of the activities.

Result 1. = D2.1. SUDEM Foresight - will summarize the specific challenges within the different disaster management domain, the potential solutions for these, and will draw a complete picture of the disaster management workflows in future, stepping on a deep digitization of all possible subdomains and -processes, for the sake of the significant efficiency increase of the disaster management activities Europe-wide. Each saved human life under disaster conditions is a large added value, therefore it is worth to invest into developing this Foresight, and based on it the SUDEM curriculum, aiming to reach a better preparedness of the relevant experts among Europe.

Result 2. = D2.2. Initial knowledge transfer concept and curriculum: Here HSO and all will deliver an initial draft of the courses structure, all possible interrelations etc.

Expected number and profile of participants.

It is expected all above mentioned team members to be involved to some extent into this WP and its 2 actions. Prof. Zafirov and his team will lead the Foresight study, and prof. Sikora and his team will elaborate the initial SUDEM learning package framework. For the Foresight 20 - 30 key relevant stakeholders from Europe will be interviewed by the SRTI team, and their inputs will flow into the Foresight.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

## Work package n°3 - Learning Concept and Curriculum Development

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

WP3 will involve the further development of the learning concept and content with the solid and important goal of them being ready for use, and will have duration from Q2 of the project to Q8. This involves mainly the updating of the existing learning initial contents, as well as creating new ones. With all of that Phase 2 of the learning concept & contents development also includes a Quality feedback system integrated into the learning process and course graduation. This system takes the constructive opinions of the involved learners and uses those for the betterment of the whole process and curriculum. This is done for the sake of delivering a proper broad overview of the industrial needs and trends, incl. knowledge from all relevant engineering and process/system management domains, to the pool of European crossover system engineers and well-informed decision makers of the future, which SUDEM will enable to be generated among the participating organisations, and beyond. The validation and test implementation of the learning contents within the whole course structure of the partner organisations is an important step for the overall success of the project. The feedback questionnaires are to be designed as a requisite for completing a course, and naturally to be a main quality feedback channel directly integrated into the Moodle framework. Furthermore, another part of this package is the summary and revision of the lessons learnt from the feedback provided by the various learners, both university and LLL students. This will provide sustainability for the relevant project topics and the continued use of the knowledge gained from lessons. Moreover, a Train-the-Trainers course is planned in this package, which will further increase the pool of highly capable experts and trainers in the field and boost Europe's resilience towards both natural and anthropogenic disasters - to be validated within a 1-week workshop at SRTI, with min. 2 teachers form each partner orga.

What will be the main results of this work package?

The main results of WP3 revolve around the refining and final elaboration of the learning concept, as well as creating the usable version of the curriculum and the quality feedback system. This will result in the implementation of the following courses:

- Disaster Management workflow & Risk Mitigation: Systemic approach: A holistic view on the disaster management workflow and the risk mitigation associated with disasters.
- Disaster monitoring: system of systems, subsystems, interrelations: How aerial disaster monitoring is to be structured and operated, and how the different systems involved in it communicate and work with each other.
- Data-driven decision-making support: How to prepare and use the data acquired from various experiences in order to make better decisions in the future.
- IoT principles: Presenting IoT to the learners and teaching them important principles and use cases for IoT.
- IoT in disaster monitoring and response management: Informs the learners and teaches them about how IoT assists relevant stakeholders with disaster monitoring and response management.
- Disaster Risk Management with AI: Transforming current processes towards full automation: How risk management can happen with the help of AI in the context of disaster management.
- Multi-Agent Decision making processes: Ways that decision making can happen in systems consisting of many networked and decentralized units.
- Edge Computing: The new technology which enables the processing of data closer to where it is generated and allowing for faster processing speeds.
- System resilience: The importance of creating resilient systems and what makes such a system, and the security of its connections.
- SUDEM train-the-trainers course: Joint case-based project work: intensive international & interdisciplinary collaboration format incl. physical workshops
- Nuclear safety and disaster management: About proper management of nuclear systems and prevention of related disasters.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

The qualitative and quantitative indicators set in place for tracking the progress of WP3 more effectively are the following:

- The establishment of a finalised Learning concept in relation to D 2.2 and D 2.1. This will enable the partners to have a clear formula on what the curriculum will look like as well as the detailed way by which the courses will be taught.
- The creation of the finalised version of the Curriculum in relation to D 2.2 and D 2.1. This will establish the exact and detailed version of what the courses' contents will include. This and the previous indicators will allow the partners to fully develop the online platform's framework and logistics.
- The continuous improvement of the SUDEM educational platform's concept and curriculum from the collection of valuable feedback, via a back loop system, from learners finishing the courses.

