



ICCECIP 2019

International Conference on Central European Critical Infrastructure Protection

Budapest, 18-19 November 2019

Abstract book

ÓBUDA UNIVERSITY,

**Donát Bánki Faculty of Mechanical and
Safety Engineering**

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Welcome to ICCECIP 2019

The ICCECIP 2019 – International Conference on Central European Critical Infrastructure Protection organized by V4 countries partner universities and the participants arrive from 12 countries. The conference lecturers will present their research results in the wide field of Critical Infrastructure Protection and Security Science. The sessions goals of this year's conference to focus on problems of threats to the security of Central Europe. In this year the motto “With science for peace” characterize the conference goals and topics. The ICCECIP 2019 also maintain to foster communication between researchers and engineers for working in a wide variety of research and applied science areas with a common interest. The aim objective of ICCECIP 2019 is to represent the latest research results of scientists (preferred students, PhD Students, and postdoc and young scientist) related to Critical Infrastructure Protection topics.

The same historical and cultural past of the region, which has taken a common path of development over the past centuries, links our countries and paves the way for future cooperation. The meeting will provide an opportunity to highlight recent developments and identify the future areas in this interested field. Also, the conference program covered oral presentations from scientists working in similar areas to establish a platform for collaborative research projects in this field.

The organizing and scientific committee of ICCECIP 2019 conference are working continuously with the relevant press editors to stand ICCECIP 2019 conference successfully.

Budapest, November 2019

Dr. Tünde Anna Kovács

Conference chair

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Monday (18. November)

08:00 - 09:00 Registration

09:00 - 09:20 Opening Ceremony

Prof. Dr. Zoltán Rajnai

Dean of Donát Bánki Faculty of Mechanical and Safety Engineering, Óbuda University,

Prof. Dr. Miklós Maróth

Chairman of Loránd Eötvös Research Network, Hungary

Bgen. Prof. Dr. László Kovács

Hungarian Defence Forces Command, Cyber Inspectorate (CI) Inspector

Plenary lectures

Chair: **Prof. Dr. Valeriu Gabriel Ghica** (*Romania*)

Dr. Tünde Anna Kovács (*Hungary*)

09:20 - 09:40 **Prof. Dr. Michel Arrigoni** (*France*)

Considerations About Critical Infrastructure Protection, Practices from Experiments to Numerical Simulation

09:40 - 10:00 **Dr. Robert C. Castel** (*Israel*)

Critical Infrastructure Protection in Israel's National Parks: The Human Dimension

10:00 - 10:20 **Prof. Dr. Marcin Gornikiewicz** (*Poland*)

International Security Decision Making Process: impact of cultural codes

10:20 - 10:40 **Prof. Dr. Pavel Manas** (*Czech Republic*)

Improving the critical infrastructure protection

10:40 - 11:00 *Coffe break*

Chair: **Prof. Dr. Agata Mesjasz-Lech** (*Poland*)

Prof. Dr. Lívía Cvetityánin (*Hungary*)

11:00 - 11:15 **Dr. Huu Hiep Nguyen** (*Vietnam*)

Isolation, selection, and applying of probiotics bacteria for the production of safety chicken meat

11:15 - 11:30 **Dr. Chiara Bedon** (*Italy*)

Protecting soft tagets with glass: design strategies and challenges

11:30 - 11:45 **Dr. Jovan Trajkovski** (*Slovenia*)

On the numerical modelling of blast loaded critical infrastructure

11:45 - 12:00 **Dr. Lucia Figuli** (*Slovak Republic*)

Analysis of Selected Assets of Critical Infrastructure Against the Extraordinary Loads

12:00 - 12:15 **Dr. János Besenyő** (*Hungary*)

New Weapon of the Terror: Forest Fire

12:15 - 13:15 *Launch*

Section 1. Cyber Security of Critical Infrastructure

Chairmen: **Dr. Pál Michelberger** (*Hungary*)

Dr. Sándor Magyar (*Hungary*)

13:15 - 13:30 **Dr. Csaba Kollár** (*Hungary*)

Information security challenges of the social credit system in the citizen's focus

13:30 - 13:45 **Lajos Záhonyi** (*Hungary*)

Examination of the history of information security - The first ones

13:45 - 14:00 **Zsolt Szabó** (*Hungary*)

The human firewall - The human side of cyber security

14:00 - 14:15 **Haya Altaieb** (*Jordan*)

Electric vehicle charging infrastructure

14:15 - 14:30 **Döníz Borsos** (*Hungary*)

Applications of LoRaWAN technology

Sections 2. Individual Security of Critical Infrastructure I.

Chairmen: **Dr. Igor Fürstner** (*Serbia*)

Dr. Tamás Berek (*Hungary*)

13:15 - 13:30 **Éva Beke** (*Hungary*)

Critical Infrastructure Protection Framework and Trends in Attacks

13:30 - 13:45 **Malak Shatnawi** (*Jordan*)

The Effect of implementation of Pumped Storage Hydroelectric Power Technique

13:45 - 14:00 **Gábor Tóth** (*Hungary*)

Taxivity – a describe of decision making under risk

14:00 - 14:15 **Gábor Tóth** (*Hungary*)

Taxivity for the future

14:15 - 14:30 **Attila Máté Kovács** (*Hungary*)

The role of capacity payments versus capacity markets - Electricity supply security in Germany

14:30 - 14:45 *Coffe break*

Sections 3. Physical Protection of Critical Infrastructure

- Chairmen:** **Dr. Leopold Kruszka** (*Poland*)
Dr. Rudolf Nagy (*Hungary*)
- 14:45 - 15:00 **Dr. Leopold Kruszka** (*Poland*)
 Applications of Hopkinson bar techniques for the design of protective structures against blast and ballistic loading
- 15:00 - 15:15 **Dr. Nataliia Ovcharova** (*Ukraine*)
 Features of Numerical Modeling of Protective Elements Under Local Impact Loads
- 15:15 - 15:30 **Dr. Tetiana Berlizova** (*Ukraine*)
 Modeling and numerical analysis of structures made of single-crystal materials
- 15:30 - 15:45 **Mahmod Al-Bkree** (*Jordan*)
 Cage slat armor to protect critical infrastructure
- 15:45 - 16:00 **András E. Máthé** (*Hungary*)
 Ground Mobile Command Centers in Crisis Management
- 16:00 - 16:15 **Ionut Bratosin** (*Romania*)
 Recycling Li-Ion batteries in eco friendly environments

