Federal Ministry of Defence

DWT

3rd International Symposium on Development of CBRN Defence Capabilities

Berlin CBRN Symposium | 19 - 21 October 2015

C chemical
B biological
R radiological
N nuclear

Conference Magazine 2015








www.cbrn-symposium.com

Gold-Sponsors

BRUKER
FUTURETECH Kärcher Group
KMW KRAUSS-MAFFEI WEGMANN
tms technisch-mathematische studiengesellschaft mbh

Silver-Sponsors

CRISTANINI
RHEINMETALL DEFENCE

Bronze-Sponsors

Beth-El Industries
OWR
SAAB
ThermoFisher SCIENTIFIC

Media-Partners

Behörden Spiegel
CBNW CHEMICAL, BIOLOGICAL & NUCLEAR WARFARE
CP CRISIS PREVENTION
MITTLER REPORT

MOBILE CBRN RECONNAISSANCE SYSTEMS

TRIED AND TESTED WORLDWIDE

- Systems for military and civil applications
- From mobile field laboratories to specialized reconnaissance vehicles
- Quickly scan large areas
- Identify CBRN warfare agents and other hazardous substances

In service with numerous armed forces around the globe.

www.rheinmetall-defence.com/cbrn

RHEINMETALL DEFENCE

Content

Content of this Magazine

Advertisements in this Magazine

Imprint

This magazine is published by the German Association for Defence Technology – Centre for Studies and Conferences (SGW mbH).
Hochstadenring 50, D-53119 Bonn · Tel.: +49-228-41098-0 · Fax: +49-228-41098-19 · E-Mail: info@dwt-sgw.de

Publisher: LtCol (ret.) Dipl.-Ing. (FH) Wolf Rauchalles, Managing Director, SGW mbH

Editorial Board: Stephan Brüss, Wolf Rauchalles

Layout: Stephan Brüss

Print: wir-machen-druck.de, 1.000 copies

Further information about the conferences of the DWT and SGW are available at www.dwt-sgw.de

Preamble of the DEU MoD

Ladies and gentlemen,

The mission of CBRN Defence is to cope with any potentially evolving CBRN threat.The CBRN threat environment has broadened from targets on the battlefield to global targets of any kind including the Alliance's populations, territory and forces without any restriction concerning temporal, geographical, social or political limits. Weapons of mass destruction remain a pressing security issue worldwide despite the existence of major non-proliferation treaties and disarmament conventions in the fields of nuclear, chemical and biological weapons – as not all countries are yet parties to these instruments. It remains an International concern.

A comprehensive strategy that provides solutions to counter this threat by synchronizing political, diplomatic, economic and civil-military efforts fosters the mutual development of the necessary civilian and military capabilities. CBRN Defence related science and technology also play a substantial role as they provide the technical solutions required to increase the effectiveness of CBRN Defence capabilities.

The objective of this third "International Symposium on Development of CBRN Defence Capabilities" is to contribute to the key process of capability development by presenting a wide range of interesting topics in a comprehensive manner. These are national and international CBRN security policy aspects, challenges to civil protection and military defence against CBRN threats in an increasingly complex and diverse security environment, various national approaches as well as the latest achievements in science and technology. This symposium provides a platform for mutual discussion and expert-level networking throughout the international CBRN defence community.

It hopefully will result in rewarding information and a substantial amount of valuable takeaways for all the numerous participants.

Colonel (GS) Hans-Christian Hettfleisch
Branch Head Directorate-General for Forces Policy II 2 - Specialist Military Tasks:
Support Tasks of the Armed Forces and Territorial Tasks, DEU MoD

Preamble of the DEU Association for Defence Technology

Ladies and gentlemen,

Once again, it is my pleasure to cordially welcome you as a participant and contributor at our 3rd International Symposium on the Development of CBRN Defence Capabilities here in Berlin.
The security challenges, which confront us, not only remain challenging but they have gained complexity, dimension and acuteness.

No doubt, they continue to encompass the risks and threats by weapons and other means of mass destruction and their proliferation. Therefore, we are very grateful that we are again able to offer a wide range of plenary and panel sessions with highly competent speakers as well as an impressive exhibition of technological developments.

We are grateful for this strong commitment of national and international institutions and actors. We are convinced that it will provide a comprehensive picture on current and future human and technological capabilities, processes and procedures for proper action or re-action.

My special thanks go to the Ministry of Defence and its leading role in this event, to the European Union, to the Ministry of the Interior, to the Federal Office of Civil Protection and Disaster Assistance, to the German Army Association and last but not least to all our speakers, sponsors, exhibitors and participants.

Let me invite all of you to use this symposium for comprehensive insights, an intensive information exchange and lively discussions.

Have a successful meeting and a good time in Berlin.