Please describe the tasks and responsibilities of each partner organisation in the work package.

- WP3 will be managed by SRTI, and together with all partners will deliver the finalised versions of the learning concept, curriculum and feedback system concept. This package will take place between Q2 and Q8.
- With D 3.1 will be set the finalised version of the Learning Concept together with the Quality Feedback system concept at

the end of Q2. This task will be done by SRTI and will be an important step for the development of the usable version of the Curriculum and the educational platform as a whole.

- HSO will have the responsibility of doing D 3.2 and deliver it timely in a draft version for upload on the digital learning platform, and the following test implementation. The final version is to be delivered by end of the project. This task revolves around the development of the usable Curriculum package and its contents that will go on to be implemented in the SUDEM digital learning platform.

- D 3.3 is the responsibility of HSO and is set for Q8 of the project's timeline. It consists of a Validation and Quality Feedback report which will have taken into account all the information given by learners via the Improvement back loop.

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

Logically, the largest amount of the overall SUDEM budget is allocated to WP3, since it is the core added value generating WP and work step - 142.000 Euro. The WP is led by SRTI.

In Action 3.1 the learning concept is finally designed, and for it 24.0000 Euro funding budget are foreseen. SRTI is leading the action and it will need 5.000 Euro for its completion.

Action 3.2. is the core project action. It will be led by SRTI-BAS and will need 98.000 Euro. From them HSO - the Activity lead, will need 36.000 Euro for the Action 3.2.

Action 3.3. will involve 20.000 Euro funding intensity capacity, from which 10.000 Euro for HSO - the Activity leading organisation.

### Activities (3 - Learning Concept and Curriculum Development)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
Learning concept development	Virtual activity	01/05/2024	31/07/2024	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG)	West Ukrainian National University (E10212116 - UA) , Composite Information Technologies B.V. (E10326291 - NL) , HOCHSCHULE OFFENBURG (E10154317 - DE) , LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)	24 000,00	D3.1 Final learning concept -
Curriculum development	Virtual activity	01/08/2024	31/07/2025	HOCHSCHULE OFFENBURG (E10154317 - DE)	West Ukrainian National University (E10212116 - UA) , Composite Information Technologies B.V. (E10326291 - NL)	98 000,00	Questionnaires which to be integrated into the SUDEM online system as a mandatory course completion element
Validation, Verification, and Improvement back loop of D3.1 and D3.2 in the practice	Virtual activity	01/11/2024	31/10/2025	HOCHSCHULE OFFENBURG (E10154317 - DE)	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) , Composite Information Technologies B.V. (E10326291 -	20 000,00	D3.3. validation report

NL) ,

LVIV STATE UNIVERSITY OF  
LIFE SAFETY (E10029034 - UA)

,

West Ukrainian National  
University (E10212116 - UA)

**142 000,00**

## Description of the activities

Describe the content of the proposed activities.

The main activities within WP3 will be focused on the refining and final elaboration of the learning concept, as well as creating the usable version of the curriculum and the quality feedback system. This will result in the elaboration of the following courses:

- Disaster Management workflow & Risk Mitigation: Systemic approach:
- Disaster monitoring: system of systems, subsystems, interrelations
- Data-driven decision-making support
- IoT principles
- IoT in disaster monitoring and response management
- Disaster Risk Management with AI
- Multi-Agent Decision making processes: Ways that decision making can happen in systems consisting of many networked and decentralized units.
- Edge Computing: The new technology which enables the processing of data closer to where it is generated and allowing for faster processing speeds.
- System resilience: The importance of creating resilient systems and what makes such a system, and the security of its connections.
- SUDEM train-the-trainers course: Joint case-based project work: intensive international & interdisciplinary collaboration format incl. physical workshops
- Nuclear safety and disaster management: About proper management of nuclear systems and prevention of related disasters.

After the concept (methodological framework) and the curriculum are elaborated, these will be validated in real learning processes - HED and LLL. Thanks to a questionnaire, the quality feedback will be structured and well implemented.

Explain how this activity is going to help reach the WP objectives.

Activity 3.1., led by SRTI-BAS, will provide the final version of the Learning package (logic + curriculum) nucleus of SUDEM. Based on it, in Activity 3.2. - led by HSO - the curriculum in its full size will be elaborated. Based on this, in Action 3.3. the curriculum from Action 3.2. will be validated and finally improved before the final publication.