Sections 4. Political Security of Critical Infrastructure

- Chairmen:** **Prof. Dr. Banasik Miroslaw** (*Poland*)
Dr. János Besenyő (*Hungary*)
- 14:45 - 15:00 **Prof. Dr. Banasik Miroslaw** (*Poland*)
 Critical infrastructure protection dilemmas
- 15:00 - 15:15 **Dr. Agnieszka Rogozińska** (*Poland*)
 The role of NATO in shaping the global security system. Reflections on the 70th anniversary of the organization
- 15:15 - 15:30 **Dr. Erika Jókai** (*Hungary*)
 The raison d'etre for the work diagnostic tests in the work safety of the disabled employees
- 15:30 - 15:45 **Dr. Bianka Speidl** (*Hungary*)
 Jihadist attacks on critical infrastructure in Europe
- 15:45 - 16:00 **Gabriella Ráczkevy-Deák** (*Hungary*)
 Hospital security: Hospitals and terrorism
- 16:00 - 16:15 **Ákos Treszkai** (*Hungary*)
 The River Nile conflict in the aspects of critical infrastructure protection

Sections 5. Individual Security of Critical Infrastructure II.

- Chair:** **Dr. Lucia Figuli** (*Slovakia*)
Dr. Zoltán Nyikes (*Hungary*)
- 14:45 - 15:00 **József Tisóczki** (*Hungary*)
Using the e-IDAS compatible personal identification data in health and transport
- 15:00 - 15:15 **Ivona Ninkov** (*Serbia*)
Safety and Security Aspects in Drones Regulations: An Overview
- 15:15 - 15:30 **János Kónya** (*Hungary*)
Results and design process of fixing points of a custom-made subperiosteal implant used in dentistry based on technological poss
- 15:30 - 15:45 **Ferenc Molnár** (*Hungary*)
Protection of critical infrastructure in energy
- 15:45 - 16:00 **Géza Dévényi** (*Hungary*)
Functional safety of road vehicle infotainment systems
- 16:00 - 16:15 **Éva Kovács** (*Hungary*)
The challenges of introducing the new technolect of security technology into the curriculum
- 19:00 – **Gala dinner**
Caterland, Budapest, Tavaszmező u. 7-13, 1084

Plenary Speakers

Prof. Dr. Michel ARRIGONI, PhD

ENSTA Bretagne, France

michel.arrigoni@ensta-bretagne.fr

Michel Arrigoni currently works as professor at ENSTA Bretagne and researcher at Institut de Recherche Dupuy de Lôme. Michel does research in Aeronautical/Aerospace Engineering and Mechanical Engineering, its research activity strongly point toward multiphysics. Among its current project, he is involved in 'Shock propagation in complex media', 'characterisation and mitigation of the effects of explosions'.

Considerations About Critical Infrastructure Protection, Practices from Experiments to Numerical Simulation

Abstract

Considerations About Critical Infrastructure Protection, Practices from Experiments to Numerical Simulation : With the increase of the terrorist threat involving IED in civil urban environment, the enhancement of civilian protection against explosion effects turns to become necessary. Explosions effects are mainly blast and fragments impacts on critical infrastructure and citizens. Actual predictive tools for the estimation of explosion effects are limited due to the fact that their physical description relies on multiphysics considerations of complex phenomena. This highlights the need of new approaches to increase survivability by retro engineering based on modelling, itself developed on relevant experimental techniques. The work presented will introduce the notion of soft impact : fluid-structure interaction, soft target or projectile. Some experimental methods are presented and recommendations are given for numerical modelling.

Dr. Robert C. CASTEL

Israel National Parks Authority, Israel
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Employment

Chief Security Officer at Israel National Parks Authority – 2014 - Current; Head of Security and Operations – Northern District – Israel National Parks Authority – 2009 – 2014; Various Command and Staff Positions – Security, Operations & Search and Rescue - Israel's National Police - Superintendent – 1995 – 2009; Various Command and Staff Positions – Israel Defense Forces – Captain – 1990 – 1995; Professional Accomplishments; Holder of professional designation Certified Security Manager – accreditation by Israel's National Police; Holder of professional designation Certified Protection Manager - accreditation by Israel's National Police; Holder of professional designation Certified Crisis Intervention Negotiator – accreditation by Israel's National Police; Holder of professional designation Certified Firearms Instructor – accreditation by Israel's Ministry of Internal Security; Holder of professional designation Certified Instructor in Security and Management - accreditation by Israel's Ministry of Education; Holder of professional designation Cyber Security Practitioner – accreditation pending. Teaching History; Lecturer at the Israel Defense Forces Staff College – teaching Creativity and Innovation in the Operational Environment; Lecturer at the Israel National Police Academy; Lecturer at several Security Colleges accredited by the Israel National Police Education; Post-doctoral at the Israel Democracy institute - Counterterrorism; Ph.D. at the University of Haifa - Innovation in the Security Domain; B.A. Honors Program at the University of Haifa

Critical Infrastructure Protection in Israel's National Parks: The Human Dimension**Abstract**

Not unlike the proverbial elephant examined by the six blind men, the task of protecting critical infrastructure is approached from different angles by professionals coming from different backgrounds. While these professionals may perform their duties according to the highest standards of their respective fields of expertise, the inevitable gaps and overlaps among their areas of responsibility may still lead to inefficiencies and vulnerabilities. The purpose of my lecture is to present our attempts at the Israel National Parks Authority to achieve, for the lack of a better civilian term, “jointness” among the different security professions. This quest for jointness demands high levels of both intra and interdepartmental cooperation, openness toward bottom-up innovation, an ongoing dialogue with the industry and last but not least new managerial skills. These difficulties will be demonstrated through the lens of a case-study. The perspective of my lecture is that of a professional turned scholar, short on theories and long on skepticism.

Prof. Dr. Marcin GORNIKIEWICZ

Military University of Technology, Poland
marcingornikiewicz2014@gmail.com

1) 2009-2012 - National Defense University National Security Department – doctoral studies PhD dissertation title: Formation of military security of the People's Republic of China

(PhD in security science)

The PhD degree was awarded on 29th January 2013.

