



ICCECIP 2022

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ABSTRACT BOOK

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CONFERENCE PROGRAM

Day 1

Batthyány Lajos Foundation, Hungary
Lónyay-Hatvany villa 1011 Budapest, Csónak u. 1.

08:30 - 09:00 Registration

09:00 - 09:45 **ICCECIP 2022 Opening Ceremony**

Tamás Vargha

Deputy Minister of Ministry of Defence, Hungary

Excellence Mme Claire Legras,

Ambassador of France in Hungary, France

Col. Péter Balogh

Commander of Hungarian Defence Forces Cyber and Information Operation Center,
Hungary

Prof. Zoltán Rajnai, PhD

Dean of Bánki Donát Faculty of Mechanical and Safety Engineering, Óbuda University,
Cyber Coordinator of Hungary Ministry of Interior, Hungary

Krisztina Schottner, PhD

Rector of Milton Friedman University, Hungary

Tamás Dezső, PhD

President of the Batthyány Lajos Foundation, Hungary

09:45 - 10:00 **Technical break**

Plenary 1

Chairs:

Lucia Figuli, PhD., University of Zilina, Slovakia

Prof. Valeriu G. Ghica, PhD., University Politehnica of Bucharest, Romania

10:00 - 10:25

**THE IMPERATIVE FOR AN INTEGRATED APPROACH TO CRITICAL
INFRASTRUCTURE PROTECTION IN CENTRAL EUROPE: THINKING
BEYOND NATIONAL BORDERS AND BUDGETS**

Prof. Moses B. Khanyile, CD(SA), Centre for Military Studies – CEMIS ,
South Africa

10:25 - 10:50

INTELLIGENCE AND CRITICAL INFRASTRUCTURE PROTECTION

Prof. Darko Trifunovic, PhD., Institute for National and International Security,
Serbia

10:50 - 11:15

WHERE IS THE WORLD GOING IN 2022 AND AFTER?

Prof. József Kis –Benedek, PhD., Milton Friedman University, Hungary

11:15 - 11:30

Technical break

**Section 1,
Political Security of Critical Infrastructure**

Chairs	Prof. József Kis –Benedek, PhD. , Milton Friedman University, Hungary Prof. Darko Trifunovic, PhD. , Institute for National and International Security, Serbia
11:30 - 11:45	CURRENT LEGAL CHALLENGES ON SOCIAL NETWORKING SITES Csenge Halász, PhD. , University of Miskolc, Hungary
11:45 - 12:00	THE EU NEW DEAL FOR CONSUMERS OBJECTIVES IN THE HIGHLIGHTS OF THE HUNGARIAN LEGISLATION dr. Zita Nyikes , University of Miskolc, Hungary
12:00 - 12:15	SPACE WEATHER EFFECTS ON CRITICAL INFRASTRUCTURE Gábor Facskó, PhD. , Milton Friedman University, Hungary
12:15 - 12:30	THE PROTECTION OF WATER INFRASTRUCTURES DURING AND AFTER ARMED CONFLICTS Sarra Rahoui, Phd. , University of Szeged, Hungary
12:30 – 13:15	Lunch (optional)

**Section 2,
Political Security of Critical Infrastructure**

Chairs	Tünde Anna Kovács, PhD. , Óbuda University, Hungary Vid Honfi, PhD. , Milton Friedman University, Hungary
13:15 - 13:30	INDUSTRIAL CONTROL SYSTEMS (ICS) SECURITY STRATEGIES Haya Altaieb , Óbuda University, Doctoral School on Safety and Security Science, Hungary
13:30 - 13:45	UNDERSTANDING THE OPERATIONAL ENVIRONMENT - THE PMESII METHODOLOGY István Szabadföldi , National University of Public Service, Hungary
13:45 – 14:00	INTERNATIONAL SCHOOL ENVIRONMENT AND NATIONAL IDENTITY Bujinlkham Surenjav , Eötvös Loránd University, Hungary
14:00-14:15	THE INTERPRETATION OF CRITICAL INFRASTRUCTURE IN PEACE OPERATIONS Richárd Schneider , Óbuda University, Doctoral School on Safety and Security Science, Hungary
14:15	Day Closing

18:00 - 21:00
GALA DINNER (optional)
Caterland, 1084 Budapest, Tavaszmező u. 7-13.

Day 2
Óbuda University, Bánki Donát Faculty of Mechanical and Safety Engineering,
1081 Budapest, Népszínház u. 8.

08:30 - 09:00 **Registration**

Plenary 2

(Ground floor 45)

- Chairs:** **Prof. Valeriu G. Ghica, PhD.,** University Politehnica of Bucharest, Romania
 Igor Fürstner, PhD., Subotica Tech - College of Applied Sciences, Serbia
- 09:00 - 09:25** **TERRORIST THREATS TO AFRICAN HOSPITALS**
 Prof. János Besenyő, PhD., Óbuda University, Hungary
- 09:25 - 09:55** **MONITORING AND DIAGNOSTICS OF TRANSPORT CRITICAL**
 INFRASTRUCTURE USING UNMANNED AERIAL VEHICLES
 Lucia Figuli, PhD., University of Zilina, Slovakia
- 09:50 - 10:15** **LATEST RESEARCH ON TITANIUM ALLOYS USED IN MEDICAL**
 APPLICATIONS
 Prof. Petrica Vizureanu, PhD., "Gheorghe Asachi" Technical University of Iasi,
 Romania
- 10:15 – 10:40** **MODERN METHODS OF MATERIAL SURFACE MODIFICATION AND ANTI-**
 WEAR PROTECTION
 Prof. Marcin Adamiak, PhD., Silesian University of Technology, Poland
- 10:40 – 11:05** **THREATS AND VULNERABILITIES IN WEB APPLICATIONS AND HOW TO**
 AVOID THEM
 Prof. Zlatko Čović, PhD., Subotica Tech - College of Applied Sciences, Serbia
- 11:05 -11:15** **Technical break**

**Section 3,
Individual Security of Critical Infrastructure
(Ground floor 45)**

Chairs:

Prof. Zlatko Čović, PhD., Subotica Tech - College of Applied Sciences, Serbia
Zoltán Nyikes, PhD., Milton Friedman University, Hungary

11:15 – 11:30

**MANAGING CLIMATE CHANGE RISKS IN CRITICAL INFRASTRUCTURE
PROTECTION WITH EXAMPLES FROM THE EUROPEAN FINANCIAL
SECTOR**

Tamás Somogyi, Óbuda University, Doctoral School on Safety and Security
Science, Hungary

11:30 - 11:45

TRAVELSEC - RESILIENCY IN AN UNCERTAIN ENVIRONMENT

dr. Péter Kohári, MultiContact Consulting Ltd., Hungary

11:45 - 12:00

**THE NECESSITY OF BIOMETRIC TECHNOLOGIES WITH LIMITED
PARAMETRES IN IT SYSTEMS OF HEALTHCARE INSTITUTIONS**

Éva Kovács, National University of Public Service, Hungary
József Tisóczki, Óbudai University Doctoral School on Safety and Security
Sciences, Hungary

12:00 - 12:15

BIONIC HAND WITH PHALANX BUILT-IN SERVOS

Daniel Salyi, Óbudai University-Kandó Kálmán Faculty of Electrical
Engineering, Hungary

12:15 - 12:30

**ANALYSIS AND EVALUATION OF THE TRANSPORT SECTOR DURING
THE COVID-19 EPIDEMIC**

Malak Shatnawi, Óbuda University, Doctoral School on Safety and Security
Science, Hungary

12:30 - 13:15

Lunch (optional)

**Poster Section,
(University hall)**

**WELDED JOINT DESTRUCTIVE TESTING BY MACRO AND MICRO
TESTING**

Márton Schramkó, Óbuda University, Doctoral School on Materials Sciences
and Technologies, Hungary

12:30 - 13:15

**THE USE OF INFORMATION SECURITY METHODS AND TECHNIQUES IN
THE EDUCATION OF SOFTWARE ENGINEERS**

Prof. Zlatko Čović, PhD., - **Igor Fürstner, PhD.**, Subotica Tech - College of
Applied Sciences, Serbia

