EVENT REPORT FORM

TYPE OF EVENT:	**Study visit; SC, PMC and QAC meetings**
VENUE:	**VSB – Technical University of Ostrava** **17. listopadu 2172/15, 708 00 Ostrava, Czechia**
ORGANIZER:	**VSB-TUO**
REPORTING DATE:	**31.03.2025.**
REPORT AUTHOR(S)	**Miroslav Voznak, Bojan Prlinčević**
INSTITUTION:	**VSB-TUO, AASKM**

Project acronym:	**NEST4WB**
Project full title:	**NEW ENERGY COMPETENCE SYSTEM AND TECHNOLOGY FOR WB ENERGY STABILITY SYSTEM CURRICULUM REFORM**
Project No:	**101129321 (Call: ERASMUS-EDU-2023-CBHE)**
Coordinator institution:	**ACADEMY OF APPLIED STUDIES KOSOVO AND METOHIJA**
Coordinator:	**Phd Bojan Prlincevic, prof.a.s.**
Beneficiaries:	**SVEUCILISTE U RIJECI-TEHNICKI FAKULTET (UNIRI RITEH), Hrvatska** **ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON (NKUA),Grcka** **VSB - TECHNICAL UNIVERSITY OF OSTRAVA (VSB - TUO), Ceska** **UNIVERSIDAD POLITECNICA DE MADRID (UPM), Spain,** **AKADEMIJA TEHNICKO-VASPITACKIH STRUKOVNIH STUDIJA (AATPS), Serbia,** **AKADEMIJA TEHNICKO-UMETNICKIH STRUKOVNIH STUDIJA (ATUSS), Serbia,** **UNIVERSITY OF MITROVICA (UPKM), Kosovo *,** **UNIVERZITET U ISTOCNOM SARAJEVU (UES), Bosnia and Herzegovina,** **University of Mostar (SUM), Bosnia and Herzegovina,** **UNIVERZITET SINERGIJA BIJELJINA (USB), Bosnia and Herzegovina,** **LUARASI UNIVERSITY (LRS), Albania,** **UNIVERSITETI METROPOLITAN TIRANA (UMT), Albania,** **FAKULTET PRIMIJENJENE NAUKE PODGORICA (FPRN), Montenegro.**

Study Visit – VSB-TUO

The third study visit was held from March 26-28, 2025, at the VSB – Technical University of Ostrava 17. listopadu 2172/15, 708 00 Ostrava, Czechia. In addition to the hosts, VSB-TUO, and the coordinator, AASKM, representatives from partner institutions attended the study visit: UPM, AATPS, UPKM, FPRN, UMT, UES, SUM, USB, UNIRI RITEH, and LRS. A total of 32 representatives from the institutions participated in the study visit. The gender structure of the participants was such that 12 female participants and 20 male participants attended the meeting.

FIRST DAY (26.03.2025)

Participants registration to the daily attendance form (09:00-09:45)

Opening Remarks and Introductions

Meeting initiated with general greetings and an introduction to the project scope by the host Prof. Miroslav Voznak (VSB-TUO). The attendees were greeted by Vice Dean Prof. Pavel Krömer, who introduced the project participants to the Technical University of Ostrava and its Faculty of Electrical Engineering.

The introductory presentation was delivered by the project coordinator, Dr. Bojan Prlinčević (AASKM), who provided a brief overview and outlined the expectations for the study visit.

The coordinator presented the agenda and work plan for the three-day study visit:

- On the first day, the program includes an introduction to the host institution, seminars, and laboratory tours. In the second part of the day, a roundtable discussion is planned, covering topics such as the finalization of the partnership (networking) agreement, collaboration with industry and strategic partnerships, internship models, preparation of teaching materials, and any other relevant needs.
- The second day is reserved for the meetings of the QAC, SC, and PMC. In the afternoon, participants will visit laboratories and attend a lecture by professors from VSB-TUO. The day will conclude with presentations by WB partners on newly adopted or updated study programs.
- On the third day, a lecture on cybersecurity will be delivered by professors from VSB-TUO, followed by another tour of the faculty laboratories. The second part of the day is dedicated to final discussions, summarizing impressions, and concluding remarks to formally close the study visit.

After the introductory presentations, the presentation of the host institutions continued with an institutional overview by prof Dr. Pavel Krömer:

- Overview of the Technical University of Ostrava (Checkia):
  - VSB-TUO draws on 170 years of a research and academic excellence to provide world-class education,
  - 7 faculties offering Bachelor's, Master's, PhD, and exchange programmes for students,
  - Number of students - Over 11 000, around 1 500 international students,

- Number of employees - Approximately 2500 of which 5% are foreign,
- Certification ISO, EFQM,
- Unique testbed for SmartFactory, Automotive, HomeCare and AI.

Following the agenda, a training session was conducted by Professor Ivan Zelinka, a leading authority in artificial intelligence. Professor Zelinka (ivanzelinka.eu) holds a position at the Technical University of Ostrava's Faculty of Electrical Engineering and Computer Science and is also associated with the IT4Innovations national supercomputing center. As a member of the British Computer Society and IEEE, Professor Zelinka has an extensive background in research, having overseen and participated in numerous national and international grant projects. His lecture focused on "Artificial Intelligence, Cyberwarfare, and Other Security Threats for Critical Infrastructures".