2) 2012.09-2012.10 - General Tadeusz Kościuszko Military Academy of Land Forces Course for future reserve personnel officers ending with an exam for first polish officer degree

3) 2008.04.06. - Land Forces Training Center in Poznań and Driving Training Center no 1 in Grudziądz Three months team commanders military training for graduate of high level studies - granting the degree terminated NCO corporal and return to the reserve personnel

4) 2002 – 2007 - University of Białystok - Law Department, Specialization: International Public Law – level of M.A. studies

International Security Decision Making Process: impact of cultural codes**Abstract**

Decision makers who are leading the states are also responsible for the shape of international policy. This is why it's so important to understand how those so important decisions are created. Cultural forecasting was designed to predict human decision making process due to subconscious codes of perception, behaviour and thinking common for people rise in the same cultural circle. The effectiveness statistically is approx. 80-90% in prediction content of decisions making by decision makers at the international level. The presentation was dedicated to present how this method works and how it could be used to predict threats for international and national security.

Prof. Dr. Pavel MANAS

University of Defence, Czech Republic
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COL Pavel Mañas obtained his PhD in 1998 from the University of the Czech Armed Forces, where he followed the curriculum of academia and education for future officers. Today, Pavel is Head of the Department of Engineering Technology at the national University of Defence that provides the Czech Military with expertise and research & development projects in the field of military structures. In his present role he is responsible for the education of young officers of the Czech Corps of Engineers. His main focus is on technical aspects for general engineering support. Pavel is also responsible for research activities and interdisciplinary cooperation with other academic bodies affiliated with the military, industry, research institutes and universities. Pavel's special interest lies in modelling and simulation technology, CAD and CAE technology, structural analysis of military and protective structures and the effects of weapons on military structures.

Improving the critical infrastructure protection

Abstract

The presentation describes some common principles between critical infrastructure protection and soft targets protection leading to improving of protection and avoiding of some mistake. Risk analysis process and security study development is discussed through optics of military officer, university researcher and practitioner with focus to typical bottle-neck in cooperation between experts and managers.

Dr. Huu Hiep NGUYEN

Biotechnology Research and Development Institute, Cantho University, Vietnam
nhhiep@ctu.edu.vn

Isolation, selection, and applying of probiotics bacteria for the production of safety chicken meat

Abstract

Poultry production is an important economic area in Vietnam. Antibiotics have been used effectively to control enteric pathogens in livestock production. However, antibiotics residues in chicken meat is a severe concern. Probiotic is a good alternative in poultry production. Thirty six strains were isolated from human breast milk and goat milk. Most of them are cocci shape. All of them are gram positive and non motile. Seventeen strains could survive at pH 3 after 3 hours. All isolated bacteria could resist to Streptomycin and Cephalexin at the concentration of 256mg/L, two strains could resist to Penicillin V at the concentration of 256mg/L, seven strains resist to Tetracycline at the concentration of 256mg/L and seven strains resist to Ampicillin at the concentration of 128mg/L. Two promising strains were identified as *Enterococcus faecalis* and *Enterococcus faecium*. These two strains were used as probiotic supplement in poultry production. The results showed that chicken applied antibiotics had antibiotic residues higher than those of permission standard while chicken applied probiotics had no evidence of antibiotic residues. The results from this study confirm that probiotics can be used as a good alternative technique in poultry production.

Dr. Chiara BEDON

University of Trieste, Italy
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Chiara Bedon is Assistant Professor at University of Trieste, Department of Engineering and Architecture, Italy, where she chairs the course of 'Structural Analysis' (PhD degree in 2012. Born 1983, since 2009 she is involved in European projects and networks. In April 2017, she achieved the Italian National scientific qualification for the position of Associate Professor in Structural Engineering. Co-author of more than 200 peer-reviewed publications, she collaborated with >80 international scientists. Since 2017, Editor-in-Chief for the open access "International Journal of Structural Glass and Advanced Materials Research" (SGAMR).

Protecting soft tagets with glass: design strategies and challenges**Abstract**

Glass facades and systems are generally intended as static partitions and assemblies in buildings, aimed to separate the occupants from the environment, or to act as non-structural, secondary components. However, especially under the action of extreme design loads, glass structures require specific design concepts voted to protect the building occupants for possible risks. This is also the case of terroristic attacks and accidents, where the intrinsic fragility and vulnerability of glass components, thus the propagation of possible shards and fragments, should be properly taken into account. Following earlier research efforts, this paper aims at emphasizing the role of glass in buildings, in the form of several load-bearing components. Major design issues and challenges of such as versatile but vulnerable material are then pointed out, with a focus on extreme loading configurations. The potentials of innovative design concepts, strategies and trends for the mitigation of glass structures under exceptional events are then discussed. Among others, it is shown that the development of a distributed-Tuned Mass Damper (TMD) system (that takes advantage of the added mass/stiffness of glass components in buildings) can be extremely efficient for multi-storey buildings. Comparative numerical simulations are then presented for a case-study building, so to assess the feasibility and possible benefits of this technique, towards further developments and more refined investigations.

Dr. Jovan TRAJKOVSKI

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Jovan Trajkovski, PhD is an Assistant professor at the Faculty of Mechanical Engineering, University of Ljubljana and a member of IAPS (International Association of Protective Structures). He has more than 15 years' experience in numerical modelling of blast response of structures using practically all the available methods. His PhD research was conducted on design optimization of centrally and eccentrically blast loaded plates with different geometries. His research work is published in numerous scientific papers and conferences mainly in the field of numerical evaluation of blast response analysis of plate structures, Light Armoured Vehicles, human injury assessment, design of blast-resistant components and infrastructure.

On the numerical modelling of blast loaded critical infrastructure**Abstract**

Numerical examination of blast loaded structures is of great importance in design evaluation of military equipment, public structures and other governmental buildings that can be potentially exposed to blast loading. Analytical solutions are limited to simple structural geometries, experiments are expensive and often impossible to perform which makes the numerical analysis the most powerful tool for structural evaluation of blast loaded structures. However, precise numerical modeling of blast wave development and blast loading of structures is one of the most complex problems in computational dynamics. The methods that are available for numerical modeling like Multi-Material Arbitrary-Language-Euler (MM-ALE), Smooth-Particle-Hydrodynamics (SPH) or Corpuscular Particle Method (CPM) are quite demanding for use and have their own advantages and disadvantages depending on the structural geometry and its relative position with regard to the blast wave source location. The speech will cover the most valuable aspects for building quick and cost-effective numerical models that can be easily applied for response evaluation of blast loaded structures.