Describe the expected results of the activities.

Result 1. = D3.1. Finalized learning concept (SRTI-BAS, all)

Result 2. = D3.2. SUDEM Curriculum (HSO, all):

- Disaster Management workflow & Risk Mitigation: Systemic approach: A holistic view on the disaster management workflow and the risk mitigation associated with disasters.
- Disaster monitoring: system of systems, subsystems, interrelations: How aerial disaster monitoring is to be structured and operated, and how the different systems involved in it communicate and work with each other.
- Data-driven decision-making support: How to prepare and use the data acquired from various experiences in order to make better decisions in the future.
- IoT principles: Presenting IoT to the learners and teaching them important principles and use cases for IoT.
- IoT in disaster monitoring and response management: Informs the learners and teaches them about how IoT assists relevant stakeholders with disaster monitoring and response management.
- Disaster Risk Management with AI: Transforming current processes towards full automation: How risk management can happen with the help of AI in the context of disaster management.
- Multi-Agent Decision making processes: Ways that decision making can happen in systems consisting of many networked and decentralized units.
- Edge Computing: The new technology which enables the processing of data closer to where it is generated and allowing for faster processing speeds.
- System resilience: The importance of creating resilient systems and what makes such a system, and the security of its connections.
- SUDEM train-the-trainers course: Joint case-based project work: intensive international & interdisciplinary collaboration format incl. physical workshops
- Nuclear safety and disaster management: About proper management of nuclear systems and prevention of related disasters.

Result 3. = D3.3. Validated and improved version of D3.2.

Expected number and profile of participants.

SRTI-BAS will involve all the above mentioned members of its team. Same will HSO, WUNU, LULS and CIT do.

For the validation phase in Activity 3.3. it is envisaged to involve at least 50 students in total into the test learning sessions - lectures, homeworks, workshops etc.



Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

## Work package n° 4 - Digital Learning and Quality Feedback environment

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

WP4 focuses on the deployment of the digital platform for knowledge transfer and it will take place from Q4 to Q8. For this task the Moodle platform will be used, which will enable interactive learning with easily accessible courses and quality feedback. The platform will be linked to the project's website, and is hosted and license owned by HSO, so the sustainability of the contents' access and use is assured. This also counts for the website as it will be locally hosted by WUNU. The role of CIT here will be a lighthouse one as it will be in the realm of novel higher education and LLL courses on international level.

What will be the main results of this work package?

The main result in WP4 will be the deployment of the digital learning environment and it being of high enough quality to satisfy the partner's and learner's expectations and criteria. The result is to have an easy to use platform, easy to navigate, simple, and optimised to provide excellent performance with no bugs or glitches. This will enable teachers to provide superb teaching without extra hustle and for learners to be able to navigate the digital environment easily and focus on the content itself. The other result is the deployment of the digital side of the quality feedback system directly into the learning platform. The goal for these questionnaires is to be seamless, intuitive and to take as little time as possible to complete while also providing the partners with valuable feedback on the state of the learning concept and curriculum as well as the teaching and the platform itself.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

The quality of the results achieved by WP4 will be measured by using the following qualitative and quantitative indicators:

- The setting and deployment of the SUDEM Digital Learning platform with the learning concepts and curriculum applied, and it being ready to be used by teachers and learners.
- The finalisation and deployment of the Quality Feedback system as part of the educational digital platform and its integration into the end of each course.
- The collection of feedback data from learners finishing the courses and its usage for the curriculum and learning concept improvement back loop - at least 50 students to be involved in total in all phases, together with the activities from Activity 3.3.

Please describe the tasks and responsibilities of each partner organisation in the work package.

- WP4 will be led by HSO together with the participation of all partners and revolves around the design and deployment of the digital systems which include the SUDEM educational platform and the Feedback system.
- HSO will have the main responsibility for D 4.1 which is expected at the end of Q8. It consists of delivering the properly working SUDEM Digital Learning platform together with all of the concepts and contents implemented and ready for use by the teachers and learners.
- D 4.2 is also a task allocated to HSO and consists of designing and implementing the Multidisciplinary knowledge transfer users' experience quality feedback system into the digital learning platform in Q8 as well. With this system, learners will be able to provide valuable assessment on the quality of the contents, teaching and the platform in general.