**THE USE OF BATTERIES IN MEDICAL DEVICES - THE PROBLEM OF
MEDICAL SECURITY**

Ana Vasile, University Politehnica of Bucharest, Romania

**THE DIFFERENT ZONES OF PLASTICITY UNDER HARDNESS
MEASUREMENT USING FINITE ELEMENT SIMULATION**

Ferenc Oláh, Róbert Stadler Óbuda University, Doctoral School on Materials
Sciences and Technologies, Hungary

THALES
Section 4, (parallel)
Cyber Security of Critical Infrastructure
(Ground floor 45)

- Chairs:** Gábor Hirsch, Ing., THALES, Hungary
 Sándor Magyar, PhD., National University of Public Service, Hungary
 András Tóth, PhD., National University of Public Service, Hungary
- 13:15 - 13:30** **RECOMMENDATIONS FOR THE CREATION OF USABLE CRITICAL INFRASTRUCTURE FOR THE DELIVERY OF PRIORITY SERVICES OF STATE BODIES**
 Dalibor Dobrilovic, PhD., University of Novi Sad / Technical Faculty "Mihajlo Pupin", Serbia
- 13:30 - 13:45** **CREATING CYBER RESILIENCY IN CRITICAL INFRASTRUCTURES**
 Attila Máté Kovács, Óbuda University, Doctoral School on Safety and Security Science, Hungary
- 13:45 - 14:00** **LORAWAN PICTURE TRANSMISSION SOLUTIONS IN AGRICULTURE**
 Dóníz Borsos, Óbuda University, Doctoral School on Safety and Security Science, Hungary
- 14:00 - 14:15** **BUILDING BLOCKS OF IDENTITY: HOW DOES INTERNATIONAL LAW PROTECT CULTURAL AND RELIGIOUS INFRASTRUCTURE IN ARMED CONFLICTS?**
 Anna Puskás, National University of Public Service, Hungary
- 14:15 - 14:20** **Technical break**

Section 5, (parallel)
Cyber Security of Critical Infrastructure
(Room 107)

- Chairs:** Zalán Egyed, Adapto Solutions Ltd., Hungary
 Vid Honfi PhD., Milton Friedman University, Hungary
 Pál Bárkányi PhD., Milton Friedman University, Hungary
- 14:20 - 14:35** **INDUSTRIAL IOT AND 5G IN CRITICAL INFORMATION INFRASTRUCTURES**
 András Tóth, PhD., University of Public Service, Hungary
- 14:35 - 14:50** **FUTURE OF BB-PPDR EVOLUTION AND 5G SECURITY ASPECTS**
 Tamas Kardos, Óbuda University, Doctoral School on Safety and Security Science, Hungary
- 14:50 - 15:05** **IMPACTS OF COVID ON CYBERSECURITY**
 Zsolt Szabó, Óbuda University, Doctoral School on Safety and Security Science, Hungary

Section 6, (paralell)
Physical Protection of Critical Infrastructure
(Room 107)

- Chairs:** **Prof. Petrica Vizureanu, PhD.**, "Gheorghe Asachi" Technical University of Iasi, Romania
László Tóth, PhD., Óbuda University, Hungary
- 13:15 - 13:30** ***CRITICAL INFRASTRUCTURE PROTECTION OPTIONS AGAINST THE MISUSE OF EXPLOSIVES***
Norbert Daruka, PhD., Óbuda University, Hungary
- 13:30 - 13:45** ***TIME ESTIMATION OF FORMATION EXPLOSIVE GAS-AIR MIXTURES IN THE RESIDENTIAL SECTOR***
Daria Doroshenko, National University of Civil Defence of Ukraine, Ukraine
- 13:45 - 14:00** ***LIGHTWEIGHT COMPOSITE FOR ELECTROMAGNETIC SHIELDING***
Mariam Shbanah, Óbuda University, Doctoral School on Materials Sciences and Technologies, Hungary
- 14:00 - 14:15** ***PRODUCTION OF SUSTAINABLE FIRE-RESISTANT CONCRETE USING DEMOLITION WASTE***
Ahmed Seyam, Budapest University of Technology and Economics, Budapest, Hungary
- 14:15 - 14:20** ***Technical break***

Section 7, (paralell)
Physical Protection of Critical Infrastructure

- Chairs:** Tamás Berek, PhD., National University of Public Service, Hungary
Norbert Daruka, PhD., Óbuda University, Hungary
- 14:20 - 14:35** **PROTECTION OF RESERVOIR PARKS AND OIL AND PETROLEUM PRODUCTS STORAGE FROM FRAGMENTATION OF AMMUNITION**
Kostiantyn Afanasenko, PhD., National University of Civil Defence of Ukraine, Ukraine
- 14:35 - 14:50** **POSSIBILITIES OF USING METAL FOAMS TO IMPROVE VEHICLE PASSIVE SAFETY SYSTEMS**
József Kertész, Óbuda University, Doctoral School on Safety and Security Science, Hungary
- 14:50 - 15:05** **ANALYSIS OF THE TURBOCOMPRESSOR ROTOR DYNAMICS TAKING INTO ACCOUNT FEATURES OF ACTIVE MAGNETIC BEARINGS USING SPECIALIZED COMPUTING SYSTEMS**
Mykhailo Kuchma, Kharkiv Polytechnic Institute, Ukraine
- 15:05 – 15:20** **HUNGARIAN REGULATION OF PERSONNEL ENTRY CONTROL TO NUCLEAR POWER PLANT**
Ákos Bunyitai, Óbuda University, Hungary

Closing ceremony

15:05

Tünde Anna Kovács, PhD., Chair of ICCECIP 2022

ABSTRACTS

Plenary session

Dr Moses B. Khanyile, CD(SA)

Faculty of Military Science, Stellenbosch University, South Africa
mosesk@sun.ac.za

Dr Khanyile has had broad exposure at operational and strategic levels within both public and private sectors. In the public sector, he has received numerous ministerial taskings to guide policy development and implementation within the Department of Defence (DOD). These include being a committee member responsible for drafting the Defence Review that was approved by Parliament in 2015, and serving as the Non-Executive Director at Armscor SOC, which is a national arms acquisition agency. He was the first Chairperson of the Defence Industry Fund Advisory Board since its establishment. He has previously served as Director Planning and Programming within the Defence Secretariat where he was responsible for strategic planning, reporting, and monitoring in support of the Secretary for Defence as the Accounting Officer.

In the private sector, he has served as an executive at Barclays Africa where he was responsible for business development, strategic planning, stakeholder relations and alternative payment solutions linked to biometric technology on the African continent. He also served as the Chairman of Masharps College Board.

He is currently the National Coordinator of the National Defence Industry Council (NDIC), which facilitates high-level interaction between government and the defence industry. NDIC is chaired by the Minister of Defence and Military Veterans, but delegated to the Secretary for Defence, and it is constituted by heads of 11 national departments of the Justice, Security and Crime Prevention (JCPS) cluster.

From an academic perspective, he is currently serving as the Director: Centre for Military Studies (CEMIS) from the Faculty of Military Science at Stellenbosch University. He supervises postgraduate students (masters and doctoral level) from the University of South Africa (UNISA), Da Vinci Business School and Stellenbosch University.

He holds a PhD in International Politics (Pret Univ), Master of Arts (Stell Univ), Master of Business Leadership (UNISA), Honours in Military Science (Stell Univ) and Law degree (UNISA). He is one of the very few qualified Chartered Directors in South Africa, as accredited by the Institute of Directors of South Africa (IoDSA). He sits in the Departmental Advisory Board of the University of the Free State and editorial boards of Óbuda University (Hungary) and Unisa. He has published numerous papers in peer-reviewed and accredited journals. He has received management and leadership training from various national and international institutions such as Post-Graduate Naval University (USA), Ashridge Management College (UK) and Christian-Albrechts University (Germany). He is a regular speaker at various national and international conferences and events.

THE IMPERATIVE FOR AN INTEGRATED APPROACH TO CRITICAL INFRASTRUCTURE PROTECTION IN CENTRAL EUROPE: THINKING BEYOND NATIONAL BORDERS AND BUDGETS

Dr Moses B. Khanyile, CD(SA)

Abstract:

The recent disruptions of global peace and stability have brought into sharp focus the importance of the protection of critical infrastructure. When the UN Security Council (UNSC) adopted *Resolution 2341* in 2017, it urged states to identify and protect critical infrastructure against potential terrorist attacks. It further called for mechanisms to ensure resilience and recovery of such infrastructure. This was in recognition of challenges associated with globalisation, at both macro and micro levels, which have brought about irreversible interconnectedness between states, interdependencies amongst various industries and the ubiquity of security threats in all facets of human existence. Given the geographic location of countries in Central Europe, where they lie on the transit route between powerful East and West adversaries, its critical infrastructure faces perennial exposure to security risks from both state and non-state actors. This paper argues for an integrated approach in protecting critical infrastructure in Central Europe, by recognizing the indivisibility of security and downplaying the eminence of national borders and budgets. Its point of departure is that the region faces the twin challenge of national security and climate change, all of which impose a huge fiscal burden on national budgets. It further analyses the imperatives as proposed in the aforementioned UNSC resolution, highlight the current scenarios of vulnerability and conclude by proposing potential pathways for ensuring long-term security for regional critical infrastructure.