Dr. Lucia FIGULI, PhD

Deputy Head of department of Technical Sciences and Informations, Slovak Republic

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Lucia Figuli is Deputy Head of the Department of Technical Science and Informatics University of Žilina, Faculty of Security Engineering, Slovak Republic, where she chairs the courses oriented to the structural engineering (PhD degree in 2009, born 1982). She was a member of the NATO Science for Peace and Security Programme's Independent Scientific Evaluation Group for the period 2016 – 2018, she is an evaluator of various international projects (Erasmus+, Slovak research and development agency, Croatian science foundation). 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 structures and people again the effect of the blast wave from the explosions.

Analysis of selected assets of Critical infrastructure against the extraordinary loads**Abstract**

Nowadays when the global security situation is changed due to the various threats the critical infrastructure is endangered. Is essential to protect individual assets of critical infrastructure protection. The papers analyses the resistance of selected assets of critical infrastructure against the extraordinary loads. According to the European standard Eurocode 1 for design of structures, as extraordinary loads, so called accidental actions are considered blast, impact and fire. There are not describe the considered building materials for the construction of very important assets as critical infrastructure assets are. Slovak National Security Authority issued methodological guideline for determining the scoring table of safety measures in a protected area, according to Act No. 215/2004 Coll. on the Protection of Classified Information and on Amendments and Supplements to Certain Acts. The paper analyses the resistance of such materials and

Dr. János BESENYŐ, PhD

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Colonel (ret.) János Besenyő had 31 years of experience in the Hungarian Defence Forces. In his last assignment he led the General Staff, Scientific Research Centre more than 4 years. He is an assistant professor of Óbuda University Doctoral School on Safety and Security Sciences and teaching African conflicts, European Security and Defence Policy, and conflict management. He is a lecturer in National Public Service University, Budapest (Doctoral School of Military Sciences), Eötvös Loránd University, Budapest (Doctoral School of History) and Eszterházy Károly University of Applied Sciences, Eger about African History, African conflicts, Hungarian participation in African peace operations, Western Sahara, terrorism, Christian-Muslim relations, Hungarian-African relations.

New Weapon of the Terror: Forest Fire**Abstract**

Between the 18th and 26th of November 2016, 220 different locations went up in flames in the Israeli forest. Israeli firefighters were powerless to contain the fires, so army and police units had to contribute. Thousands of civilian volunteers also joined the fight against the fire. The Israeli firemen were unable to curb the continuously blazing fires, which is why the Prime Minister, Benjamin Netanyahu, asked and received international support. The operation lasted for eight days, more than 1,700 fires were eliminated, but the conflagration caused considerable damage. Due to the extremely dry and windy periods, many blamed the weather conditions for the damage, but it soon became clear that in several cases, the cause was arson. Although arson as a method of extremism has been continuously practiced in many incidents worldwide, it is still beyond the scope of research on terrorism. This essay aims to prove that we have to raise awareness of the issue, highlighting both relevant incidents and the extremist group's propaganda incentive towards the enhanced use of arson. We raise the question whether on the basis of the incidents in Israel, arson could become a frequently used method of European terrorist units or individuals. And if yes, how the national counter-terrorist and law-enforcement agencies may adapt to the challenge of hardly controllable arson in order to minimize the chance of similarly executed attacks in the future.

Section Speakers

Dr. Csaba Kollár

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Information security challenges of the social credit system in the citizen's focus

Abstract

According to public news, China's social credit system will be introduced in 2020. However, some elements of the system have been operating for several years and not only in China. Their purpose is to score and evaluate the citizen based on his actions. The presentation is structured around five main ideas: (1) data and information available in the Social Credit system must be protected from unauthorized access, (2) algorithms based on ethical and lawful principles must be used in the processing of data and information, it is necessary to provide for the correction (3) of errors resulting from incorrect data and information flow and processing, and (4) of faulty algorithms, finally (5) in the social credit system based on IT solutions and legislation must be expressed the principle of social utility. In summary: If these expectations are not met, then the personal security of citizens will be compromised in the social credit system.

Lajos Záhonyi

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Examination of the history of information security - The first ones

Abstract

Information security is based on three principles. The first principle is the issue of authorization or confidentiality, meaning that only the authorized or authorized person should have access to the information. The second is to keep the information intact, accurate and not be distorted. The third principle is that the authorized user always has access to the information and related values. Information security and its toolkit have changed a great deal from the early 20th century to the present. It can be stated that the culture of the gradually expanding IT systems since the end of the 20th century has really brought to the forefront the need for more organized information security. Based on the information security three principles, it is possible to follow along what milestones and events in evolution these changes are took place. In my presentation, I turn back to the early 20th century and based on three principles of information security I would like to introduce some episodes of the first really great global conflict. The examples come from the First World War from the security science perspective. These are the first "incidents", the first "auditors" and the first "data leaks". In my presentation, I will also discuss how the systems of tools noted by the technical standards of the given age could be respond to the challenges of information security. Due to the interdisciplinary nature of the lecture, it will start from the basics of security science and will also cover the fields of history and law.

Zsolt Szabó—Annamária Beláz

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The human firewall - The human side of cyber security

Abstract

Cyber criminals are keen to exploit vulnerabilities in various software programs to gain access to users' computers and accounts and steal important data, such as credit card information. An important change in the case of digital data theft, compared to paper-based data management, is that in many cases we do not even notice when something is missing. No need to go far back in time, just a few days ago, hackers had access to Facebook's profile of nearly 50 million customers, not just data, but doing what they wanted with Facebook profiles, for example. they could also access other systems that the victim logged into with a Facebook profile. A little earlier, the credit card details of 380,000 customers who bought tickets on British Airways' website were in the wrong hands. In 2016, Tesco Bank (UK) lost the money of its 20,000 customers, also due to IT errors. And these are just some of the many events that are well known. Attacks are usually made using automated methods that search for common bugs. These are the attacks you can and should defend against. It is essential to know what the potential faults of the IT system are and what you can do to prevent them. The purpose of the study is to analyze the role of humans in the information security of the digital state and society.

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Electric vehicle charging infrastructure

Abstract

Plug-in electric vehicles (PEVs) are becoming increasingly popular in the developed countries and in an effort to overcome pollution problems, depleting natural oil reserves, fossil fuels, and rising gasoline costs. The availability of public transport infrastructure is a critical factor in increasing the adoption of PEVs because long journeys cannot be achieved through the limited electric range of PEVs. Therefore, providing a general charging service to reach the home is a basic requirement. Moreover, the automotive industry is facing increasing social pressure and renewed government regulations to reduce emissions and adopt cleaner and more sustainable technologies such as PVS.