General (ret.) Rainer Schuwirth
Chairman, German Association for Defence Technology (DWT)

Floor Plan of the Conference Centre

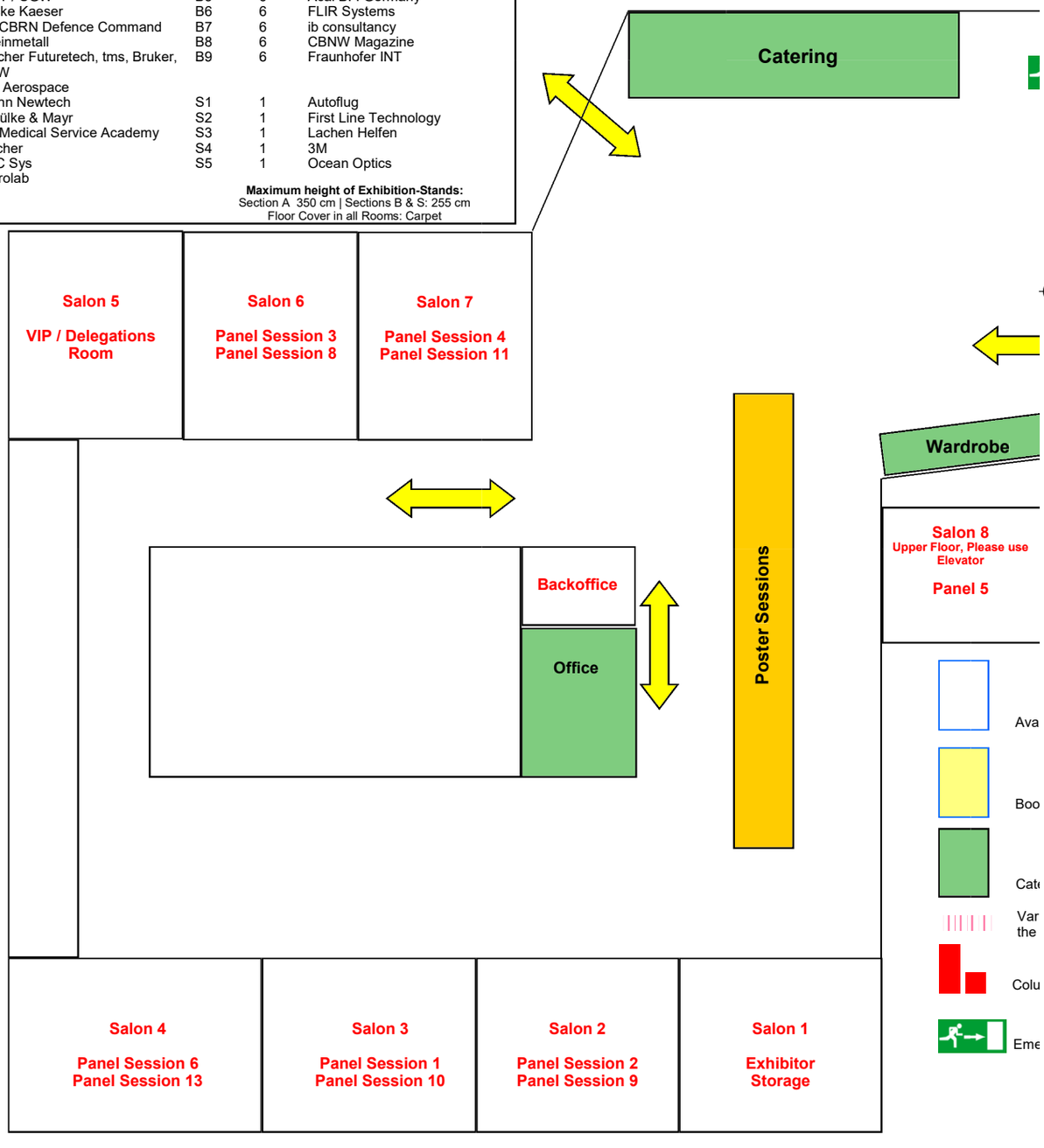
German Association for Defence Technology
CENTRE FOR STUDIES AND CONFERENCES

Stand	m²	Company	Stand	m²	Company
A1	9	W.L. Gore	A27	6	Vitmo and Barit
A2	12	Arktis Detectors	A28	25	DEU MoI, BBK
A3	12	OWR	A29	6	Mirion Technologies
A4	6	ThermoFischer	A30	6	IUT Medical
A5	6	ThermoFischer	A31	9	Analyticon
A6	12	WIS	A32	9	Smiths Detection
A7	12	WIS	A33	8	Argon Electronics
A8	12	Saab	A34	6	NATO WMD Non-Proliferation
A9	12	Cristanini			Centre
A10	12	Cristanini			
A11	12	Beth-EL Industries	B1	6	Environics
A12	12		B2	6	CBRNe World
A13	6		B3	6	Lorenz Meßgerätebau
A14	6	Proengin	B4	6	Environics
A15	8	DWT / SGW	B5	6	Acal BFi Germany
A16	6	Noske Kaeser	B6	6	FLIR Systems
A17	20	Bw CBRN Defence Command	B7	6	ib consultancy
A18	30	Rheinmetall	B8	6	CBNW Magazine
A19	50	Kärcher Futuretech, tms, Bruker, KMW	B9	6	Fraunhofer INT
A20	6	Pall Aerospace			
A21	8	Bruhn Newtech	S1	1	Autoflug
A22	6	Schülke & Mayr	S2	1	First Line Technology
A23	30	Bw Medical Service Academy	S3	1	Lachen Helfen
A24	9	Blücher	S4	1	3M
A25	9	NBC Sys	S5	1	Ocean Optics
A26	6	Miprolab			

