

Preface

The International Conference on Structural and Mechanical Engineering for Security and Prevention 2017 is a conference intended to be a forum for researchers in all related fields connected with the security, safety and prevention because of the security threats. Actually it's become of great attention due to the worsening of the global security situation and increasing in terrorist acts using explosives as a means of terrorist fight. With the increase in terrorist attacks in recent years, the conference topics are highly current. The fact is that the terrorist attacks have moved from the world's battlefields such as Syria, Iraq or Afghanistan, into city centres (e.g. Oklahoma City, Madrid, Moscow, Bologna, London, Ottawa, New York, Boston, Paris, Nice and recently Manchester). But security treats occurs in the another area too. It is not only about terrorist attack, but the influence of extreme weather condition leads to crisis situation which have to be solved. Grave industrial accidents and security treats connected with the transport. The presented conference wanted to join the best researches whose work involve the area of safety, security and bring a new, stronger ideas for resolving problem.

This conference provides a forum for the presentation and discussion of the latest research advances and engineering-practice innovations with a focus on the new technologies and current practice related to the blast protection, mechanical and security engineering which brings together professionals from the engineering and scientific fields. The conference will also give you an opportunity to update and expand your technical knowledge with keynote and technical sessions, panel discussions, and short courses. The topics of conference include new materials for safety and security engineering; diagnosing and testing of materials; modelling and experiments; security technology of explosives; critical infrastructure protection; construction safety and security; underground structures and tunnels; risk analysis, assessment and management; emergency and crisis management; new standards on security engineering; rock and mining engineering; blast protection; seismity and geomechanics; fire engineering.

This issue contains selected papers from the ICSMESP 2017, which took place in Prague, the capital of Czech Republic, from June 14 to June 16, 2017.

Finally, as guest editors, we would like to express our sincere appreciation to the members of the editorial committee and the advisory board for giving an opportunity to work with us. We are grateful to all the authors and reviewers of the manuscripts and especially to Michael Gaul, for his valuable advice and his support from NATO Emerging Security Challenges Division.

We thank the generous support by Czech Technical University in Prague, Department of Building technologies under lead of the Prof. Ing. Pavel Svoboda, CSc., to Faculty of Security Engineering in Žilina, Slovakia, to Willenberg Foundation for their enthusiasm and help with the organisation of the conference and we thank the office of the Trans Tech Publications Inc. for assistance with editorial matters.

Ing. Lucia Figuli, Ph.D.

Col. Assoc. Prof. Ing. Pavel Manas, Ph.D.

Dipl.-Ing. Alexander N. Kravcov, Ph.D.

Ing. Václav Pospíchal, PhD.

Assoc. Prof. Ing. Bohuš Leitner, PhD.

Assoc. Prof. Ing. Pavel Svoboda, CSc.

Committee

HONORARY CHAIRMAN

Prof. Ing. Zdeněk Dvořák, PhD., Dean of the Faculty of Security Engineering in Žilina, Slovakia

CONFERENCE CHAIRMEN

Prof. Ing. Vladimír Křístek, DrSc., Czech Technical University in Prague, Czech Republic

Col. Assoc. Prof. Ing. Pavel Manas, Ph.D., University of Defence in Brno, Czech Republic

Assoc. Prof. Ing. Pavel Svoboda, CSc., Czech Technical University in Prague, Czech Republic

Col. Ing. Štefan Jangl, Ph.D., Faculty of Security Engineering in Žilina, Slovakia

Dipl.-Ing. Alexander N. Kravcov, Ph.D., Czech Technical University in Prague, Czech Republic

INTERNATIONAL ADVISORY COMMITTEE

Prof. Ing. Helmut Kurth, Ingenieurbüro in Fölschnitz, Germany

Assoc. Prof. Michel Arrigoni, Ph.D., ENSTA Bretagne, France

Michael Gaul, Emerging Security Challenges Division, NATO

Prof. Ing. Jiří Barták, DrSc., Vice-Chairman of the Czech Tunnelling Association, Czech Republic