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

WP4 will be led by HSO, as well as both the Activities planned - the deployment of the digital learning platform, as well as the quality feedback questionnaire tool, and HSO will be the main contributor here. The total WP budget is 34.000 Euro, 24.000 Euro are allocated to HSO. CIT will be consulting HSO in both Activities, and will have 4.000 Euro allocated. LULS, WUNU and HSO will have each 2.000 Euro for both activities in total in the WP4.

#### Activities (4 - Digital Learning and Quality Feedback environment)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
Setting and Deployment of the Digital Learning platform	Virtual activity	01/05/2024	31/10/2025	HOCHSCHULE OFFENBURG (E10154317 - DE)	West Ukrainian National University (E10212116 - UA) ,	22 000,00	Learning platform deployed - in English
					Composite Information Technologies B.V. (E10326291 - NL) ,		
Quality Feedback system design and testing	Virtual activity	01/11/2024	31/10/2025	HOCHSCHULE OFFENBURG (E10154317 - DE)	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) ,	12 000,00	Quality feedback questionnaire embedded and automated as obligatory part of each course's completion
					LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)		
						<b>34 000,00</b>	

## Description of the activities

Describe the content of the proposed activities.

In WP4 there is 2 main envisaged activities: Act. 4.1. - Deploying the SUDEM digital platform D4.1. and Act. 4.2. - designing and integrating the quality feedback tool inside D4.1.

Explain how this activity is going to help reach the WP objectives.

The activities contents of Act. 4.1. and 4.2. exactly respond to the set objectives for the WP4: Deploying an accessible digital learning platform and integrating into it a quality feedback questionnaire-based tool, which to be obligatory for use in case on wishes to complete a particular course in the platform.

Describe the expected results of the activities.

Result 1. = D4.1. Properly working SUDEM Digital Learning platform (HSO, all)

Result 2. = D4.2. Multidisciplinary knowledge transfer users' experience quality feedback system (HSO, all)

Expected number and profile of participants.

The entire HSO/ivESK team will be involved in the activity, since it needs A. to set a structure and B. upload the learning contents for the test operations.

For the questionnaire test implementation 50 students/learners are expected to participate, in total, as a sum from all partner organisations.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

## Work package n°5 - Communication, Dissemination and Policy Recommendations

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

WP5 takes place throughout the whole duration of the project. Its purpose is the dissemination of information about the project through means valid for its goals. These include the hosting of its own website, social media presence for progress and milestone sharing, academic articles and a book. The website's hosting and maintenance will be done locally for the sake of sustainability assurance of the project impact in mid- and long-term perspective. Social Media presence will occur via LinkedIn and Facebook which includes 1 post bi-monthly in each, explaining the project progress and milestones achieved. Main milestones here are the phases of Intellectual Outputs completion and delivery. Complimenting that will be the use of academic publications where important lessons learnt can be shared with the relevant academia fields. Lastly, a book on the SUDEM approach and curriculum is planned to be elaborated and published by the entire team, led by WUNU. This will further solidify the knowledge and experience gained during the project's duration.

What will be the main results of this work package?

The results of WP5 revolve around the elaboration of the communication and dissemination plans as well as the development of the policy recommendations package. Firstly, the expected result from the communication plan is the gained clarity for how the partners will establish contact during the project, and times and places for online as well as physical meetings. This will enable the partners to share information and progress efficiently as well as solidify the partnership connections. Secondly, the expected result from the dissemination plan is the clarification and setup for how exactly the project's news, achievements and lessons learnt would be shared, as well as suitable timings, formats, and platforms or places. This enables the team to delegate these tasks more efficiently between each other and to avoid any misunderstandings on the information and topics that can be shared. Lastly, the policy recommendations package is expected to result in concrete steps and actions taken from the relevant policy-making institutions, and it will take into account all of the feedback given by the learners as well as the lessons learnt by the project partners from the whole duration of the project.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

For the fifth package are in place the following qualitative and quantitative indicators to measure the achievement of the set goals:

- Firstly is the elaboration of a SUDEM communication plan with all of the involved partners which will set in place the framework for communication between each other and for the sharing of progress.
- The creation of a SUDEM dissemination plan together with all of the involved partners which will pave a clear way and guide on how, when and what to present to all interested stakeholders and the public on matters such as reaching milestones, achievements and lessons learnt.
- The establishment of an online presence for communication and dissemination, which includes the creation of the project's website, social media pages and the publishing of articles.
- A Policy Recommendations package which will be created from all the feedback and lessons learnt from the project's duration, and presented to the respective policy-makers and regulatory bodies.

Please describe the tasks and responsibilities of each partner organisation in the work package.