The presentation was followed by an interactive discussion session, during which the participants actively contributed their insights.

After a coffee break, a tour of the laboratories involved in the project was organized:

- Guided tour to Electrical Machines and Drives Laboratory,
- Guided tour to High Voltages Laboratory
- Guided tour to Industrial Automation Laboratory

After the lunch break, Prof. Miroslav Voznak introduced the attending consortium members to the history of quantum computers at VSB-TUO and presented the agenda for the laboratory/institute tour. During the visit to the Czech National Supercomputing Centre IT4I, HPC and Quantum Computing (European Center of Excellence), Professor Marek Lampart, VSB-TUO, delivered a lecture/training session. IT4Innovations is a Czech National Supercomputing Center at the VSB – Technical University of Ostrava. It operates several supercomputers, including Salomon, Anselm, Karolina, Barbora and LUMI. LUMI is one of the most powerful supercomputers in the world. IT4Innovations provides open access to its resources for research in Czechia, based on scientific excellence and societal benefits. It is part of the EuroHPC Joint Undertaking, which aims to create a federated HPC/QC infrastructure in Europe. IT4Innovations is also involved in AI Factories, deploying AI-dedicated supercomputing services, and hosts the LUMI-Q quantum computer. It employs approximately 180 people, with a focus on research and development in areas like advanced data analysis, modeling for nanotechnologies, parallel algorithms, infrastructure research, and quantum computing.

An open discussion, characterized by active participation from the attendees, followed the lecture. The session then transitioned to a tour of the supercomputing infrastructure, encompassing the supercomputers themselves, the power supply systems, and the cooling mechanisms. Interactive discussions were held throughout the tour, allowing for further exploration of the topics presented.

The roundtable session reconvened after lunch according to the agenda, addressing the following key areas:

- Finalization of the partnership (networking) agreement,
- Collaboration with industry and strategic partnerships,

- Internship models,
- Preparation of teaching materials.

A partnership agreement between the WB partners for the formation of a network was presented. Following discussion, the agreement was adopted and approved by both the PMC and SC, and it was agreed that the document would be forwarded to the management of each partner institution for signature.

Regarding collaboration with industry, the partners committed to securing at least two cooperation agreements each. The importance of further developing internship models was also emphasized, with colleagues from NKUA taking the lead in preparing model proposals.

The preparation of teaching materials was discussed in detail. Timelines were established for the development of models for authoring learning materials, with a preliminary proposal to be prepared by the next study visit, scheduled for May 6–8, 2025, in Madrid.

After a thorough and productive exchange, all agenda items were successfully concluded.

SECOND DAY (27.03.2025)

After participants registration (9:00-:9:30) to the daily attendance form, the second day of the study visit began according to the planned agenda, with the SC meeting, PMC meeting, and QAC meeting

The third **SC, PMC and QAC Meeting Summary (09:30-11:30)**

- **1st Annual Quality Report:** Prof. Miroslav Voznak (Chair of the Quality Assurance Committee) presented the 1st Annual Quality Report. The report was discussed, voted on, and approved by both the QAC and PMC.
- A meeting of the Dissemination Work Package was also held, during which the work package leader, Prof. Danijela Zubac, presented the first annual dissemination report. The report was subsequently adopted by both the PMC and SC.
- **PMC Focus:** Project achievements and results were reviewed. Tasks for the next period (with emphasis on the next 3 months) were assigned. Key priorities include:
    - Installation of laboratories
    - Development of a plan for creating learning materials
    - Preparation and delivery of deliverables D2.3 and D3.1, followed by D2.2, D3.2, and D3.3 (critical deliverables for this period).
- **QAC Focus:** Improving the quality of project activities and evaluating results (reports, events, promotional materials).
- **SC Focus:** Analysis of activities related to the project.

Key Outcomes:

- 1st Annual Quality Report adopted.

- Tasks assigned for the next period, with a focus on laboratory installation, learning material planning, and key deliverable completion.

After lunch, the study visit continued with a tour of the Centre for Energy and Environmental Technologies (CEET) at VSB – Technical University of Ostrava. Dr. Lukáš Prokop (VSB-TUO) delivered a presentation on the center's energy research activities and current directions for energy sustainability within the European Union.

The Centre for Energy and Environmental Technologies (CEET) is a university institute dedicated to research and development in low-carbon and sustainable energy and environmental technologies, aligned with the principles of the circular economy. CEET focuses on areas such as materials for energy and environmental technologies, energy utilization of secondary raw materials and alternative sources, energy storage and management, and environmental aspects and technologies. The center collaborates with partners from academia, industry, and the public sector at both national and international levels, and offers access to its advanced laboratory facilities for research, development, and education CEET official site.Robotics and Related Laboratories: In addition to its energy and environmental research, VSB – Technical University of Ostrava is home to the Advances Nanorobots and Multiscale Robotics Lab, part of the Faculty of Electrical Engineering and Computer Science. This specialized laboratory focuses on the development and application of nanorobots and multiscale robotic systems, supporting research in automation, robotics, and advanced manufacturing. The lab is equipped for both fundamental and applied research, fostering innovation in fields such as nanotechnology, biomedical engineering, and intelligent systems Advances Nanorobots and Multiscale Robotics Lab.