Prof. Darko Trifunovic PhD.,

Institute for National and International Security, Serbia

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Prof. dr Darko Trifunovic is a founding member and Director of the Institute for National and International Security. Dr. Trifunovic is Editor in Chief of the "Security Science Journal". Dr. Trifunovic was elected as a guest professor at FUDAN University – Center of American Studies, Shanghai, China. Dr. Darko Trifunovic is a Research Professor in the rank of Associate professor at FUDAN University Institute of BRI Strategy and International Security. Dr. Trifunovic is an Adjunct Professor of Shanghai Academy of Social Science, Coordinator for Research. Dr. Darko Trifunovic is full time employed at the Faculty of Security Studies-University of Belgrade. Prof. dr Darko Trifunovic is a guest professor at Matej Bel University, Faculty of Political Science, Slovakia and Senior Researcher at Bar-Ilan University, Israel. He is Senior Advisor at the Research Institute for European and American Studies, Greece, Athens. He is a specialist in Security Studies, Intelligence & Counter-Intelligence studies as well as Counter-Terrorism, National and International Security studies. He is a former diplomat (First Secretary of the Foreign Service of Bosnia and Herzegovina at the United Nations). Dr. Trifunovic is the representative for Serbia and Montenegro of the International Strategic Studies Association (ISSA); Defense & Foreign Affairs publications; and the Global Information System. The Shanghai Center for International Studies appointed him as the first foreign expert for the Olympic Games (2008) security preparation in China. In 2010, he is engaged in World Expo Security preparation. Prof. dr Darko Trifunovic is one of the founding members of the International Counter-Terrorism Academic Community (ICTAC). He has published a number of academic books papers and articles.

INTELLIGENCE AND CRITICAL INFRASTRUCTURE PROTECTION

Abstract:

The protection of critical infrastructure facilities in modern circumstances requires increasing attention from intelligence services in view of new threats that mostly come from non-traditional risks. Threats to critical infrastructure facilities that come from cyberspace are widely known. However, how and in what way to protect objects of critical infrastructure from threats requires the application of methods of Security Science, about which little is known. That's why entire systems remain vulnerable, especially critical infrastructure facilities because their protection requires the knowledge and skills of intelligence experts and professionals. This primarily refers to general knowledge of Security Science as well as the Science of Intelligence. The way in which the object of critical infrastructure protection is carried out includes all techniques of data collection, data processing, data analysis, data assessments, and, of course, predictions. Only physical and technical protection and all those measures related to safety protocols are not enough. The application of the Security Science methodology as well as the working methods of intelligence for the protection of infrastructure facilities has become a daily necessity, but also a major problem. Employees in the intelligence and security services know little about the mentioned methods, which is incredible, but also a factual paradox that must be urgently changed through the education process. The classic approach to education in the field of security must be changed and supplemented with new knowledge and skills that are necessary to counter new risk trends, both internal and external to a society or country.

József Kis-Benedek DSc.

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Col. (ret.) József Kis-Benedek (DSc.) is honorary professor at the National University of Public Service in Hungary. His background is military intelligence. His last military position was deputy director of production at the Hungarian Military Intelligence Office. He served as defence attaché 10 years abroad. Actually he gives lectures at many universities in Hungary. His area of research are the Middle East, terrorism, intelligence and crisis management.

WHERE IS THE WORLD GOING IN 2022 AND AFTER?

Abstract:

The lecture deals with the temporary and future global trends, analyses the hyperconnected world, the changing constellation of powerful actors, the disequilibrium between the public demands and governments capabilities. The lecturer gives an outlook for international norms (contested, regional, norms at highest risks at the next decade and norms at early development). The lecture analyses the major power competition increasing the likelihood of major power kinetic conflict during the foreseeable future. After the theoretical analyses the lecturer presents a short overview of the global trends.,

Prof. János Besenyő, PhD.

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Prof. Dr. János BESENYŐ teaches African history, European security and defence, and conflict management. He is making research on African History, African conflicts, Hungarian participation in African peace operations, Western Sahara, terrorism, migration, Christian-Muslim relations. He is the head of the Africa Research Institute at the Óbuda University, Budapest, Hungary. He was the formal head of the General Staff Scientific Research Centre in the Hungarian Defense Forces. He served in various peacekeeping mission in Africa (Darfur, Western Sahara), Afghanistan and Balkan. He lives in Budapest, Hungary, his email address is: besenyo.janos@uni-obuda.hu To find more about his academic background see: https://doktori.hu/index.php?menuid=192&sz_ID=11528&lang=EN

TERRORIST THREATS TO AFRICAN HOSPITALS

Abstract:

The research is about the attacks on health facilities including hospitals, medical staff and security inside the healthcare institutions. The researcher first goes on to present a short introduction about the general knowledge concerning the situation of the terrorist assaults on the hospitals and the medical staff. He divides the presentation into several parts, which try to comprehend the most important sides of the attacks on the healthcare institutions. First, he starts with armed assaults on hospitals and health workers, where he describes the dangers, the terrorists pose against the institutions and the personnel in them. Then he goes on to talk about the attacks by radicalized medical staff against their own personnel and patients, which presents a serious problem for the security officers. He continues with attacks by explosions, hostage taking and cyber-attacks on medical facilities. At the end, the researcher concludes by giving some advises for the international community how to resolve these problems.

Lucia Figuli, PhD.

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Lucia Figuli is associate professor at the Department of Security Management at University of Žilina, Faculty of Security Engineering, Slovak Republic, where she chairs the courses oriented to the security and structural engineering (PhD degree in 2009, born 1982). She is a member of the NATO Science for Peace and Security Programme's Independent Scientific Evaluation Group, she is an evaluator of various international projects (Erasmus+, Slovak research and development agency, Croatian science foundation, European Commission, etc.). Co-author of more than 80 peer-reviewed publications. Editor for the open access "International Journal of Structural Glass and Advanced Materials Research" (SGAMR), Soft Target Protection: Theoretical Basis and Practical Measures, Structural and Mechanical Engineering for Security and Prevention, Advancements in Design and Analysis of Protective Structures. She deals in her research activities with the protection of critical infrastructure elements from the structural aspects.

MONITORING AND DIAGNOSTICS OF TRANSPORT CRITICAL INFRASTRUCTURE USING UNMANNED AERIAL VEHICLES

Lucia Figuli – Zdeněk Dvořák

Abstract:

The paper presents new trends in monitoring and diagnostics of transport infrastructure assets, which are part of the international research project NATO. In the introduction of the paper the aims of the project are presented, then the current methods of monitoring and diagnostics of assets, their current status as well as new trends using unmanned vehicles and various types of robots are described.

Prof. Petrica Vizureanu, PhD.

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Full Professor with a teaching experience over 30 years, a very rich experience in project management of a national and international research projects (Director – 7, member – 35), concerns concretized in many articles in different competences areas: biomaterials (characterization, testing and material expertise, medical devices, surface properties, tissue-implant interaction phenomena), materials science, unconventional energy, refractory materials, computer assisted design, geopolymers, safety and health at work, management and commercial engineering. (over 200 ISI/WoS Articles in Journals, Conferences etc.). Member of the specialized commission for Materials Engineering within the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU). Professor Vizureanu is co-founder of the spin-off SIMTIT ENGINEERING (www.simtit.ro) for Research&Design&Innovation of biocompatible alloys. He is Editor in Chief of European Journal of Materials Science and Engineering indexed by DOAJ, CAS and CiteFactor. Also, Guest Editor for MATERIALS (MDPI): Special Issue - Advanced Surface Treatment Technologies for Metallic Alloys and COATINGS (MDPI): Special Issue - Surface Treatment of Metals. Chairman/Organiser for ICIR EUROINVENT - International Conference on Innovative Research (Scopus & Web of Science Proceedings) 2015-2021. Author of 18 national books and 19 international chapters/books. Editor of books INTECH OPEN (10 books + 9 chapters). H-index: 20 (>1500 citations for 159 articles in Web of Science Core Collection). He published articles in following WoS Journals: Coatings, Materials and Corrosion, Materials Chemistry and Physics, Journal of the Mechanical Behavior of Biomedical Materials, Acta Physica Polonica A, Revista de Chimie, Materials, Journal of Optoelectronics and Advanced Materials, Materiale Plastice, Materials Transactions, Physica Scripta, Environmental Engineering and Management Journal, Japanese Journal of Applied Physics, Metalurgia International, International Journal of Nonlinear Science and Numerical Simulation.