In this paper, we describe the electric Vehicle Charging technologies, global electric vehicle market and the main factors for both standard and DC fast charging infrastructures such as population density and the prevalence of multi-unit domicile.

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Applications of LoRaWAN technology

Abstract

LoRaWAN is a network specification that has been in continuous development since 2015 by the LoRa Alliance. Its base is the LoRa technology by Semtech, which dates back to 2013. Thanks to the special modulation of radio technology, it accomplishes long range, low power consumption wireless communication, even in unfavourable conditions such as in reinforced concrete buildings, underground car parks, basements or areas without current supply. Nevertheless, there are ongoing IoBT researches regarding the technology and its applications in modern warfare in urban environments along with increasing the efficiency of data transfer.

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Critical Infrastructure Protection Framework and Trends in Attacks

Abstract

With the arrival of Industry 4.0 data, cyber and critical infrastructure protection became an even more important responsibility. Considering the interconnection of devices able to carry out terrorist and cyber-attacks, besides traditional threats, such as industrial accident, sabotage or environmental hazard, would affect directly and indirectly national security, economy and also would ripple through our everyday life. Critical Infrastructure protection, their continuous and reliable operations, their safety and maintenance are the utmost importance to all governments around the globe. It requires policies, priorities and demands, and balanced strategic planning for global and national level. This paper focuses on the fundamental concept and responsibilities of the protective steps should be implemented to protect critical facilities or sectors as well as on the latest trend in cyberattacks and their relevant legal framework. For research method I have used content analysis, desktop research and secondary data analysis .

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The Effect of implementation of Pumped Storage Hydroelectric Power Technique**Abstract**

Due to the new trend in Hungary to utilize renewable energy resources such as biomass, wind and solar, this led to introduce new challenges to the energy system and to the nature of these intermittent and uncontrollable system which require having a technology to balance between the supply and demands and make the system flexible and controllable. The electrical system is characterized by fluctuation in demand and generating capacities due to the fact that generating sources of various types of renewable energy source are characterized by instability and in many cases the on-peak period is not commensurate with the available generating capacity which leads to the direction of the expensive sources generation and often harmful to the environment. This paper was made based on the output of the research prepared by Energy Regulators Regional Associations ERRA which relates to the use of pumped-storage hydroelectric power plants: Issues and Applications, 2016. It aims to utilize energy during off-peak hours to generate electricity in the selected area and store the surplus electricity by means of pumped water storage technique typically equipped with turbines and generators connecting an upper manmade reservoir and lower natural reservoir (lake or river) then by reversing water pumping to utilize the naturally available gravitational force to the nearby water resource, (detailed technical description with illustrative diagram for the selected area and funding sources for the project will be provided within the body of the research), this storage system require three major elements to exist together at the same place which is the availability of sufficient water resources, the topography of location to have variation in hydrostatic head and the availability of power supply and electric power network or consumers, even though there are large initial financial investment the lifetime of the equipment of hydro plant is operating with low operation and maintenance costs having short startup and shutdown requirements, also the plants themselves may have lifetimes of hundred years and unlimited cycles of lifetime with upgraded added capacity per year if needed. Hungary enjoy the availability of large amount of renewable water resources either from the Danube River or the lakes, even there is enough electrical network but it depends mostly on the conventional source of energy, this makes the current research very important to achieve the vision of European Union, 98% of Hungary has an elevation of less than 200 metre above sea level which is a limitation in selecting the suitable area for pilot projects.

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Taxivity – a describe of decision making under risk

Abstract

Based on data gained from behavioural economics experiments carried out by the author in order to measure willingness to pay taxes, I examined participants' decisions regarding taxpaying. This paper presents participants' choices among risky prospects by a view of prospect theory. How do taxpayers think about paying taxes and what is the difference between thinking and decision making? How does it all depend on taxpayers' income or tax rate changing? Based on the distribution of available data collected during 60 Taxivity experiments and games, I defined players' behaviour depending on whether wanted/unwanted events took place independently or under certain circumstances. As we know, people underweight outcomes that are merely probable, in comparison with outcomes that are obtained with certainty. Our results accord with Kahneman's and Tversky's: people generally discard components that are shared by all prospects under consideration. I described participants' choices with a type of the overweight distribution function.

Taxivity for the Future

Abstract

Based on data gained from behavioural economics experiments carried out by the authors in order to measure willingness to pay taxes, we examined participants' decisions regarding paying taxes. With the extension of the examined sample, we performed an econometrical modelling of tax evasion. Based on the measured data, the typical distribution function types were identified, and estimations of the parameters of the distribution functions were made with mathematical-statistical tools to describe the typical patterns of tax evasion. Based on the measured data, the typical distribution function types (gamma distribution, polynomial distribution, binomial distribution, geometric distribution, negative binomial distribution) characterize players' behaviour depending on whether wanted/unwanted events took place independently or under certain circumstances. Based on the distribution of available data, we defined the likelihood principle of tax evasion. By publishing our results, we can provide data for the risk management map of economic operators, and we can show how changes of tax rates, of the severity of inspection, and of the degree of sanctions affect the decisions of economic operators.

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The role of capacity payments versus capacity markets - Electricity supply security in Germany

Abstract

Achieving the perfect balance between maintaining enough electricity generating capacity to meet peak demand while not paying for a glut of idle power stations is notoriously difficult for any power system. Too much capacity adds unnecessary cost and too little risks blackouts. Are capacity payments essential for guaranteeing the security of supply in a high renewables power system? Or is their promotion all about keeping legacy power plants solvent well past their sell-by date? As is, generators and suppliers in liberalised economies must dance to the disciplines of market efficiencies. .

Dr. Leopold Kruszka

Applications of Hopkinson bar techniques for the design of protective structures against blast and ballistic loading

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Abstract

Experimental studies of the dynamic properties of different structural materials at high and very high strain rates in various deformation modes at lowered, room and elevated temperatures, will be presented. There will be descriptions of laboratory setups for testing material specimens, based on various modifications of the Hopkinson bar technique. This presentation will focus the attention on experimental tests and their interpretation. The results reported here will be useful for the designers working on the dynamic behaviour of building and mechanical protective structures made of different materials such as steels, aluminum alloys, ceramic and sand bricks, mortars, woods, ceramics, and concrete fireproof and soils

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Security of Military And Civil Objects Under Local Impact Loads

Abstract

Many objects of modern technology are exposed to shock and impulse loads. A three-dimensional dynamic stress-strain state arises in constructions elements under the action of local impact loads. Therefore, the analysis of the dynamic stress-strain state is an actual and complex problem. Modelling of high-rate deformation of constructions, taking into account the dynamic properties of materials and large displacements, is carried out. Numerical studies of the dynamic stress-strain state of the structural elements of vehicles and gas turbine engine corps are carried out by the finite element method.