- WP5 is planned to be led by WUNU together with the active participation of all involved partners. The tasks in this package revolve around the communication between partners, the dissemination of information coming from the project's activities, and policy recommendations for the relevant policy-makers.
- D 5.1, which will be led by WUNU, is set for the end of Q1 and consists of the elaboration of the SUDEM communication plan and its approval by all of the partners. This plan will set up a framework on the ways by which partners communicate, dates for meetings, and how progress is shared.
- D 5.2 consists of launching the project's website which will play a crucial role by being the link to the SUDEM digital learning platform as well as providing valuable information about the project and the involved partners. This task is allocated to WUNU and is expected to be delivered at the end of Q2, and constantly further developed & updated.
- D 5.3 is expected at the end of Q2 and will be managed by LULS. It consists of elaborating a dissemination plan together with all partners. This plan will provide valuable clarity on how the sharing of news and lessons learnt about the project will happen.
- D 5.4 consists of the creation of the Policy Recommendations package which integrates all of the quality feedback from learners as well as all the lessons learnt from the project. This package will be geared towards the relevant policy-makers and is expected to be done at the end of Q8 by CIT.

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

20.000 Euro in total are dedicated to WP5, where 6.000 Euro to the communication Activity 5.1 - mainly covered by WUNU, who also coordinates the entire WP5.

8.000 Euro are dedicated to the Dissemination activities within Activity 5.2., led and mainly covered by LULS.

6.000 Euro are dedicated to Activity 5.3. - Policy recommendations, mainly covered by CIT.

## Activities (5 - Communication, Dissemination and Policy Recommendations)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
Communication	Virtual activity	01/11/2023	31/10/2025	West Ukrainian National University (E10212116 - UA)	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) , Composite Information Technologies B.V. (E10326291 - NL) , HOCHSCHULE OFFENBURG (E10154317 - DE) , LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)	6 000,00	.
Dissemination	Virtual activity	01/11/2023	31/10/2025	LVIV STATE UNIVERSITY OF LIFE SAFETY (E10029034 - UA)	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) , Composite Information Technologies B.V. (E10326291 - NL) , HOCHSCHULE OFFENBURG (E10154317 - DE) , West Ukrainian National University (E10212116 - UA)	8 000,00	.
Policy recommendations	Virtual activity	01/11/2023	31/10/2025	Composite Information Technologies B.V. (E10326291 - NL)	Applicant - Space Research and Technology Institute, Bulgarian Academy of Sciences (E10103255 - BG) ,	6 000,00	.

HOCHSCHULE OFFENBURG (E10154317 - DE) ,

LVIV STATE UNIVERSITY OF LIFE SAFETY  
(E10029034 - UA) ,

West Ukrainian National University (E10212116 -  
UA)

**20 000,00**

## Description of the activities

Describe the content of the proposed activities.

WP5 will be led by WUNU and involving all consortial partners - WUNU, LULS, HSO and SRTI. The tasks in this package focus on the communication between partners, the dissemination of information coming from the project's activities, and policy recommendations for the relevant policy-makers.

- D 5.1, which will be led by WUNU, starts at Q1 and covers the elaboration of the SUDEM communication plan and its approval by all of the partners. This plan will set up a framework on the ways by which partners communicate, dates for meetings, and how progress is shared.
- D 5.2 consists of launching the project's website which will play a crucial role by being the link to the SUDEM digital learning platform as well as providing valuable information about the project and the involved partners. This task is allocated to WUNU and is expected to be delivered at the end of Q2.
- D 5.3 is expected at the end of Q2 and will be managed by LULS. It consists of elaborating a dissemination plan together with all partners. This plan will provide valuable clarity on how the sharing of news and lessons learnt about the project will happen.
- D 5.4 consists of the creation of the Policy Recommendations package which integrates all of the quality feedback from learners as well as all the lessons learnt from the project. This package will be geared towards the relevant policy-makers and is expected to be done at the end of Q8 by CIT.

Explain how this activity is going to help reach the WP objectives.

The envisaged Deliverables, resulting from the 3 activities under WP5, correspond exactly to the objectives set for the WP5. So, through providing these, the project and WP objectives are being precisely reached:

1. Communication plan and successful project communication processes towards risk mitigation and successful dealing with challenging situations (WUNU)
2. Successful dissemination and good visibility of the project advancements through involving the project website (LULS)
3. Providing the dissemination plan, ensuring a timely and qualitatively, well-coordinated dissemination work throughout the entire project runtime (LULS)
4. Providing a clear policy recommendations package and disseminating it well among the relevant stakeholders - planned to be performed through the social media, and especially within the final project event, which will invite min. 1000 participants from all relevant domains and countries.