LATEST RESEARCH ON TITANIUM ALLOYS USED IN MEDICAL APPLICATIONS

Prof. Petrica Vizureanu, PhD.

Abstract:

Biomaterials are in a continuous evolution to improve the quality of life with the ultimate goal of promoting a new generation of multifunctional implants with long-term performance. Consequently, an assessment of its regulatory framework with an emphasis on security-related matters is expected to demonstrate in practice how specific measures and EU legislation on Critical Infrastructures apply in practice and help mitigate ever-increasing cyber threats. Various metallic materials, including steels, cast iron, nickel-based alloys, and other metals with exceptional mechanical properties, have been reportedly used for fabrication in medical applications. However, Titanium and its alloys have proven to be outstanding due to their enhanced properties. Titanium and its alloys have been widely adopted in medical applications because they have important characteristics that are required of implant materials, like, good mechanical properties (lower modulus of elasticity than stainless steel or CoCr alloys, fatigue strength, strength corrosion) and high biocompatibility. The mechanical properties of titanium alloys are dependent on the chemical composition, structure but also on the function that the implant must fulfill in the living organism and to have accordingly properties similar to those of the tissue they replace. In this sense, development of titanium-based alloys by alloying non-toxic elements to the human body is necessary, replacing aluminum and vanadium, with other elements biocompatible with human tissue such as molybdenum, zirconium, tantalum, niobium and silicon. Research on new titanium alloys developed for biomedical applications shown superior properties to conventional alloys and aims to eliminate the disadvantages of cobalt-based materials and stainless steels. The role of the created alloys is to improve the modulus of elasticity (by 40-50% compared to the classic Ti6Al4V alloy) and mechanical strength without affecting the biological capabilities of the alloy, as well as lowering the costs of obtaining. The research direction approached is a multidisciplinary one combining fundamental aspects related to materials engineering with important notions in the medical field, especially in implantology.

Prof. Marcin Adamiak, DSc

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Prof. Marcin Adamiak, DSc., PhD., Eng. was born on 7 June 1968 in Sanok, Poland. He graduated from the Faculty of Mechanical Engineering of the Silesian University of Technology in Gliwice in 1993. He completed his PhD thesis in the field of materials science in 1997. Permanently, since 1993, he works at the Faculty of Mechanical Engineering of the Silesian University of Technology in Gliwice. His scientific interests include materials science and materials engineering, within the specialization: metal and non-metal engineering materials (metals, polymers, ceramics, and composites), biomedical and dental engineering, gradient technologies and materials, engineering materials manufacturing and processing technologies, powder metallurgy, surface engineering, including PVD and CVD coatings, as well as laser treatment and micro texturing. Since 2017 Prof. Marcin Adamiak was a Deputy Director of the Institute of Engineering Materials and Biomaterials of the Silesian University of Technology, and simultaneously – since 2014 – the Head of the Division of Biomaterials Engineering. His scientific output includes more than 180 scientific publications, in international journals and in scientific conference proceedings of worldwide range. From 1st of October 2019 he is the Head of Laboratory of Materials Research of the Faculty of Mechanical Engineering.

MODERN METHODS OF MATERIAL SURFACE MODIFICATION AND ANTI-WEAR PROTECTION

Abstract:

The service life of machine elements, devices, construction elements, tools and many other products that are used in various areas of life, significantly depends on the progress that is made mainly thanks to advanced methods and techniques for modifying their surface. The positive effects of surface modification on the properties of materials are observed in the areas of modern catalytic, photo-active, medical, surface-functionalised materials for various applications and many others. It results directly from the fact that the functional properties of products and their elements depend not only on the possibility of transferring mechanical loads or on physicochemical properties, but very often also on the structure and properties of their surface layers. The article presents an overview of the results of surface treatment of engineering materials subjected to modifications with the use of advanced methods.

Key words: Surface treatment, hybrid surface modification, biomaterials, plasma treatment, laser texturing, coatings, wear resistance.

Prof. Zlatko Čović, PhD.

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Zlatko Čović was born in Subotica where he finished Subotica Tech and received the title of electrical engineer. After graduating he started with studies of Informatics at University of Novi Sad (Technical faculty Mihajlo Pupin). In parallel with studying, he starts working at Subotica Tech as webmaster and teaching assistant for laboratory exercises on several courses in the field of informatics and web programming. At the University of Novi Sad he received B.Sc. in Computer Sciences, Magister of Technical Sciences and in 2013 he defended his doctoral dissertation in creating its own detection and adaptation algorithm for mobile devices and mobile content. This algorithm was used for creating an integrated model of mobile learning in the health information system of counseling services for youth. From 2011 to 2017 Zlatko was Head of the Department of Informatics at Subotica Tech. During that period his emphasis was to make stronger the connection with industry and to mentor students in several competitions in the field of informatics. After winning the first place in Serbia in category of Software Design of Imagine Cup competition, his student team from Subotica Tech represented Serbia at Worldwide Finals in Sydney in 2012. From 2011 he is a member of Information Society of Serbia. He was worked on more than 30 web based projects for small, medium and big companies as web programmer and project manager. From 2016 he is the Local Coordinator for European Researcher's Night at Subotica. In his work he tries to transfer experience from practical work to show students the real-life experience. He involved Hackathon based learning in the education of software engineers. Currently he is the Assistant Director for Public Relations and Students at Subotica Tech and the professor of subjects at BSc and MSc level focusing on web programming, mobile development, security in web applications and development of integrated information systems.

THREATS AND VULNERABILITIES IN WEB APPLICATIONS AND HOW TO AVOID THEM**Abstract:**

Security of web applications is very important. People use web applications and web sites every day and they read, collect, and share lot of information. Developers must be aware of security issues in a web application and must be able to recognize the most effective method or technique to secure the application. According to OWASP there are Top 10 vulnerabilities that are common for web applications. Most of them are associated with authentication, user inputs and validation. Big problem in the development and use of web applications is insufficient knowledge and weak awareness of possible threats of user and developer. The lecture will present the 10 most common threats and vulnerabilities, how to avoid them and what we must pay attention to and how we can protect our web applications. Based on a couple of examples, possible security flaws will be shown.

**Section of
Political Security of Critical Infrastructure**

CURRENT LEGAL CHALLENGES ON SOCIAL NETWORKING SITES

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Abstract:

In 2022, it seems trite to think that global social networking sites will permeate the daily lives of legal entities. But there are many legal problems and security risks associated with these platforms. The functioning of social media affects almost all areas of law, and in my presentation I will provide a comprehensive overview of the most important areas, including key legal issues related to constitutional law, civil law, consumer law and data protection law. Of course, I will also show what, if any, legislative and enforcement responses can be given to the issues raised. I will also present legislative efforts at national and EU level and possible future regulatory directions.

THE EU NEW DEAL FOR CONSUMERS OBJECTIVES IN THE HIGHLIGHTS OF THE HUNGARIAN LEGISLATION

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Abstract:

The framework of the system of the Hungarian consumer protection legislation is complex. The EU legislation has been adopted and there are several highlights that are important in terms of the protection of the Hungarian consumers. The New Deal for Consumers program was launched in 2018 in the EU of which the aim was the better enforcement and modernisation of European Union consumer protection rules. The main points appeared in the Act CLV of 1997 on Consumer Protection and in the Act XLVII of 2008 on the Prohibition of Unfair Business-to-Consumer Commercial Practices in Hungary.