Maximum height of Exhibition-Stands:
Section A 350 cm | Sections B & S: 255 cm
Floor Cover in all Rooms: Carpet

Floor Plan of the
Berlin CBRN-Symposium 2015

Conference and Exhibition Area at the 1st Floor
of the Hotel Maritim proArte
Status: October 05th, 2015
October 19 - 21, 2015
Hotel Maritim proArte
Friedrichstraße 151
10117 Berlin, Germany



Floor Plan of the Conference Centre

Programme of the 1st Day of the Conference

08:00 **Opening of the Exhibition**
Welcome Coffee, Dialogue with the Exhibitors

08:45 **Opening of the Conference**
Major General (ret.) Wolfgang Döring, Managing Director of DWT, DEU
Colonel Hans-Christian Hettfleisch, Conference Chair, MoD, DEU

09:00 **Key Note Politics**
Dr. Katrin Suder, State Secretary, MoD, DEU

Political Opening Session

09:20 **Introduction in the Conference**
Major General Eberhard Zorn, Director Forces Policy FüSK, MoD, DEU

Destruction and Beyond: New and Emerging Challenges for Chemical Disarmament
Ahmet Üzümcü, Director General, Organisation for the Prohibition of Chemical Weapons (OPCW)

The Future of Weapons of Mass Destruction
John P. Caves Jr., Deputy Director, WMDC, National Defence University, USA

The Importance of Multilateral Cooperation in Preventing CBRN Attacks and Incidents
Dr. Oliver Meier, International Security Division, German Institute for International and Security Affairs (SWP), DEU

Capability Driven Collaboration – Exploiting Synergies
Sebastian Meyer-Plath, President Bruker Detection Division

11:00 **Discussion Round**
Chair: ***Dr. Jamie Shea***, Deputy Assistant Secretary General, NATO
Speakers: ***Major General Eberhard Zorn***, Director Forces Policy FüSK, MoD
Ahmet Üzümcü, Director General OPCW
John P. Caves Jr., Deputy Director, WMDC/NDU
Dr. Oliver Meier, German Institute for International and Security Affairs

11:45 Luncheon / Dialogue with the Exhibitors

Session 1: Chemical Threats

13:30 **Session Chair and Introduction**
Peter Andreas Beerwerth, Federal Foreign Office, DEU

13:40 **The Global Threat of Chemical Weapons**
Philippe Denier, Head of Unit Verification, Organisation for the Prohibition of Chemical Weapons (OPCW)

14:00 **The Political Planning Process for Rapid International Interventions**
Rebecca Hersman, Center for Strategic and International Studies, Washington, USA

14:20 **Experiences from Operation RECSYR**
Commander John G. Refsnes, Norwegian Navy, NOR

Session 2: Epidemics

14:40 **Session Chair and Introduction**
Brigadier General (MC, MD) Dr. Norbert Weller, Director Military Medical Science & Medical Service Capability Development, DEU

14:50 **The Global Risk of Epidemics**
Dr. Maurizio Barbeschi, GCR Department, World Health Organisation, WHO

15:10 **Lessons Learned from the EBOLA Epidemic**
Wolfgang Rudischhauser, Director WMD Non-Proliferation Centre, NATO HQ

15:30 **The Use of the Mobile Laboratory Units in Support of the Ebola Outbreak Response in West Africa**
LtCol MD Dr. Roman Wölfel, Bundeswehr Medical Service Academy, DEU

15:50 **Biological Outbreaks: Containment and Consequence Management**
Dr. Stefano Miorotti, Cristanini, ITA

16:10 **Coffee Break / Dialogue with the Exhibitors**
Poster Sessions from 16:15-16:55 during Coffee Break

17:00 **Parallel Panel Sessions 1-7**

Panel 1:	**Detection, Identification, Monitoring (CHEM)**	**Salon 3**
Panel 2:	**Detection, Identification, Monitoring (FORENSICS)**	**Salon 2**
Panel 3:	**Medical CBRN-Countermeasures and Support**	**Salon 6**
Panel 4:	**Protection and Disinfection in Epidemics**	**Salon 7**
Panel 5:	**Evaluation / Prognosis / Consultation**	**Salon 8 (Upstairs)**
Panel 6:	**Integrated CBRN Detection Solutions**	**Salon 4**
Panel 7:	**Public-Industrial Cooperation – A View from Industry**	**Plenum**

18:50 **Continuation of the Dialogue at the Walking Dinner Reception** | Eat, Drink and Talk
(Reception ends 22:00)