Prof. Ing. Ladislav Hofreiter, CSc., Faculty of Security Engineering in Žilina, Slovakia

Prof. Ing. Claus-Peter Strobach, LGA Bayern, Nurnberg, Germany

Assoc. Prof. Dr. Ing. Jan Pruška, Czech Technical University in Prague, Czech Republic

Prof. Ing. Jozef Melcer, CSc., University of Žilina, Faculty of Civil Engineering, Slovakia

Ing. Lucas Domergue, Ph.D., CEA/DCS/SPACI/Physical Protection laborator, France

Prof. Ing. Jozef Vičan, CSc., University of Žilina, Dean of the Faculty of Civil Engineering, Slovakia

Prof. Dr. Zoltan Rajnai, Obuda University, Dean of the Faculty of Mechanical and Safety Eng., Hungary

Prof. Dr. Laszlo Pokoradi, Obuda University, Faculty of Mechanical and Safety Eng., Hungary

Prof. Mohamed Abdel-Mooty, Ph.D., Cairo University, Egypt

Prof. Ing. Tomas Lovecek, PhD., Faculty of Security Engineering in Zilina, Slovak Republic

Prof. Dr.-Ing. Eckhard Goldau, MHS Baunormteile, Nordrhein-Westfalen, Germany

Assoc. Prof. Ing. Linda Osvaldovska-Makovicka, Ph.D., University of Žilina, Slovakia

Lt Col. Ing. Vladimír Kavický, Ph.D., Ministry of Defence, Slovakia

Assoc. Prof. Tunde Kovacs, Ph.D., Obuda university, Faculty of Mechanical and Safety Eng., Hungary

Assoc. Prof. Ing. Bohuš Leitner, PhD., University of Žilina, Slovakia

Ing. Lucia Figuli, Ph.D, Faculty of Security Engineering in Zilina, Slovakia

Prof. Ing. Josef Reitšpís, CSc., University of Secure Management in Kosice, Slovakia

Prof. Dr. Tamas Reti, Obuda University, Faculty of Mechanical and Safety Eng., Hungary

Dr.h.c. Prof. Ing. Milan Žmindák, CSc., University of Zilina, Faculty of Mechanical Eng., Slovakia

Assoc. Prof. Vladimír Mozer, PhD., Faculty of Security Engineering in Zilina, Slovakia

Assoc. Prof. Chiara Bedon, Ph.D., University of Trieste, Italy

Prof. Ing. Jan Kusak, CSc., Prototypa Brno, Czech Republic

Prof. RNDr. Milan Malcho, DrSc., University of Žilina, Faculty of Mechanical Engineering, Slovakia

Prof. Ing. Anton Osvald, CSc., Faculty of Security Engineering in Žilina, Slovakia

ORGANIZING COMMITTEE

Ing. Lucia Figuli, Ph.D, University of Žilina, Slovakia

Col. Assoc. Prof. Ing. Pavel Manas, Ph.D., University of Defence in Brno, Czech Republic

Dipl.-Ing. Alexander N. Kravcov, Ph.D., Czech Technical University in Prague, Czech Republic

Mjr. Ing. Jiří Štoller, Ph.D., University of Defence in Brno, Czech Republic

Ing. Zuzana Zvaková, Ph.D., University of Zilina, Slovakia

Mjr. Ing. Petr Dvořák, Ph.D., University of Defence in Brno, Czech Republic

Sponsors

Company Profile

Established in 1953, KONŠTRUKTA - Defence is a leading Slovak defence company operating as an artillery weapons and ammunition design and testing house. Its current core business in Design&Development&Testing of artillery systems and high calibre ammunition represents in particular the outstanding 155mm / 52 cal. family of Self-propelled Gun Howitzers.