SPACE WEATHER EFFECTS ON CRITICAL INFRASTRUCTURE

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Abstract:

Gas pipelines, transmission lines, overhead wires, transformers, GNSS navigation, and telecommunication systems are part of critical infrastructure. Industry, transportation, service operations, farming, and everyday life highly depend on this infrastructure. However, these systems are very sensitive to solar activity. Therefore, all activities above are vulnerable and defenseless against the catastrophic changes in Earth's cosmic environment.

The Solar System is dominated by the influence of our star. In the Solar System, all objects are bounded gravitationally and the Sun's radiation provides the energy par example for the terrestrial biosphere. A small fraction of the energy produced in the core of our star turns into a magnetic field and emits the constant high-velocity plasma flow, the solar wind. Solar magnetic activity produces radiation and ejects matter from the upper atmosphere of our star. The magnetic field frozen to the solar wind plasma interacts with the planetary magnetic fields and atmospheres. These phenomena, called Space Weather have a serious influence on the radiation environment of Earth where telecommunication, GNSS, meteorological, and other purpose satellites are located. The conductivity and transparency of the higher partly ionized atmospheric layer, the ionosphere also depend on solar radiation and activity. This fact makes the navigation and communication systems dependent on solar activity. Finally, the solar magnetic activity creates magnetic variations in the terrestrial magnetic field and induces currents in gas pipelines, transmission lines, overhead wires, and transformers.

In this short briefing, we introduce the solar activity phenomena, and their influence on our planet's cosmic neighborhood and provide a detailed description of the Space Weather effects on critical infrastructure. Finally, we share and detail some methods to forecast the critical Space Weather effects and protect the infrastructure mentioned previously.

THE PROTECTION OF WATER INFRASTRUCTURES DURING AND AFTER ARMED CONFLICTS

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Abstract:

The deployed violence, brutality, and heavy weapons targeting water resources in several regions, such as the Middle East and more recently in Ukraine, prove the significance of water in today's armed conflicts. The multi-dimensional outcomes in these conflicts are destructive and can threaten several hydrological resources and undermine water security in total. Moreover, physical and economic damage to the water infrastructure, especially to reservoirs, dams and deep wells has proved to generate social and ecological consequences and most importantly regional outcomes that transcend the target countries. Therefore, it became mandatory to stop water weaponization and ensure the protection of water resources during and after international armed conflicts. However, the question of how to end weaponizing water is to a certain extent similar to asking how we can stop terrorism. Both require a long and complicated process that demands long-term solutions and a mechanism of reforms that includes social and ideological alterations. Nevertheless, certain efforts can be made through the international community to limit or at least protect the facilities endangered by terrorism during and after the armed conflicts

Keywords; Armed conflicts, environmental protection, water security, International law

INDUSTRIAL CONTROL SYSTEMS (ICS) SECURITY STRATEGIES

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Abstract:

Information security's primary purpose is to safeguard confidentiality, integrity, and availability. Moreover, as a result of the current global expansion, protecting ICS networks and infrastructure is a necessary activity. This article discusses the most important security strategy definitions, including the GRS, which is a framework for a comprehensive risk management strategy, plan, or foundation that identifies and categorizes all risks a company faces. The GRC framework directs the enterprise's comprehensive response to risks and legal obligations. The writers also discussed information security concepts, physical security, and incident response.

Keywords: cyber security, industrial control systems, information security, GRS

UNDERSTANDING THE OPERATIONAL ENVIRONMENT - THE PMESII METHODOLOGY

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Abstract:

Understanding the Operational Environment – The PMESII methodology

Military Operations are planned, prepared and executed in accordance with the strategic decision has been made for the military intervention in a crisis, and the desired end-state defined. These are determining the strategic goals of the operations, where ex-ante evaluation of the Operational Environment (OE) has primary importance, which determines the concept (CONOPS-Concept of Operations), content and process of the operations (CoA-Course of Action) depending on their expected impact. Among the several methods and assisting tools by which the Operations Planning process is carried out, the PMESII framework is the one that is included in the methodology described by the COPD (Comprehensive Operations Planning Directive) of NATO. The development of the operational plan (OPLAN) is based on the analysis of the mass of information in the PMESII (Political, Military, Economic, Social, Information, Infrastructure) domains of the Operational Environment. The DIME approach includes diplomacy, information, military and economic means of influence on the Center of Gravity of the identified six PMESII domains of the OE. The ASCOPE (Areas, Structures, Capabilities, Organizations, People, and Events) approach is primarily used in counterinsurgency operations to analyze areas, structures, capabilities, organizations, people, and events, while ICR2 is the information-collection requirements and information capability requirements. Critical Infrastructures are part of the PMESII domains and primary targets in Military Operations either to control or destroy them, whatever is possible, in order to weaken the adversary's means for attack or resistance.

Keywords: critical infrastructure, operations planning, military decision making, NATO crisis resolution.

INTERNATIONAL SCHOOL ENVIRONMENT AND NATIONAL IDENTITY

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Abstract:

Throughout history, schools have played an important part in nation-building and national identity. Since citizenship education has traditionally intended to prepare young people to assume their position in adult society and a national community, each country has its own education policy priorities. However, international school's curriculum typically depart from national curriculum in specific areas specially language education. Although learning English language provides students with enormous advantages in the global market and in terms of enrolling in prestigious universities, it can also foster isolation for the national community in which they live. Thus, in this globalized world, how national identities are produced, communicated, interpreted, and negotiated in the curriculum of international schools can be a critical subject for national safety. Aiming to answer this question, we looked at how dominant English language environment affect international school students' perceptions of national identity. As language has psychological value to its speakers, and as self-esteem and pride are bound in language, we believe language plays an important role in building national identity.

THE INTERPRETATION OF CRITICAL INFRASTRUCTURE IN PEACE OPERATIONS

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Abstract:

According to the UNESCO, radio is still the most reliable and affordable medium of accessing and sharing information in Africa. Radio is a channel to influence behavioural change on critical topics like hygiene, violence or AIDS. At the same time, as Rwanda's history of genocide in the 1990s illustrated, information infrastructure and radio, in particular, can be used to create opinion and mobilize large population groups in order to incite violence against certain layers of the society, which makes such infrastructure critical. Even though the technology to cease radio broadcasting existed at that time, the United States refused to take action. The UN Global Pulse, however, has just started an experimental programme in Uganda to analyze people's voices from radio broadcasts which can inform early warning systems to prevent violence, conflict and social tensions from escalating in support of peace and security efforts.

It is said that the end purpose of a peace mission is to win people's hearts and minds. And when it comes to winning them, infrastructure seems to be the 'arms and legs', through which it becomes possible. According to the United Nations Office for Project Services (UNOPS), infrastructure, that is a 'double-edged sword', should be understood as systems comprised of assets, institutions and knowledge. However, in fragile and conflict-affected contexts states are usually unable to commit to the major financial investments required to rebuild assets or repair malfunctioning systems and they cannot maintain the functionality of the state and preserve the social order and stability without international assistance. In such situations, the capacity of state and non-state actors to damage public confidence and destabilize state authority and critical infrastructures could have powerful, long-term implications for peace and security. Therefore, it is highly important to clarify how critical infrastructure can be interpreted and used during and after armed conflicts and explore the politics of the built environment in conflict-torn societies. The aim of the presentation is to add some thoughts to such topics by presenting the infrastructural aspect of how peace operation can break the vicious circle of fragility and outlining five directions how peace operations are connected to critical infrastructure and what specific role radio may have as a critical infrastructure.

**Section of,
*Individual Security of Critical Infrastructure***

***MANAGING CLIMATE CHANGE RISKS IN CRITICAL INFRASTRUCTURE PROTECTION
WITH EXAMPLES FROM THE EUROPEAN FINANCIAL SECTOR***

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Abstract:

Extreme weather events fostered by climate change jeopardise the smooth operation of critical infrastructures, thus threatens the availability of essential services, including the financial services. As these extreme events are predicted to become more frequent, the proper management of natural hazards is essential in critical infrastructure protection.

This paper first describes the risk management of natural hazards. Then examines how does the European financial sector approach the issue of climate change and natural hazards in general, based on publicly available sector specific data. It will then give an overview of the preparedness of some European banks, based on our survey. At the end it attempts to identify areas for further improvement.

Although the focus has been put on the members of the European banking industry, the results and conclusions may be applicable in other sectors as well. Moreover, the findings and best practice may be of service for auditors, legislators and researchers.