Panel Sessions 1-4

Panel Session 1 (in Salon 3)
Detection, Identification, Monitoring (CHEM)
Chairperson: Major Andrè Althoff, CDSEP School, DEU

17:00 Introduction by the Chairperson
17:10 **Revolutionizing the traditional way of chemical agent decontamination with chemical agent disclosure spray and next generation enzymatic decontamination**
Markus Erbeldinger, Ph.D., FLIR Systems, Inc., USA
17:30 **Application of an IR standoff detector for estimating surface contamination**
Thomas Wolf, WIS, DEU
17:50 **Rugged, Handheld Mass Spectrometry for Priority CWA and TIC Detection**
Dr. Christopher Brown, 908 Devices Inc., USA
18:10 **Surveillance of Chemical Threats by Combining Active and Passive Standoff Detection Systems**
Frank Wilsenack, WIS, DEU
18:30 Discussion / Q&A
18:50 Continuation of the Main Programme

Panel Session 2 (in Salon 2)
Detection, Identification, Monitoring (FORENSICS)
Chairperson: Prof. Dr. Konstantin Karaghiosoff, LMU München, DEU

17:00 Introduction by the Chairperson
17:10 **CRBN Mixed Samples - Safe Handling and Preparation**
Bärbel Niederwöhrmeier, WIS, DEU
17:30 **Hair External Contamination as a Tool for Detection of Individual Contamination after Vapour Exposure to Chemical Warfare Agents Simulants**
Marie Spiandore, Laboratoire de Chimie de l'Environnement, FRA
17:50 **C-IED/CBRN Exploitation: Procedures for Sampling of Potentially Contaminated Forensic Samples**
Günter Povoden, BMLVS AT NBC Defence School, AUT
18:10 **Experience of Medical Forensics in Poisoning Cases and Possible Relevance for CBW Investigative Mechanisms**
Dr. John Hart, SIPRI, SWE *Dr. Sadik Toprak*, University of Zonguldak, TUR
18:30 Discussion / Q&A
18:50 Continuation of the Main Programme

Panel Session 3 (in Salon 6)
Medical CBRN Countermeasures and Support
Chairperson: Colonel MD Dr. Matthias Port, Bw Inst. Radiobiology, DEU

17:00 Introduction by the Chairperson
17:10 **Forensic Analysis of Protein Adducts in Plasma as Prove of Exposure to Nerve Agents and Sulphur Mustard: Capabilities of the German Medical Chemical Defence Program**
PD Dr. rer. nat. Harald John, Bundeswehr Institute of Pharmacology and Toxicology, DEU
17:30 **Medical Management of CBRN Casualties from Role 1 to Role 2: A French Perspective**
Colonel MD Prof. Frederic Dorandeu, IRBA, FRA
17:50 **A Novel Device for Preventing Acute Radiation Syndrome and Reducing Cumulative Marrow Dose**
PhD Oren Milstein, StemRad Ltd., ISR
18:10 **Assessment of Radiation Induced Individual Health Injuries and Prognostic Clinical Evaluation using Integrative "Dosimetry" Strategies**
Colonel MD Dr. Matthias Port, Director Bundeswehr Institute for Radiobiology, DEU
18:30 Discussion / Q&A
18:50 Continuation of the Main Programme

Panel Session 4 (in Salon 7)
Protection and Disinfection in Epidemics - Procedures and Equipment
Chairperson: LtCol MD Dr. Roman Wölfel, Bw MedServiceAcad., DEU

17:00 Introduction by the Chairperson
17:10 **Protection and Disinfection in Mobile Laboratories – Lessons-learned during the Ebola Outbreak**
LtCol Dr. Kilian Stöcker, Bundeswehr Institute of Microbiology, DEU
17:30 **GIS-Use Cases in Epidemic Situations**
Thomas Gersthofer, ESRI Deutschland GmbH, DEU
17:50 **The Challenge of Purifying Extremely CBRN-Contaminated Raw Waters – Water Purification System 'WAA Dekon' of the German Armed Forces**
Dipl.-Ing. Franz Weber, Kärcher Futuretech, DEU
18:10 **Room and equipment decontamination using H202 vapour (HPV technology)**
N.N., Bundeswehr Hospital Hamburg, DEU
18:30 Discussion / Q&A
18:50 Continuation of the Main Programme

Panel Sessions 5-7

Panel Session 5 (in Salon 8 / Upstairs)
Evaluation/ Prognosis/ Consultation
Chairperson: LtCol Bernd Allert, BwCBRNDCmd, DEU

17:00 Introduction by the Chairperson

17:10 **Space perspectives and possible tools in support of CBRN issues in local and global scale**
Professor Amnon Ginati, ESA

17:30 **The use of standards and Web Services for CBRN Information Management**
Eric Juel Ellinghaus, Bruhn NewTech, DEU

17:50 **Situational Awareness for CBRN with Software as a Service (SaaS)**
Andreas Schiel, ESG, DEU

18:10 **Applied Knowledge Management in the JCBRN Defence COE – Organizational measures, Semantic Web Technologies and Visualization Tools for a constructive CBRN-KM**
Captain Dietmar Trees, JCBRN Defence COE, CZE