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Modelling and numerical analysis of structures made of single-crystal materials

In gas turbine construction superalloys single-crystal materials have taken a strong place. Blades of single-crystal alloys are used in airplanes, ships, power plants, etc. In nowadays the operating temperature of the blades exceeds the normal operations temperature of heat-resistant alloys, only an effective cooling system helps to blades to withstand high temperatures. Gas turbine blades operate not only at high temperatures but at high flow rates. Therefore, breakaway pieces of the blades with a gas flow can hit the engine components, which can lead to decrease in efficiency.

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Slat armor to protect critical infrastructure

Abstract

The unmanned aerial vehicles (UAV) proliferation impose a new big risk against critical infrastructures, the small size of this UAV, the ease of deployment, it's autopilot navigation ability, and the cheap price makes it the future weapon of choice for attacking critical infrastructures. in this paper I'm trying to investigate effectiveness of the slat armour for the protection of critical infrastructures.

traditionally the walls and fences (2 dimensions) are used to provide physical ground barrier around protected areas, However, the UAV can easily and cheaply fly over these fences carrying cameras and spying sensors and explosives. I argue for the need of all dimensions physical fence not only to protect against ground intruding but against aerial intruding as well. the suggested fence is more like a full cage slat armor around and above the critical infrastructures.

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Ground Mobile Command Centers in Crisis Management

Abstract

The first deployment of Mobile Command Centers was at the North African battlefields during World War II. The quick movement of military troops and the continuously changing and extending battlefields which could become tens or even a hundred kilometre in size, lead to the use of such military operational command posts which were not fixed to a building but could be relocated easily and quickly. Thanks to the successful use of Mobile Command Centers in military operations and the fast development of info-communication systems the governmental civil protection authorities found mobile command center very effective and rapid solution in the coordination of their site work against natural and industrial disasters, accidents, terrorism. In this article the author shows the history, the typical design, equipment and aspects of selection of Mobile Command Centres.

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Recycling Li-Ion batteries in eco frandly environments

Absrtact

Li-Ion batteries can be considered part of an essential system for maintaining the vital functions of the society by ensuring the supply of essential devices for: health (heart simulators), transportations safeness (aviation), communications security (telecommunication). As the use of electric vehicles expands, the need for Li-Ion batteries will increase exponentially in the future. The collection and recycling management process of used Li-Ion batteries raises unresolved problems still: thrown into the trash landfill can trigger fires that are difficult to extinguish (the intervention vehicles have no access roads) and environmental pollution. Due to the content of expensive and deficient metals (i.e. Cobalt, Lithium, Nickel, Titanium) their recovery and recycling is necessary.

The paper presents the results of the research carried out with the -goal of recovering the useful non-ferrous metals (i.e. Cobalt, Lithium, Copper Aluminum) from used Li-Ion batteries. We developed an optimal process to separate active paste (containing LiCoO₂ compound) from the aluminum cathode. For this purpose, we used an ultrasonic bath in which we introduced different acid solution (i.e. citric acid, acetic acid, lactic acid), as a bleaching agent. This recovery process presents the following advantages: it has low costs, the process has high recovery efficiency (90%) and is largely ecological.

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The role of NATO in shaping the global security system. Reflections on the 70th anniversary of the organization

Abstract

NATO has survived to its 70th anniversary in essentially the same condition as it characterized virtually every year of its existence. In the opinion of commentators and learned experts from the outside, the Alliance appears to be in constant crisis, and each new version of the crisis is seen as final and deadly. For a change, for those who operate inside, NATO seems stronger than ever before - it is engaging in more places than before, it presents new initiatives at an unprecedented pace and in increasingly longer declarations from the summits. Now that the Alliance has firmly returned to its inherent collective defense mission, its future has long not seemed so secure. The problem situation presented in this way allows formulation of the main research problem: What role does NATO play in shaping the global security system? The research problem formulated in this way consists of detailed problems formulated in the form of questions:

2. What threats are currently ahead of NATO?

3 What is Donald Trump's policy towards NATO?

The aim of the presentation is to provide an analysis of the role of NATO in ensuring collective security in the context of the 70th anniversary of the organization's celebration. The methodology mainly uses analysis and criticism of literature.

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The Raison D’etre for the Work Diagnostic Tests in the Work Safety of the Disabled Employees

Abstract

According the Hungarian Labor Safety Law (Mvt. 50/A § 63), workers from vulnerable groups (persons with disabilities, juveniles, pregnant women) should be protected from the risks especially affecting their health. During profession choice and employment the assessment of the student’s and employee's suitability for the job is harder due to lack of information, so it is necessary to develop professional guides based on ability tests and job simulator surveys. Our goal in our work diagnostic measurements was to optimize the measurement process, create a database for younger age groups, develop a specific methodology for measuring disabled persons. The examinations and the results obtained with the help of work diagnostic tests can be used for the selection, counselling and evaluation of the suitability of persons who are in the process of choosing a career or a job. Occupational diagnostic measurements provide useful information during training and employment for assessing the suitability, promoting rehabilitation, and skills development. In this way, work diagnostic tests help for all employees to ensure safe work

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Jihadist Attacks on Critical Infrastructure in Europe

Abstract

Besides its function to maintain the social and economic well-being of a nation, operating critical infrastructure serves as proof of the ability of the state to provide protection to its citizens. Hence, a successful terrorist attack targeting critical infrastructure - in addition to generating fear and panic in the ranks of society undermines the operational character of the state. In recent years, several terrorist incidents in Europe have highlighted the vulnerability of critical infrastructure and, consequently, the importance of protecting it. Bearing this in mind, the protection of critical infrastructure has become a high priority for Western states, in parallel with the growing trend of risks, challenges and threats posed by international terrorism. This study aims to assess how the uncontrolled wave of migration affected the vulnerability of critical built infrastructure in Europe, as well as examine the religious justification of Jihadist terrorist attacks.