TRAVELSEC - RESILIENCY IN AN UNCERTAIN ENVIRONMENT

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Abstract:

The globalized world, the transnational economical cooperation and the present challenges of the supply chains require increased efforts to ensure healthy and safe working conditions for the mobile workforce. All such professional activities must be an integrated part of a complex corporate security management. However, the geopolitical instability and uncertainty of recent years call for a different approach to security management, which demands new types of interactive security services and structures applying cutting edge IT systems to support workers posted abroad and working there for shorter or longer periods.

Providing an adequate level of safety and the provision of a safe working environment is the obligation of the employer, which has been adequately defined in EU and domestic legislation. The geographical borders are no limits for „Duty of Care” and in addition to legal requirements, there are moral considerations that must be borne in mind by all companies and institutions taking responsibility for their employees.

The presentation will describe a supportive risk management approach of an R&D project's framework with the application of advanced technological solutions, using artificial intelligence and enabling interactivity for providing a higher level of individual security all around the world and round the clock.

THE NECESSITY OF BIOMETRIC TECHNOLOGIES WITH LIMITED PARAMETRES IN IT SYSTEMS OF HEALTHCARE INSTITUTIONS

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Abstract:

In the aftermath of the SARS-CoV-2 pandemic, the Russian-Ukrainian war is a significant challenge, in addition to the challenges posed by the virus mutations. In the third military operational space, namely cyberspace, conflict-induced operations are ongoing. In the globalised world and the countries of the European Union, our country's IT infrastructures are also affected by these operations. Valid and disinformation data are emerging every day. In addition to these and other challenges, ensuring the availability chain of Hungary's critical infrastructures is a continuous, high-level professional challenge. In our presentation and paper, we aim to present a conceptual technological solution to the challenges outlined above. We will focus on the actors in the critical infrastructure for healthcare, with a focus on data security indicators measured over the last year.

Keywords: Reduced parameter biometric authentication, Critical health infrastructure, SARS-CoV-2, Specific personal data, Cyber space

BIONIC HAND WITH PHALANX BUILT-IN SERVOS

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Abstract:

The human hand has an incredible spectrum of functionality, with fundamental capabilities for survival, as well as the ability to communicate or convey artistic expressions. Thus, undoubtedly, losing one or both hands is a devastating experience. People have used cutting-edge technologies to restore lost limbs, as a consequence, these state-of-the-art prosthetics could cost a fortune. Unfortunately, the less fortunate cannot afford these devices, regardless of their needs.

During wars, the number of amputees skyrockets, therefore the aim of this paper is to create a prosthetic hand, as close to biomimicry as possible, by embedding a DC motor, a controller and a series of gears into each phalanx. This is achieved by inexpensive components and tools widely available worldwide so that others can replicate it for their own use. Additionally, the device in this paper could be used for telemanipulation or other similar activities where the precise movements of the human hand might be applicable.

ANALYSIS AND EVALUATION OF THE TRANSPORT SECTOR DURING THE COVID-19 EPIDEMIC

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Abstract:

The COVID-19 pandemic is considered a focal point in many ways, and many countries adopted preventive instructions and forced procedures to fight the disease. The research will measure from the users' perspective whether the applied procedures to limit the spread of transportation, including digital transformation that had been used during the COVID-19 pandemic, were efficient and worked effectively to prevent the spread of the disease, a questionnaire with the necessary tools was implemented to make a comparison between two capitals; Budapest_ Hungary and Amman_ Jordan. The major descriptive and analysis plan concentrated on the frequency of usage of each transport mode vs. outdoor activities as a matrix question before and during the pandemic with several multiple-choice simultaneously in a grid format. The results were analyzed using Excel, SPSS, and AMOS to reach the final model. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) both were conducted to identify and explain the relationships between variables. After computing the measurement, the results showed that the best-fit structural models for Amman and Budapest were improved significantly by utilizing the hypotheses together.

THALES
Section of,
Cyber Security of Critical Infrastructure

***RECOMMENDATIONS FOR THE CREATION OF USABLE CRITICAL INFRASTRUCTURE
FOR THE DELIVERY OF PRIORITY SERVICES OF STATE BODIES***

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Abstract:

This paper presents the conclusions derived from the experience of IT technicians employed in the state bodies of the Republic of Serbia during wartime periods. Due to global circumstances and given conditions the experience was gained on specific needs and ways of designing and maintenance of usable critical infrastructure for the delivery of priority services of state bodies. The experience is combined with expertise in the implementation of ISO standards in this area. The empirically recognized guidelines and solutions, supported with standards, can help in creating recommendations that can tackle the problems following current events in the world. These recommendations can be directed to IT experts employed in state bodies to give them the opportunity to be efficient in regular circumstances without infrastructure disruptions as well as in situations when total disruptions of critical infrastructure may occur. Maintaining priority services on such infrastructure is certainly a technological but also an organizational and procedural challenge. The paper presents a global strategic-operational-tactical model with an emphasis on cooperation with procedural and organizational factors as a prerequisite for a functional technical framework for managing infrastructure.

CREATING CYBER RESILIENCY IN CRITICAL INFRASTRUCTURES

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Abstract:

Industries and large organizations that employ the use of IT/OT, ICS, SCADA, PLC, IIoT, and Industry 4.0 standards are constantly being targeted by cybercriminals across multiple domains. Modern threat actors, also known as Advanced Persistent Threat (APT) groups have devised complex, sophisticated ways and methods to infiltrate the IT/OT infrastructure causing businesses to crumble and be left entirely at the mercy of these threat actors. Industries such as Water, Power, Nuclear, Energy, Health, Automobile, Banking sector, Heavy Industries, Electricity generation, etc. all fall under critical infrastructures. Nation-State threat actors have targeted various critical infrastructures such as the Nuclear and Energy sectors in the current year. It is vital to note here that critical infrastructures must be protected at all times whether it's war, conflicts, political unrest, or any other unforeseen circumstances.

The sharing and transfer of information from trusted boundaries and air-gapped systems have become very essential in industries that truly rely on ubiquitous and interconnected systems. This exchange of information must be carried out in a manner that does not expose sensitive information, critical systems, and networks and without introducing security vulnerabilities. Organizations should not rely on a single security control but rather adopt a solution that addresses multiple controls working in conjunction with each other.

Cross-domain Solutions (CDS) technologies address the security requirements, especially when it comes to Confidentiality, Integrity, and Availability of resources, systems, networks, or high-end industrial and production applications. It allows organizations to securely, and reliably share information across multiple virtual and locally administrated and separated boundaries also known as security domains.

LORAWAN PICTURE TRANSMISSION SOLUTIONS IN AGRICULTURE

Döníz Borsos

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Abstract:

Industries and large organizations that employ the use of IT/OT, ICS, SCADA, PLC, IIoT, and Industry 4.0 standards are constantly being targeted by cybercriminals across multiple domains. Modern threat actors, also known as Advanced Persistent Threat (APT) groups have devised complex, sophisticated ways and methods to infiltrate the IT/OT infrastructure causing businesses to crumble and be left entirely at the mercy of these threat actors. Industries such as Water, Power, Nuclear, Energy, Health, Automobile, Banking sector, Heavy Industries, Electricity generation, etc. all fall under critical infrastructures. Nation-State threat actors have targeted various critical infrastructures such as the Nuclear and Energy sectors in the current year. It is vital to note here that critical infrastructures must be protected at all times whether it's war, conflicts, political unrest, or any other unforeseen circumstances.

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Cross-domain Solutions (CDS) technologies address the security requirements, especially when it comes to Confidentiality, Integrity, and Availability of resources, systems, networks, or high-end industrial and production applications. It allows organizations to securely, and reliably share information across multiple virtual and locally administrated and separated boundaries also known as security domains.

BUILDING BLOCKS OF IDENTITY: HOW DOES INTERNATIONAL LAW PROTECT CULTURAL AND RELIGIOUS INFRASTRUCTURE IN ARMED CONFLICTS?

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Abstract:

Recent years' conflicts have dramatically shed light on how cultural property and places of worship can become an – either explicitly or suspectedly – intended target in armed conflicts. Due to their strong relationship with collective identity, cultural, historical or religious sites are often weaponized with the aim of demonstrating cultural/political dominance, breaking the morale of the enemy, and eventually altering or annulling the historical evidence and collective memory of the ones living there as a tool of psychological warfare. The presentation seeks to explore why the protection of cultural property is considered critical in times of conflict and whether the body of international humanitarian law in place for their protection – constantly evolving since the second half of the 19th century – is still apt to prevent and manage the consequences of modern-day conflicts. Finally, the possibilities of enforcement of these provisions through the international (criminal) justice system will be also discussed with recent examples.