18:30 Discussion / Q&A

18:50 Continuation of the Main Programme

Panel Session 6 (in Salon 4)
Integrated CBRN Detection Solutions
Chairperson: LtCol Dr. Sebastian Weis, CDSEP School, DEU

17:00 Introduction by the Chairperson

17:10 **Biological Reconnaissance within the Constraints of both - Analytical Requirements and Legal Limitations**
Dr. Hermann Dreyer, Rheinmetall MAN Military Vehicles, DEU

17:30 **Approach to a Total CBRN Commitment**
Peter Wahlin, Saab, SWE

17:50 **CBRN Detection Using UGV**
N.N., Cobham Mission Equipment - Unmanned Systems, DEU

18:10 **CBRN Reconnaissance – a Dual Use Capability**
Alexander Müller, Bruker Daltonik GmbH, DEU

18:30 Discussion / Q&A

18:50 Continuation of the Main Programme

Panel Session 7 (in Plenum)
Public-Industrial Cooperation – A View from Industry
Chairperson: Colonel (R) Wolfgang Widders, DEU

17:00 Introduction by the Chairperson

17:10 **Mobile, Compact and Reliable CBRN Decontamination Systems for Different Scenarios**
Dr. Patrick Marcus, Kärcher Futuretech GmbH

17:35 **Protected Airmobile CBRN Defence**
Dipl.-Ing. Rainer Lutz, Kraus-Maffei Wegmann GmbH & Co.KG

18:00 **A Comprehensive Approach to Warning & Reporting for CBRN Incidents**
Computer Scientist Holger Effertz, Technisch-Mathematische Studiengesellschaft mbH

18:25 Discussion / Q&A

18:50 Continuation of the Main Programme

Programme of the 2nd Day of the Conference

08:00 **Opening of the Exhibition**
Welcome Coffee, Dialogue with the Exhibitors

08:30 **Introduction Day two and Chair Session 3**
Colonel Hans-Christian Hettfleisch, German MoD, Conference Chair

Session 3: Nuclear and Radiological Threats

08:40 **Session Chair and Introduction**
Wolfgang Rudischhauser, Director WMDC NATO HQ – IS/ESC

3A: Nuclear Terrorism

08:50 **Political Assessment of the Threat**
Giorgio Franceschini, Peace Research Institute Frankfurt (PRIF), DEU

09:10 **Experiences from a Reference Scenario**
Dr. Mario Burger, Labor Spiez, Switzerland, CHE

3B: Fukushima Daiitschi – Assessment of a Nuclear Disaster

09:30 **Experiences and Conclusions**
Colonel Shinji Iwakuma, Vice Superintendent Chemical School, JGSDF, JPN

09:50 **Experiences and Conclusions from a National Point of View**
Dr. rer. nat. Horst Miska, Ex-European Commission DG Environment, Ex-Ministry of Interior Rheinland Pfalz, DEU

10:10 **The future of CBRN Defence - A system integrator's point of view**
Dr. Bernhard-Christoph Halstrup, Rheinmetall, DEU

10:30 **Coffee Break / Dialogue with the Exhibitors**
Poster Sessions from 10:35-11:00 during Coffee Break

11:10 **Parallel Panel Sessions 8-13**

Panel 8: Detection, Identification, Monitoring (RAD NUC)	**Salon 6**
Panel 9: Detection, Identification, Monitoring (BIO)	**Salon 2**
Panel 10: Decontamination and Disinfection	**Salon 3**
Panel 11: Individual and Collective Protection	**Salon 7**
Panel 12: Risk Analysis / Risk Assessment / Scenarios	**Plenum**
Panel 13: Education and Training	**Salon 4**

12:50 Luncheon / Dialogue with Exhibitors

Session 4: The way ahead in Europe

14:00 **Session Chair and Introduction**
Colonel Hans-Christian Hettfleisch, MoD, DEU and Dr. Iris Gnedler, MoI, DEU

14:10 **The EU CBRN Centres of Excellence Initiative**
Ph.D. Bruno Dupré, European External Action Service (EEAS), Policy Coordinator on CBRN Issues

14:30 **The EU CBRN AP and R&D Programme**
Dr. Said Abousahl, Head of Unit Nuclear Safety and Security, European Commission - DG JRC

14:50 **CBRN Capability Development**
Colonel Henry Neumann, Commander, Bundeswehr CBRN Defence Command

15:10 **Medical CBRN Defence Capabilities of the Bundeswehr Medical Services**
Colonel MD Prof. Dr. Viktor Meineke, Bundeswehr Medical Service Academy, DEU

15:30 **EDA's CBRN Defence Project - An Opportunity for Industries**
Gerlof de Wilde, EDA

15:50 **The Role of the European Union in the Area of WMD Non-Proliferation**
N.N., (please see programme info at the conference counter)

16:10 **Conclusions and Closing Remarks**
Colonel Hans-Christian Hettfleisch, Conference Chair, MoD
Major General (ret.) Wolfgang Döring, Managing Director of DWT