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Hospital security: Hospitals and terrorism

Abstract

Hospitals are part of the critical infrastructure and are incredibly vulnerable. Unexpected events may hinder the functioning of institutions, causing severe damage and loss of asset value and quality of service. Every hospital should be prepared for such incidents with well -developed plans and strategies. The hospital can be an ideal target for a bomber because a lot of civilians are taken care of and are open 24 hours a day, seven days a week. Unfortunately in recent years have taken place more and more terrorist acts. (eg: November 13, 2015, Paris, March 22, 2016, Brussels) How are hospitals prepared for these events in Hungary and abroad? Are the Hospitals Disaster Management Plans sufficient? What kind of terrorist targets can be a hospital? How prepared are the home health systems if a hospital falls out of healthcare during an attack? In my essay I am looking for the answers to these questions, and also I introduce the concept of hospital security .

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The River Nile conflict in the aspects of critical infrastructure protection

Abstract

It is often said that the next world war will be fought over water, and there are few places as tense as the River Nile. Egypt and Ethiopia have a serious disagreement, Sudan is in the middle of it, and a big geopolitical shift is being played along the world's longest river. The Great Renaissance Dam has been under construction on the Blue Nile River in Ethiopia. This dam will be the greatest hydroelectric power plant in Africa. This critical infrastructure has both political and military importance.

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Using the e-IDAS compatible personal identification data in health and transport

Abstract

Reliable authentication of entities using systems is an essential part of Critical Infrastructures (CIP) protection. One of the central challenges of Europe today is to formulate and implement concrete responses to security threats. In order to authenticate entities that use critical infrastructures the implementation of the so-called two-factor identification is very important. A reliable, useful and cost-efficient alternative to this form of strong authentication could be the use of an e-IDAS compatible personal ID in healthcare and public transport too. In the future, more and more miniaturized IoT and smart devices will be involved in healthcare processes and in the validation of authenticated trajectory-based transport, traveling and devices according to eIDAS, GDPR and NIS directives. Our lecture gives a brief summary of the knowledge and research results related to the above.

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Safety and Security Aspects in Drones Regulations: An Overview

Abstract

Nowadays, there is increased use of drones with civilian purposes. Most of the countries regulate the safe operation of drones. In addition, there is the regulation which takes care not to disturb and harm the public and national security by drones. In this paper an overview of drone regulation is done. The comparing of regulations of ten European countries is done. In the paper the Hungarian drone regulation which adopts the existent legislation and implements the temporary provisions on the operation of drones is considered. Based on the comparative analysis of regulations for various countries some similarity are found, but also differences which include the specifications of some countries. In the paper the attention is given to the differences in security aspects in drone regulation which are connected with the type and size of drones. To overcome these differences in regulation, the EU is preparing the new common legalization up to 2020 in the framework of safety aviation. This paper has the aim to give a contribution for giving some legislative proposals.

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Results and design process of fixing points of a custom-made subperiosteal implant used in dentistry based on technological poss

Abstract

In our study, we retrospectively investigated implants success rate in patients with bone deficiency in a 6-year time interval. The follow-up, analysis, and evaluation of these cases were of vital importance to implement an evolutionary design process. With the demonstration of the implementation steps and phases, we give an explanation of the whole construction process of the idealised fixing element. This study investigates fixing points used as pillar elements for cortically-supported individual subperiosteal implants in order to achieve optimal implementation method of the manufacturing technology, mechanical strength for the used titanium implant material, and overall material homogeneity. By analysing case reports during the design process, minimum physical limits for sizes of fixing pillars were investigated. Hereby, mechanical loads caused by static and dynamic articulation movements were analysed considering inter-occlusal distance dimensions. Functional and red white aesthetics, which relates to the interface between gum tissue and denture, were major aspects during the development. While designing these ideal pillars, practical experiences could contribute to the perfect biological subgingival compatibility, which accommodates internal surfaces of implant-surrounding mucous membrane. We have put a great emphasis on the analysis of biological, physiological, functional, and technical problems of individual implants regarding pillars and fixing points. As a result, anatomical and physical locations, geometrical design and function of the conventional fixing points for customisable individual implants were determined.

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Protection of critical infrastructure in energy

Abstract

Continuous economic and social development is a defining feature of human history. Technological revolutions have been following each other at an ever-accelerating pace since the Industrial Revolution. As a result of this development, our ever-expanding supply and supply of equipment results in a strong increase in energy demand. The comfort of mankind is provided by the ever-widespread electrification, that is, we are encountering electricity-based technologies in more and more areas of our daily lives. In addition to providing convenience, automation and digital technology are improving the efficiency of economic activities and promoting sustainable energy production. The life of an urbanized people is moving towards full automation. Smart homes, internet-based work and commerce are gaining ground. There is a proliferation of selfless software, thinking computers. Self-propelled vehicles run a test run. In addition to peaceful civilian applications, drone technologies are now increasingly being used for combat purposes. What would happen if power were cut off for an extended period of time? Without the continuous, reliable availability of electricity, today's advanced technologies are worthless. Without electricity, life stops. Based on this recognition, energy infrastructure systems are increasingly being attacked by external attackers. In addition to the reliability of technologies that play a decisive role in the supply of energy, it is necessary to take effective action against potential threats from the environment. This article, together with a description of the power supply systems, identifies potential external threats and remedies that can be applied.

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Functional safety of road vehicle infotainment systems

Abstract

This paper investigates the challenges arise due to the increased performance and complexity of the In-Vehicle-Infotainment (IVI) systems. Series production road vehicles install increasingly more highly-automated driving functions. The IVI-systems are interconnected with these functions as well as are in close interaction with the driver. Therefore the IVI-systems are becoming considered as safety-critical. The proper interaction with the driver plays a significant role in the controllability of hazardous situations. Also, the requirements on providing valid information, e.g. geolocation, to other critical functions make the IVI-systems safety-critical. IVI-system malfunctions of self-driving vehicles can have the potential to lead to the violation of critical transportation infrastructure.

Also the compromise of critical IT-infrastructure, e.g. cloud-based navigation, can have the potential to lead to the malfunction of the IVI-system of self-driving vehicles. .