**Section of,
Cyber Security of Critical Infrastructure**

INDUSTRIAL IOT AND 5G IN CRITICAL INFORMATION INFRASTRUCTURES

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Abstract:

New networked elements (Internet of Things) are becoming more widespread in critical information infrastructures. They are also very much emerging in industrial environments where they are used to improve productivity. Here they do not always appear on the IT side, but in many cases, they can also be found on the OT side. The basic purpose of these devices in an IT environment is to collect all the data generated in their environment that they are programmed to acquire. The information they collect is continuously shared between the devices and with a central storage and processing server. The required interconnections are typically two-way communications, with all the criteria to share the collected data in the shortest possible time. Data collected and analyzed in this way can contribute significantly to real-time monitoring of the actual operational situation and environment. Such capability will enable IoT elements in the OT environment to perform their activities defined in the manufacturing processes as accurately as possible. In this manuscript, the author explores different levels of integration of industrial IoT devices and the use of 5G technology as a solution to improve the communication environment. In order to achieve the research objectives, the author performs a comparative analysis between relevant international scientific publications and technical reports on the topic, based on which he formulates his research findings.

FUTURE OF BB-PPDR EVOLUTION AND 5G SECURITY ASPECTS

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Abstract:

Future of BB-PPDR evolution and 5G security aspects:

Introduction of the Hungarian Unified Digital Radio Communications System (EDR). The evaluation plans of BroadBand Public Protection and Disaster Relief systems. Brief introduction of network architectures. The development strategy of Pro-M Zrt (Provider of EDR service). 5G and Mission Critical Communication standardization issues. Security and reliability issues - 5G. Threats. Vulnerabilities. Risks. 5G EU risk assessment. 5G EU Toolbox. Suggestions. Conclusions.

IMPACTS OF COVID ON CYBERSECURITY

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Abstract:

COVID-19 has forced us all to rely on the internet more than ever before. During periods of lockdown, and while social distancing is advised, online infrastructure has become a central hub for communication, commerce, work and learning. The COVID-19 pandemic has given businesses and employees an unprecedented push to change the way we work and communicate. Companies are forced to rapidly digitize their business models, create flexible and remote work environments, reach customers and manage employees primarily through digital channels. This creates an opportunity for the cyber security sector to respond to the rapidly increasing volume of cyber security attacks and the increasing number of cyber security attacks. The coronavirus pandemic has presented new challenges for businesses and organizations as they adapt to an operating model in which working from home has become the "new normal". Companies and organizations are accelerating their digital transformation, and cyber security is now a major concern. Ignoring cybersecurity risks can have significant reputational, operational, legal and compliance implications. The presentation and accompanying article will examine and explain the effects of COVID-19 on cyber risks and mitigation measures that businesses and organizations can take.

**Section of,
Physical Protection of Critical Infrastructure**

CRITICAL INFRASTRUCTURE PROTECTION OPTIONS AGAINST THE MISUSE OF EXPLOSIVES

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Abstract:

Today's military actions have had an unprecedented impact on critical infrastructures and have put countries, the European commonwealths, in a very difficult situation. Attacks on infrastructures and the problems of their performance have caused and may continue to cause not only economic but also political crises. Critical infrastructures are threatened by a number of dangers, which are, above all, an unhelpful consequence of technological progress. Of these threats, the most brutal are those related to the misuse of explosives and explosives-related offences. Unfortunately, there are numerous examples of explosive attacks on critical infrastructure and the attacks are still tangible today. We must therefore look at ways and means of effectively countering blast attacks and draw conclusions from the attacks that have taken place that can make further defences effective.

TIME ESTIMATION OF FORMATION EXPLOSIVE GAS-AIR MIXTURES IN THE RESIDENTIAL SECTOR

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Abstract:

Technogenic accidents, such as explosions of gas-air mixture in residential buildings, unfortunately, occur systematically. An emergency situation with the risk of fire in the building can be caused by accidental leakage of the gas mains or human error when closing the gas burner.

The probability of an explosion when flammable gas enters a room is determined based on the condition that the gas concentration reaches the lower concentration limit of fire propagation. For natural gas it is 5.28-14.1%. In order to assess the risks of gas-air mixtures explosion, it is necessary to know the probability of such mixtures creation. For this purpose, the study of the probability of formation of an explosive concentration in the room from time was carried out. The dependence of the distribution function on the speed of gas flow was established. The time before the formation of explosive concentrations was estimated.

LIGHTWEIGHT COMPOSITE FOR ELECTROMAGNETIC SHIELDING

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Abstract:

A shield is coated with Faraday fabric to completely block the signals and insert a device in it to block the signals of tracking, hacking, and sometimes to protect EMP. Therefore, I studied electromagnetic shielding to design and prepare useful and new composite materials that we can use to protect different types of electronic devices because of the electromagnetic radiation and radiation coming from other electronic units in the environment. EMI shielding is found in all modern vehicles, so engineers use metals because they are excellent electrical conductors and can absorb, reflect and transmit electromagnetic interference.

The rapid advancement in compact mobile electronic and telecommunication devices has caused serious electromagnetic interference issues, such as malfunctioning devices data loss or data misinterpretation due to the strong electromagnetic induction effect in proximity. These highly integrated devices demand EMI shielding materials with lightweight, easy processability, and minimal thickness along with improved shielding efficiency. Generally, efficient EMI shielding materials require high electrical conductivity. However, the most commonly used conducting non-magnetic shielding materials, such as metals and carbon-based nanomaterials.

The analysis stage includes establishing the shielding demands and studying the properties of the materials that can be used to build the shield. For instance, polymer nanocomposites give effective shielding.

These materials have optical, electrical, thermal, and mechanical properties. Therefore, we can obtain many benefits compared to other materials. In addition, the materials that will be chosen have a very good advantage in creating a functional shield for a specific application.

In this research, I studied composite technology and production methods. Define the mechanical properties requirements on the base of the loads and prepare a mechanical model for the planned Faraday cage. I have studied the Faraday cage properties, how it works, the best material for good shielding, and the material that gives us perfect protection. The material that I have used is conductive. The stiffness of the conclusive material is defined by the volume of the fibre of the Lamina. In addition to that, the properties are going to be determined by how much of each material will be used and the fibre volume fraction, and this fibre volume fraction is essentially the volume of the fibres over the total volume of the laminate.

PRODUCTION OF SUSTAINABLE FIRE-RESISTANT CONCRETE USING DEMOLITION WASTE

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Abstract:

The consumption of waste materials is one of the essential concerns of waste management strategies in many parts of the world. With the advances in concrete technology, the utilization of waste materials in sustainable construction has developed increasingly widespread because of technological, economic and ecological advantages. The concrete industry is a core element of the building sector, but it has to deal with the increasing attention on the environmental issues related to the production process: increasing energy efficiency and adopting alternative fuels or raw materials represent the most relevant solutions. The present work experimentally investigates the physical and mechanical performances of concrete incorporating residues derived from the cladding wastes of the Budapest University of Technology and Economics, external claddings, as substitutes of the coarse aggregates. Recycled clay brick aggregates are used as a complete replacement for the coarse aggregates.

The results of this research showed that concrete can be successfully produced using recycled clay bricks. The crushed clay bricks showed a lower density compared with the regular aggregate, and the concrete made with these aggregates shows a good mechanical property, so we can use it as a structural concrete more over the concrete made with these crushed clay bricks showed better thermal properties in case of applying heat load.

PROTECTION OF RESERVOIR PARKS AND OIL AND PETROLEUM PRODUCTS STORAGE FROM FRAGMENTATION OF AMMUNITION

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Abstract:

In the conditions of Russia's military aggression against our country, in addition to military and civilian facilities, critical infrastructure facilities, including oil refineries and storage facilities for oil and petroleum products, came under fire.

According to various sources, since the beginning of the armed aggression, 40 to 50 small and large warehouses of petroleum products have been partially or completely destroyed, which led to huge financial losses and, at the end of spring, caused a serious crisis with the provision of automobile fuel for both civilian and military infrastructure. At the same time, the initial occurrence of fires during shelling repeatedly occurred on more than one tank as a result of high-explosive fragmentation action ammunition.