16:20 **End of Conference**

Panel Sessions 8-10

Panel Session 8 (in Salon 6)
Detection, Identification, Monitoring (RAD/NUC)
Chairperson: Dr. Wolfgang Rosenstock, Fhg INT, DEU

11:10 **Introduction by the Chairperson**

11:20 **Recent R&D Advances in Modelling and Decision Support Systems at CEA – Examples of Use in the Framework of CBRN-E Exercises**
PhD Patrick Armand, CEA, FRA

11:40 **Car-borne Measurements of Radioactive Material**
Monika Risse, Fraunhofer Institute INT, DEU

12:00 **LLR Mobile Detection Systems for Gammas and Neutrons with Training/Simulation Capabilities using Realistic Scenarios**
Dr. Jürgen Böttcher, Thermo Fischer, DEU

12:20 **Mobile Nuclear Detection Technology: Reducing the illicit Trafficking Haystack**
Dr. Rico Chandra, Arktis Detectors

12:40 Discussion / Q&A

Panel Session 9 (in Salon 2)
Detection, Identification, Monitoring (BIO)
Chairperson: Dr. Bärbel Niederwöhrmeier, WIS, DEU

11:10 **Introduction by the Chairperson**

11:20 **Field Based Multiplex Detection of Biothreat Agents**
Christopher Pöhlmann, Bruker Daltonik GmbH, DEU

11:40 **Rapid, Reliable and Easy On-Site Identification of Biological Threats**
Dr. Sebastian Ziewer-Arndts, analyticon instruments gmbh, DEU

12:00 **Rapid and Easy Detection of Biowarfare Agents – A Field Exercise**
Dr. Sybille Pagel-Wieder, miprolab GmbH, DEU

12:20 **Hyperspectral Laser Induced Fluorescence as a Method for Standoff Detection and Classification of Biological Hazardous Materials**
Anita Hausmann, DLR, DEU

12:40 Discussion / Q&A

Panel Session 10 (in Salon 3)
Decontamination and Disinfection
Chairperson: LtCol Johann G. Kappelmeier, BwCBRNDCmd, DEU

11:10 **Introduction by the Chairperson**

11:20 **Use of Chlorine Oxidants and Butyldiglycol for Decontamination of Skin, Equipment and Vehicles**
OFAp Dr. Martin Weber, ZI SanDstBw Munster, DEU

11:40 **Vacuum Decontamination Chamber - The next Generation**
Dr. Markus Hellmuth, Kärcher Futuretech, DEU

12:00 **Gaseous Hydrogen Peroxide Gassing - The Solution for the Inactivation of Fungi and their Spores Inside of Military Vehicles and Tanks**
Udo J. Werner, MBS MaschinenBeratungsService, DEU

12:20 **Tailored Systems and Solutions: Decontamination and Disinfection in Military and Civil Scenarios - Challenges and Developments**
Thilo Schuppler, OWR, DEU

12:40 Discussion / Q&A

Panel Sessions 11-13

Panel Session 11 (in Salon 7)
Individual and Collective Protection
Chairperson: Dr. Alexander Grabowski, WIS, DEU

11:10 Introduction by the Chairperson

11:20 **Comprehensive Air Treatment – A Decisive Requirement for Future Collective Protection Systems (COLPRO)**
Colonel (ret.) Ernst Elbers, Beth-El Industries, ISR

11:40 **Solar Light-Activated Photocatalysts and Functionalized Textiles for Self-Decontaminating Individual Protection Against Toxic Agents - "Safe Coat"**
Jan Voigt, WIS, DEU

12:00 **Physical Protection for Pilots under NBC-conditions**
Dr. Oliver Burkhardt, Autoflug GmbH, DEU

12:20 **Collective Protection – the Swiss Approach**
Daniel Jordi, Labor Spiez, Switzerland, CHE

12:40 Discussion / Q&A

Panel Session 12 (in Plenum)
Risk Analysis / Risk Assessment / Scenarios
Chairperson: LtCol Andreas Kayser, BwCBRNDCmd, DEU

11:10 Introduction by the Chairperson

11:20 **Synthetic Biology – The next "Dual Use" Risk**
Dr. rer. nat. Annika Vergin, Bundeswehr Planning Office, DEU

11:40 **Fostering Biosafety and Biosecurity in a Changing World: The Toolbox Approach of the German Partnership Program for Excellence in Biological and Health Security**
Joachim von Bonin, GIZ, DEU

12:00 **Critical Infrastructure Protection and CBRN – The Forgotten Dimension?**
Martin Neujahr, Bruker Daltonik GmbH, DEU

12:20 **Critical Infrastructure for Biosafety and Biosecurity in the Context of Surfaces in Laboratory Buildings**
Dr. Gabriele Bartel-Lingg, Vitmo + Barit GmbH, DEU

12:40 Discussion / Q&A

Panel Session 13 (in Salon 4)
Education, Training and Exercices
Chairperson: LtCol Dirk Bludau, BwCBRNDCmd, DEU