The visit provided valuable insights into CEET's innovative research, ongoing projects, and its role in advancing energy sustainability in the EU, as well as the university's broader commitment to cutting-edge research in robotics and automation.

After the laboratory tour, the agenda continued with the presentation of the content of newly adopted or innovative study programs and the installed laboratories in the Western Balkans countries (WB). The following institutions presented their results: AASKM, UPKM, UES, SUM, USB, UMT, LRS and FPRN. Each institution provided an overview of their achievements in developing and implementing new study programs, as well as the establishment and equipping of modern laboratories to support educational and research activities.

The second working day concluded with a discussion and summary of the day's outcomes.

THIRD DAY (28.03.2025)

After participants signed the attendance sheet (09:30 – 10:00), the third day of the conference began with a keynote address by **Prof. Miroslav Vozňák** entitled **"Cyber-Security in Critical Infrastructures and the Latest ENISA Recommendations."** The presentation distilled ENISA's current guidance for protecting essential services—energy, transport, healthcare, and finance—against rapidly evolving cyber-threats, and identified **quantum-safe solutions** as a strategic imperative.

Key take-aways from Prof. Vozňák's lecture

- **Quantum computing will break today's cryptography.** Widely used algorithms such as RSA and ECC, secure against classical attacks, can be defeated by Shor's algorithm once large-scale quantum computers become available.
- **Post-Quantum Cryptography (PQC) is ready for adoption.** NIST's third-round finalists—Crystal-Kyber (KEM) and the signature schemes Dilithium, Falcon, and SPHINCS+—already have open-source implementations and performance benchmarks confirming their suitability for real-world deployment.
- **Quantum Key Distribution (QKD) is emerging as the "last mile" of trust.** BB84 fibre links, satellite demonstrations (e.g., *Micius*), and large pilot networks such as DARPA-BBN, SECOQC, and China's Beijing–Shanghai backbone show how QKD can deliver provably secure keys. Trusted relays and hierarchical Key-Management Servers (KMS) allow the approach to scale to national networks.
- **5G and Industry 4.0 testbeds are incorporating quantum-safe layers.** The Ostrava campus network (LTE, sub-6 GHz, mmWave) is piloting AES-256/ChaCha20 encryption at 7 Gbps and emulating QKD links within the 5G core, supporting research on quantum-secure industrial applications.

European investment

Europe is investing heavily in quantum security. The EU's **OPEN-QKD** and **EuroQCI** programmes, together with Germany's recent **€2 billion commitment**, demonstrate strong political will to safeguard critical infrastructure with quantum-safe technologies.

After lunch, the group joined a guided tour of selected laboratories at the Faculty of Electrical Engineering and Computer Science, focusing on robotics and related research facilities.

During the tour, participants: - **Observed live demonstrations** of collaborative industrial robots and autonomous mobile platforms used in smart-factory research; - **Explored the AI & Machine Vision Laboratory**; - **Visited the Control-Systems and IoT testbed**, which features digital twins that mirror sensor data from remote production lines.

The visit ended with an open Q&A session, allowing attendees to discuss collaboration opportunities and student-exchange placements.

The study visit concluded with a discussion and summary led by Dr Bojan Prlinčević, the project coordinator.

Conclusions and Next Steps

1. Continuation of Equipment Procurement for laboratories in partner institutions.
2. Implementation of New Courses focusing on smart grids and digitalization.
3. Development of Professional Internship Programs with stronger industry collaboration.
4. Project Dissemination through scientific conferences and promotional activities.
5. Upcoming Study Visits:
   - May 06-08.2025 – Madrid (UPM).
6. Upcoming dissemination event:
   - March XX-XX, 2026 – Jahorina, INFOTEH Conference, (UES)

- Appendixes:
  1. Agenda,
  2. Attendance lists,
  3. Presentation of the VSB-TUO
  4. Report on equipment procurement status – laboratory formation
  5. Presentations - *Artificial intelligence, cyberwarfare, and other security threats for critical infrastructures,* prof. Ivan Zelinka.
  6. Presentations - *Introduction to it4innovations2025*, Prof Marek Lampart.
  7. Round Table
  8. Progres report
  9. Presentation of the 1st annual quality report, prof. Miroslav Voznak
  10. Presentation of the 1st annual Dissemination report, prof. Danijela Zubac
  11. Presentations of of the content of new/innovated study programs and installed laboratories in Western Balkans countries (WB):
      - AASKM
      - UPKM
      - UES
      - SUM
      - USB
      - LRS
      - UMT
      - FPRN
  12. Presentation - Cybersecurity in critical infrastructures and the latest recommendations of ENISA (European Union Agency for Cybersecurity), Miroslav Voznak.
  13. Evaluation report

REPORT DONE BY:

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