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The challenges of introducing the new technolect of security technology into the curriculum

Abstract

The presentation touches upon significant issues of my research topic regarding the introduction of the new technolect and subject called ‘English for Safety and Security Sciences’ into the university curriculum. The young specific scientific area of ‘Safety and Security Sciences’ celebrated its 25th anniversary of its presence in Hungarian tertiary education last year while its introduction as a technolect into BSc training faces numerous challenges. One of them is the method for identifying the most recent relevant literature representing the science in an authentic way, also providing a base to formulate a course description and material for the subject. I am going to examine best practices to achieve the aims we set together with Donát Bánki Faculty of Mechanical and Safety Engineering. I am also going to discuss methods of how to develop students’ vocabulary of terminology both in the target language and mother tongue in regulatory circumstances where all students will arrive at tertiary education having a level B2 language examination.

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Mobile Security Basics to Mitigate the Risk of Social Engineering

Abstract

Humans are the weakest link in the security chain: their individual, personal decisions can have a huge impact on the security of organizations. Publicly accessible personal information about employees can be a vulnerability for companies and can be exploited by malicious players. Individuals can be used to get to organizations with cyber-crimes, for example with social engineering or phishing. These are common threats nowadays, against which awareness, constant questioning and taking some basic appropriate steps to increase safety are key. This article aims to raise alertness of this risk. The consequences of security breaches can be serious, enterprises can face enormous fines and their reputation can suffer, which can endanger the future of them. People spend substantial amount of time using their smart phones and accessing social media in their personal lives without considering the risks of this for their employer. In the following article we are going to introduce cyber-crimes and their tools to get to companies through employees. We are going to explain simple and practical methods to mitigate these kind of risks, with a special emphasis on mobile device security. We trust that even the simplest measures can help people and organizations to achieve a better state of security. In the last section of the article, we are going to present our survey, which aims to explore the current situation and habits of using the presented countermeasures in this regard.

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Critical infrastructure protection in the energy sector

Abstract

In the interest of the citizens of the European Union, it is of paramount importance that critical infrastructure in their territories operates with particular attention. We must be able to prevent any damage that may occur in the equipment. Energy security measures are therefore of particularly important as European energy supply paralysis is rather weak and can have lasting consequences. Stopping the supply of energy has therefore always served as an attractive target for terrorist attacks because it can completely disrupt the functioning of a country.

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Critical Infrastructures: The Bottleneck of Societal Security

Abstract

With the appearance of cryptocurrencies, the idea of “making money” has been implemented again and just like in the 19th century, the famous ‘Gold Rush’ in California, this phenomenon is so much similar in many ways. Connecting critical infrastructures to the internet is of the most dangerous impact on societal security because that gives a big opportunity for remote access to a high-power source. Cybercriminals can exploit these weak points, which has been made by co-workers and serious problems can arise. On the other hand, there are also organisational activities against these assets, which can be targeted by political motive. The main concept of this paper is to spotlight the purposes of financial gain, the reasons behind the actions and the great risks which can evolve from these interests.

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Stranger Things – Threats and Opportunities related to the Internet of Things

Abstract

The Internet of Things (IoT) is often seen in the context of a fourth industrial revolution, which will take interconnectedness, based on the internet, on a new level. Increased data collection, thoroughly monitored customer and user behaviour, and the increased need for data miners and analysts are all part of this transformation. Security concerns, however, are not only there, but with new platforms and methodologies in the business world, new ways of attacks, obtaining data, and making service providers unavailable emerged. Germany aims to implement a 10-15 years-long strategy to accelerate its economy's digitalization and maintain its status among the world leaders in terms of industry and research

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Environmentally conscious education

Abstract

In the XXI. century, perhaps the most important issue is protecting our environment and preserving its values for future generations. Environmental awareness as a concept: Environmental awareness is a term used to denote the awareness, sensitivity, and conscious responsibility of an individual or segment of society about the state of the biosphere and the environment of the human population, and is often used as an indicator. Environmental awareness, as such, is very broad, as there are countless ways we can contribute to protecting our environment. Take, for example, someone who does not simply drop their trash on the street, but throws it to the nearest bin. It may seem like a small step, but in my opinion, with such small steps, someone can start off with environmental awareness, as the next step is to selectively dispose of their waste and dispose of it at designated points or to dispose of it in bags provided by municipalities. But environmental awareness as such goes beyond selective waste collection. It includes things like organic food, plant production, cultivation, or keeping in mind water use, including the construction and use of passive houses, which are becoming more and more widespread, and efforts to exploit renewable energy sources. The unsustainable way in which mankind operates globally and the need for immediate changes in production and distribution and in consumer behavior are central, almost everyday, issues. Unfortunately, in spite of the fact that more and more social groups, groups, organizations and even individuals are recognizing the inevitability of this change, there is a wealth of press coverage, warning messages from science, so many conferences and marketing campaigns, political statements, The vast majority of the earth's population consume our material goods and natural resources to an extent that will inevitably lead to ecological disaster and depletion of our resources.

In this article, I would like to emphasize the importance of environmental protection and conscious education, examining its educational policy background and outlining the Hungarian kindergarten and school tasks related to environmental education.

Barnabás Sándor

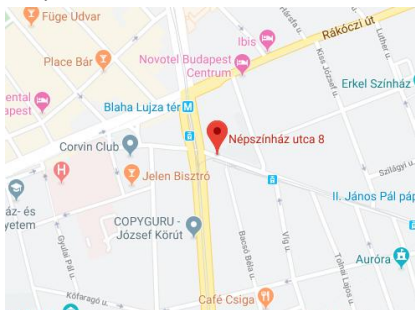
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Warflying – 2.4 GHz and 5 GHz wireless network detection by drone in critical infrastructure

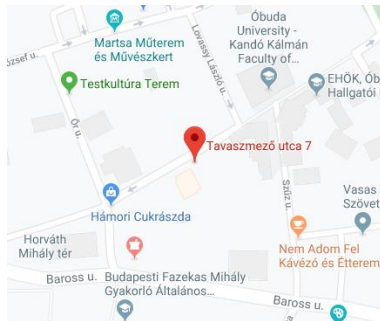
Abstract

The object of this research is to discover and map unauthorized wireless network access points from a drone (UAV) in critical infrastructure. From the time the hypothesis was set up, presents the processes, the measurement results, and IT security suggestions through the design of the system, the execution of the measurements. During the research, I designed a system for capturing and mapping Wi-Fi signals of the 2.4 GHz and 5 GHz wireless range then convert it to map view.

Conference venue:
Óbuda University
Budapest, Népszínház u. 8.
By car: Csokonai u. 5-7.



Gala dinner venue:
Caterland
Budapest, Tavaszmező u. 7.



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