11:10 Introduction by the Chairperson

11:20 **Threat Identification and Emergency Response to CBRN Emergencies: TIER**
Ahmadreza Djalali, CRIMEDIM, ITA

11:40 **The Importance of a High Level Academic Approach to the CBRNe Problem to improve the Capabilities of Prevention, Management and Evaluation of Consequences**
L. Palombi et al., University of Rome "Tor Vergata", ITA

12:00 **Training in the Detection of Homemade Explosives (HME)**
Dr. Sebastian Wiegmann, CDSEP School, DEU

12:20 **Facilities and Support Provided to Help SIBCRA Teams Train Sampling and Identification Techniques and Procedures in (realistic) B Scenarios**
LtCol Dr. Sebastian Weis, CDSEP School, DEU.

12:40 Discussion / Q&A

Poster Sessions

Poster 1
Identification of Biological Warfare Agents as Contaminants in Spices and Herbs
Myriam Kruse, Sylvia Schirmer, Bärbel Niederwöhrmeier, WIS, DEU

Poster 2
On Site Detection of Chemical Contamination on Surfaces via HAPSITE® by Combining SIM with Provisional Swipe Analysis
Captain Gerald Bauer, MSc, BMLVS AT NBC Defence School, AUT

Poster 3
Direct Mass Spectrometric Laboratory Analyses of Low-Volatile Compounds
Björn Klein, Dr. Vanessa Kunde, WIS, DEU

Poster 4
Vapour Pressure Determination of Hazardous Chemical Agents by Simultaneous Thermal Analysis
Dr. Arne Ficks, Dr. Martin Jung, WIS, DEU

Poster 5
A High Performance for Life Support in Mission: Potable Water
Jeldrik Moritz*; Sven Fiebing and Elke Reifer, WIS, DEU

Poster 6
Microemulsions as Adaptable Reaction Media for Decon Agents
Dr. Martin Jung, WIS, DEU

Poster 7
Analytical Estimation of Shelf Life for Reactive Skin Decontamination Lotion (RDSL®)
R.Bogan, B. Klaubert, T. Zimmermann, Bundeswehr Central Medical Service, DEU

Poster 8
Detecting Chemical Warfare Agents using the µRAID™
Franziska Lange, Wolfgang Heller, Thomas Elßner, Bruker Daltonik GmbH, DEU

Poster 9
Catalytic Oxidation and Pressure Swing Adsorption
Friedrich Hesse, Beate Trier, WIS, DEU

Poster 10
Solutions for the Next Generation Permeable CBRN Protective Garments
Karola Hagner, Friedrich Hesse, David Liebscher, WIS, DEU

Poster 11
Zodiac with Mask 2000 and COTS Boots
Friedrich Hesse, Beate Trier, Karola Hagner, WIS, DEU

Poster 12
Oxidative Decomposition Behaviors of Liquid Chemical Warfare Agents on Substrates by Hydrogen Peroxide Vapor and Additional Ammonia Gas
Sam Gon Ryu*, Hyun Bae Park; Agency for Defence Development, KOR

Poster 13
The World of Research Working on CBRNe Problems: Laser Remote Sensing Systems for CWA, TICs and TIMs Detection and Identification
P. Gaudio et al., University of Rome “Tor Vergata”, ITA

Poster 14
Gap Tool for Evaluation (G.A.T.E.) of CBRNe Drills, Table Top Exercices and Full Scale Exercices
D. Di Giovanni, et al. University of Rome “Tor Vergata”, ITA

Poster 15
A Novel Approach to set up a Quasi Real-Time Biological Agents Detection System
M. Carestia et al., University of Rome “Tor Vergata”, ITA

Poster 16
The Importance of a High Level Academic Approach to the CBRNe Problem to improve the Capabilities of Prevention, Management and Evaluation of Consequences
L. Palombi et al., University of Rome “Tor Vergata”, ITA

Poster 17
Study on the Adsorption Behaviors of Cyanogen Chloride and Water Vapor by Various Molecular-Organic Frameworks
Hae Wan Lee*, Sam Gon Ryu, Agency for Defence Development, KOR

Poster 18
The Source Attribution of Sarin and Nitrogen Mustard Chemical Agents through Impurity Profiling and Stable Isotope Ratios
Carlos G. Fraga, Senior Research Scientist, National Security Directorate, Pacific Northwest National Laboratory, USA

Caterings / Buffets during the Conference

Luncheon on Tuesday, 20th October

Tomato and Mozzarella cheese galantine | Mackerel served two ways | Black forest ham, sausage and Obazda | cheese with pickled vegetables | Graved salmon with a mustard sauce | Premium salami mini-pralines | Vitello Tonnato | Cream cheese terrine with crayfish and horseradish | Mozzarella balls with cherry tomatoes | Herring fillet with herbs | Game terrine on a Waldorf salad | “Uckerkaas” cheese with grapes | filled half eggs | An assortment of sushi | Turkey canapés | Mixed leaf salad with two dressings | Berlin egg salad with ham | Argentinean beef salad | Piquant coleslaw, broccoli salad with ham | Tomato and cucumber salad | Fresh rocket salad in a balsamic dressing | “Berlin style” potato salad in vinegar and oil | Antipasti of zucchini and yellow peppers | Organic penne salad | Organic carrot with raisins