Describe the expected results of the activities.

Following results are expected from the WP5:

- Result 1. = D 5.1, which will be led by WUNU, is set for the end of Q1 and consists of the elaboration of the SUDEM communication plan and its approval by all of the partners. This plan will set up a framework on the ways by which partners communicate, dates for meetings, and how progress is shared.
- Result 2. = D 5.2 consists of launching the project's website which will play a crucial role by being the link to the SUDEM digital learning platform as well as providing valuable information about the project and the involved partners. This task is allocated to WUNU and is expected to be delivered at the end of Q2.
- Result 3. = D 5.3 is expected at the end of Q2 and will be managed by LULS. It consists of elaborating a dissemination plan together with all partners. This plan will provide valuable clarity on how the sharing of news and lessons learnt about the project will happen.
- Result 4 = D 5.4 consists of the creation of the Policy Recommendations package which integrates all of the quality feedback from learners as well as all the lessons learnt from the project. This package will be geared towards the relevant policy-makers and is expected to be done at the end of Q8 by CIT.

Expected number and profile of participants.

WUNU will involve min. 3 persons from its team in leading and performing 2 of the 3 actions at the WP, as well as the WP itself.

LULS, HSO, SRTI and CIT will involve 1 person each in the project communication and management, and 2 each for the dissemination activities. CIT will involve min. 2 persons in the policy recommendations package elaboration.

It is targeted to have following visibility factor numbers:

- A. Social media: Min 200 reactions to posts on the LinkedIn and Facebook pages in total
- B. Min. 1.000 visits of the project website
- C. Min. 100 accessed interested persons in the curriculum section
- D. Min. 100 participants from all relevant domains and countries among Europe at the Final Project Event in Sofia

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.



## Annexes

The maximum size of a file is 15 MB and the maximum total size is 100 MB.

## Declaration on Honour

Please download the Declaration on Honour, print it, have it signed by the legal representative and attach.

File Name	File Size (kB)
DOH -E+_SUDEM_Letter_DoH_SRTI-BAS_gez_GEG.pdf	3 739
<b>Total Size (kB)</b>	<b>3 739</b>

## Mandates

Please download the mandates, have them signed by the legal representatives and attach them here. You can add a maximum of 90 documents.

Please ensure that mandates are valid before submitting them to the National Agency. Mandates shall be provided at the latest before the signature of the grant agreement.

File Name	File Size (kB)
MAN -E+_SUDEM_Letter_M_CIT_gez_GEG.pdf	1 330
MAN -E+_SUDEM_Letter_M_HSO_gez_GEG.pdf	944
MAN -E+_SUDEM_Letter_M_LULS_gez_GEG.pdf	925
MAN -E+_SUDEM_Letter_M_WUNU_gez_GEG.pdf	1 037
<b>Total Size (kB)</b>	<b>4 237</b>

## Other Documents

If needed, please attach any other relevant documents (a maximum of 9 documents). Please use clear file names.

If you have any additional questions, please contact your National Agency. You can find their contact details here: [List of National Agencies](#).

File Name	File Size (kB)
OTH -20230321_E+_KA220_HED_SUDEM_LoS_GEG.pdf	186
<b>Total Size (kB)</b>	<b>186</b>

<b>Total Size (kB)</b>	<b>8 164</b>
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## Checklist

Before submitting your application form to the National Agency, please make sure that:

- It fulfills the eligibility criteria listed in the [Programme Guide](#).
- All relevant fields in the application form have been completed.
- You have chosen the correct National Agency of the country in which your organisation is established. Currently selected NA is: BG01 - Human Resource Development Centre (HRDC)

### Protection of Personal Data

Please read our privacy statement to understand how we process and protect [your personal data](#)

Please also keep in mind the following:

Mandates of each partner to the applicant, signed by both parties, should be submitted latest before the signature of the grant agreement. If the application is approved for funding, signed mandates will be considered as a condition for signature of the grant agreement.

The documents proving the legal status of the applicant must be uploaded in the Organisation Registration System, here: [Organisation Registration System](#)

## Submission History

Version	Submission time (Brussels time)	Submission ID	Submission status
3	22/03/2023 11:42:57	1446231	Submitted
2	22/03/2023 11:38:34	1446100	Submitted
1	21/03/2023 21:57:28	1439468	Submitted