Damage to the target by remote munitions is carried out either due to the effect on the target of the products of the explosion and shock wave (high-explosive munitions), or due to the damage by fragments of individual vulnerable units of the target (fragmentation munitions), or by a combination of both factors.

The paper proposes a review of the height of the fire dyke (its increase) of ground tanks in order to minimize the consequences of the fragmentation effect of ammunition, taking into account the sectors of the affected zone on the terrain during the ground detonation of fragmentation shells.

POSSIBILITIES OF USING METAL FOAMS TO IMPROVE VEHICLE PASSIVE SAFETY SYSTEMS

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Abstract:

Vehicle manufacturers believe that the key to a more sustainable future lies in vehicle electrification. However, batteries and the structures used to protect them add significant weight to the vehicle. This extra weight can be compensated by optimising the mass of the bodywork, but this compensation must not be at the expense of passive safety. The present study presents the possibilities for the development of a body element capable of absorbing higher impact energy, focusing on the properties of the metal foams used in it. The study investigates the properties of a closed-cell aluminium foam as a function of different compression rates and radial constraints. It also describes the possibility of using foams of different densities in a single structure. The main objective is to create a compact, space-saving structure that can absorb as much impact energy as possible during crumpling, thus increasing the efficiency of the passive safety system. In addition to low weight and high efficiency, manufacturability and ease of installation are important considerations, as well as recyclability, among many others.

ANALYSIS OF THE TURBOCOMPRESSOR ROTOR DYNAMICS TAKING INTO ACCOUNT FEATURES OF ACTIVE MAGNETIC BEARINGS USING SPECIALIZED COMPUTING SYSTEMS

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Abstract:

The article includes an analysis of various computational engineering analysis tools in terms of evaluating the dynamics of rotors in active magnetic bearings (AMBs). An analysis of the dynamics of the rotor of a turbocompressor of a gas-pumping unit is considered, taking into account AMBs. Two different software packages were used to simulate rotor dynamics of the rotor-AMBs system: the first is a package for general technical engineering analysis and the second is a specialized computing system for simulation of rotordynamics characteristics of different rotor-bearing systems. Both programs are based on the application of finite element methods. The work aims to identify the advantages and disadvantages of using different software packages for modeling and calculating rotordynamics characteristics of rotors supported by AMBs. The identification is based on various static and dynamic analyses. The results of numerical experiments are presented in the form of calculations of critical speeds and modes of oscillation (precession), as well as maps of the critical speeds and frequency-response characteristics. This makes it possible to judge the possibility of the resonance regimes of the system and prevent dangerous situations. Obtained results indicate the accuracy and adequacy of results generated in different software packages. The accuracy of the results is confirmed by results deviation analysis and verification during the simulation and results postprocessing phases. Herewith, solid modeling which is available in the general technical analysis software package allows taking into account the deformability of the hinged elements of the rotor and its effect on its natural frequencies and critical speeds. In turn, specialized software is based on equivalent models and allows an in-depth study of the main characteristics through complete rotor dynamics analyses according to industrial standards, such as API standards. The results could be used to determine the applicability of certain software package depending on the specific needs of an engineer or researcher.

HUNGARIAN REGULATION OF PERSONNEL ENTRY CONTROL TO NUCLEAR POWER PLANT

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Abstract:

In Hungary, the minimum requirements for the physical protection of nuclear power plants are regulated by specific sectoral legislation, unlike other critical national installations, due to the specific characteristics of the field. To facilitate compliance with international standards, the conceptual framework and technical criteria required by national legislation, and to ensure a sufficiently effective system against the attacks defined in the Design Basis Threat for the installation, guidelines are provided to assist the designers and operators of the Physical Protection System. The study presents the minimum requirements for personnel entry control into the complex protection system of nuclear power plants through national legislation and guidance documents, with reference to international guidance documents, standards and scientific publications.

Poster Session

WELDED JOINT DESTRUCTIVE TESTING BY MACRO AND MICRO TESTING

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Abstract:

Inspection of the welded joint is a particularly important task to ensure the safe working of the structures. Many bridges and supporting structures are made by welding, which are elements of critical infrastructure. Welded joints can be tested with destructive and non-destructive tests. In this project, the authors want to show the importance of the macro and microscopic Metallographic Examination of Structural Materials and their Joints. The macro and microscopic test evaluation need high material science knowledge. The inspector must also be qualified in the welding processes and material testing.

THE USE OF INFORMATION SECURITY METHODS AND TECHNIQUES IN THE EDUCATION OF SOFTWARE ENGINEERS

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Abstract:

Information security is one of the most important areas in the information society. The need for engineering personnel of various profiles in the world is great. We witness that cyber-attacks, theft of digital identities and data, website crashes happen every day. Many people carelessly use web resources, share their personal data, download dangerous content, use unsafe applications and services. The main problem in this behavior lies in insufficient information about security threats. For information systems, web sites and applications to be safe, it is necessary to introduce appropriate areas of information security into the education of software engineers. This paper will present the areas of information security that are taught at Subotica Tech – College of Applied Sciences. These areas are present in many subjects at the undergraduate and especially at the master's studies. In most professional subjects, students work on practical projects with the aim of developing various information systems and applications, as well as setting up and installing network environments. During work, they are trained to recognize security threats and to apply appropriate methods and techniques.

THE USE OF BATTERIES IN MEDICAL DEVICES - THE PROBLEM OF MEDICAL SECURITY

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Abstract:

Batteries are an indispensable component of everyday life. How would we carry out our current activities - characterized by mobility and flexibility without these energy storage systems? Could we work constantly surrounded by cables? The battery is a critical component of modern medical devices. We find batteries in intensive care units (ventilators, defibrillators, pacemakers, insulin pumps) in diagnostic and monitoring systems (blood glucose monitors), in electrical surgical instruments (instruments for cutting, shaping, fixation, bone dissection, fragmentation and soft tissue suction in all types of procedures). To find out how reliable and safe these batteries are, which are used in critical moments for our health, then where they end up when they are no longer useful, for all these reasons the batteries must be investigated in depth. From the large family of rechargeable batteries, we focused on Ni-MH type batteries. Ni-MH batteries are rechargeable, they have a capacity two or three times higher than NiCd batteries, a high energy density but lower than lithium-ion batteries. The paper presents the results of the investigations undertaken on some Nickel Metal Hybrid (Ni-MH) type medical batteries used in defibrillators (devices that send an electric pulse or shock to the heart to restore a normal heartbeat) and EKG (devices can quickly and effectively measure the rhythm and strength of heart beats). The batteries were disassembled and analyzed by specific methods of electron microscopy (SEI, EDX).

Keywords: medical devices, Nickel Metal Hybride battery, SEI, EDX.

THE DIFFERENT ZONES OF PLASTICITY UNDER HARDNESS MEASUREMENT USING FINITE ELEMENT SIMULATION

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Abstract:

Hardness test is one of the most fundamental types of mechanical testings. Hardness is determined by testing the resistance of a material to penetration, which takes several forms. In the present paper, the hydrostatic and plastic zones, formed under the indenter ball, have been investigated in the case of the Brinell measurement, by using a finite element method to determine the displacement of all the nodes formed under a surface and the stress values which have been generated in them after final loading. The aim of this study is to define these zones more precisely .

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Dr Kovács is an Associate Professor in the Department of Materials Technology of the Óbuda University, Hungary. Member of the editorial board of the Acta Materialia Transylvania, Safety and Security Sciences Review and Security Engineering of Anthropogenic Objects, author and co-author of 199 publications with around 302 citations, h-index 12 in Google Scholar. Her research interests are in the field of the materials science and engineering, special welding processes (ultrasonic and explosive welding). Her researches focus on the welding caused effects in the microstructure and the movement of the dislocations. Investigation on the dependence of the mechanical properties on the welded microstructure.

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Dr Nyikes is an Associate Professor in the Department of Informatics of the Milton Friedman University, Hungary. He is a Computer Science Engineer, Dipl. Security Engineer, Doctor of Military Engineering, University Lecturer, Member of the Public Body of the Hungarian Academy of Sciences. Author and co-author of 85 publications with around 163 citations. His research focuses on INDUSTRY 4.0, user safety awareness and digital competence, the security of information transmission, buildings protection coatings innovation against explosive loads and safety of rail transport. Researcher on several research and development projects. Supervisor of engineering thesis works and diploma works. Dr Nyikes has 11 in Google Scholar



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