The Company Core Business Activities are:

- Design and Development
- Testing
- Assembly & Product Integration
- Special Services

KONŠTRUKTA - Defence is a Research & Development company with a long-term proven capability in designing, developing and certifying state-of-the-art land and air defense weapons systems, ammunition, command and control systems, electronic systems and other customized special-purpose superstructures and platforms for both wheeled and tracked vehicles.

Our D&D capabilities are mainly specialized in:

WEAPON SYSTEMS

- ⊕ Cannons and Howitzers
- ⊕ Rocket Launchers
- ⊕ Anti-Aircraft Systems
- ⊕ Turret Units
- ⊕ Mortars
- ⊕ Mine Laying and Mine Clearing Systems

AMMUNITION

- ⊕ 152 and 155 mm Howitzer Ammunition
- ⊕ 125 mm MBT Ammunition
- ⊕ 81, 98, 120 mm Mortar Ammunition
- ⊕ 122 mm Rockets
- ⊕ NATO Standard Fuses for Artillery Ammunition

ELECTRONIC SYSTEMS

- ⊕ Fire Control and Command Systems
- ⊕ Control Systems for the complete range of weapon systems and military equipment
- ⊕ Compilation of SW for the customer

KONŠTRUKTA - Defence, a.s.

Lieskovec 575/25

018 41 Dubnica nad Váhom

Slovak Republic

Tel.: 00421 42 285 2232

Fax.: 00421 42 285 2203

E - mail: kotadef@kotadef.sk

Web: <http://www.kotadef.sk>



The Science for Peace and Security Programme (SPS) is a partnership tool which benefits both Allies and Partners by addressing shared security concerns. The Programme aims to enhance Euro-Atlantic and international security, peace, and stability by fostering cooperation and dialogue with all partners on security-related civil science, innovation, and the sharing of expertise. The SPS Programme seeks to promote large-scale and more strategic activities with a high political impact and public diplomacy value as outlined in the SPS Overarching Guidelines agreed by the North Atlantic Council in 2013. The reorientation of the SPS Programme beyond scientific cooperation clearly demonstrates its flexibility and adaptability to new political guidance provided by Allies.

NATO EMERGING SECURITY CHALLENGES DIVISION

THE NATO
SCIENCE
FOR PEACE
AND SECURITY
PROGRAMME

NATO EMERGING SECURITY CHALLENGES DIVISION

Building on NATO's 2010 Strategic Concept and the Berlin Partnership Policy of 2011, the SPS Programme will respond to the Alliance's main goals as clearly stated during the 2014 Wales Summit. The successful implementation of the SPS Programme in the future is assured by its alignment to the political guidance provided by Allies; enhanced coordination between relevant NATO bodies; efficient, transparent, and accountable management.



A handwritten signature in black ink, appearing to read 'Sorin Ducaru', with a long horizontal stroke extending to the right.

Ambassador Sorin Ducaru

Assistant Secretary General

NATO Emerging Security
Challenges Division

SWIETELSKY



Dipl. Ing. Hellmuth SWIETELSKY founded the company in 1936. With a workforce of more than 8.700 employees, SWIETELSKY Baugesellschaft m.b.H. is today among the foremost companies in the Austrian construction industry. Central office is in Linz (Austria).

The activities of SWIETELSKY cover all aspects of construction work:

- Railway construction
- Road construction
- Civil construction
- Bridge construction
- Building construction
- Tunnels
- Buildings for sport activities
- Ecological building

SWIETELSKY

Baugesellschaft m.b.H

Edlbacherstraße 10
A-4020 Linz
Phone: +43 (732) 6971-0
Telefax: +43 (732) 6971-7410
E-Mail: homepage@swietelsky.at
www.swietelsky.com



SWIETELSKY – Slovakia spol. s r.o.

Mokráň záhon 4,
821 04 Bratislava, SLOVAKIA
Phone: +421 (0)2 5710 1710,
Telefax: +421 (0)2 5710 1720
E-mail:
office.slovakia@swietelsky.sk
www.swietelsky.sk

YOU CAN BUILD ON US