***

Coconut-curry soup with fried shrimps

***

100% organic turkey curry with wok vegetables and basmati rice
Poached wolffish fillet on pepper vegetable, and coriander potatoes
Fried glass noodles Asian vegetables

***

Latte Macchiato cream | Chocolate brownie bar | Melon served three ways | Coconut mousse with passion fruit | Strawberry mousse with red jelly

Walking Dinner Buffet on Tuesday, 20th October

matjes nature with onion rings and whole wheat bread | matjesfilet with sour apples and onions | herring cucumber roll | baked Herring | various raw food salads | berliner meat salad | potato salad with wild garlic | terrine of halibut with shrimp salad, rabbit terrine with berries | roast pork with onions | vital vegetables salad | cucumber and tomato salad | salmon chocolates with creme fraiche | chopped from the board with chives and onions | warm bacon potato salad | oven fresh Schusterjungs | pickled Harz cheese with traditional accompaniments

***

Berlin potato soup with sausage

***

homemade meatball with fried marjoram onions | Kassel rips with pickled cabbage and mashed potatoes | pike-perch fillet with braised cucumber and dill rice | mustard eggs and sausage | potato and vegetable casserole |

***

red fruit jelly with vanilla cream | creme brulee mango | marbled chocolate mousse | Berlin air at barry salad |various maccarons

Luncheon on Wednesday, 21st October

Duck terrine with cranberries | Poached salmon with cream of dill | Exotic chicken galantine with melon | Mini salmon tarlets | Rare beef steak with cream of pickled gherkin | Mixed vegetable terrine with herb dip | Tomato and mozzarella cheese with an orange reduction | Pickled feta cheese with hot peppers | Herring fillet with herbs | Cubes of Gouda and Edam cheese with fig mustard | Bright chicory salad, mixed leaves with vinegar, oils and two different dressings | Green salad, vegetable salad with French dressing | Mexican coleslaw | Cucumber salad with yoghurt dressing | Organic summer pasta salad | Organic potatoe salad | Feta cheese salad, fruity beetroot with apple | Antipasti of mushrooms and red pepper | Mini Wraps

***

Sweet corn and pastrami soup

***

100% organic BBQ chicken legs with grilled carrots and macaroni
Alaskan Pollock with a sardine and caper sauce on pepper and chilli vegetables and roasted sweet potatoes
Bright vegetable pan with spaetzle

***

Mango and papaya mousse in pyramid cake | coat | Small cardinal slices with wine cream and cherry pulp | Chocolate mousse slices | Berry ragout with a vanilla sauce | Cream with apricots

Attendees from Authorities are kindly asked to pay the Catering Fee of 20,- Euro per Buffet or 50,- Euro for all Caterings and the Ice-Breaker-Reception at the Conference Counter (if not paid in forefront).

Teilnehmer aus Behörden werden gebeten, den Verpflegungskostenbeitrag von 20,- Euro pro Buffet oder 50,- Euro für alle angebotenen Speisen inkl. Ice-Breaker am Coutner zu entrichten (sofern nicht im Vorfeld bezahlt).

Exhibitor Profiles

3M

3M steht für Minnesota Mining and Manufacturing und ist ein weltweit agierender Multi-Technologiekonzern mit Hauptsitz in St. Paul / Minnesota in den USA. Die Hauptverwaltung der deutschen Niederlassung sitzt in Neuss bei Düsseldorf. Der Konzern stellt mehr als 50.000 verschiedene Produkte auf der Basis von 47 Technologieplattformen her.
Für Bundeswehr ist 3M ein beliebter und langjähriger Lieferant unter anderem für hochwertige Schutzausrüstung wie z.B.: 3M Peltor® Gehörschutz- und Kommunikationssystemen.
Streitkräfte weltweit vertrauen 3M bei: Persönlicher militärischer Schutzausstattung (Schutz & Kommunikation), flexiblen Systemlösungen für die Vernetzung und Kommunikation von militärischen Einheiten, medizinischer Versorgung, biometrischen Lösungen für den Schutz kritischer Infrastruktur und bei Innovativen Herausforderungen.

www.mmm.com

Acal BFi

Acal BFi, a division of Acal plc, is a pan-European distributor of specialist products and services to the electronics and opto-electronics market. Some 500 engineers and other staff are employed at 16 locations throughout Europe.
Acal BFi Imaging & Detection division provides a selection of advanced state-of-the-art imaging solutions for security & surveillance, military, industrial, machine vision, metrology, scientific and life science applications, including Hyper-Vision IR Systems from Telops, Quebec/Canada.
The Hyper-Cam Camera Series includes the FAST-IR, the FASTEST Infrared camera available and the HD-IR, the HIGHEST resolution 1280x1024 pixel IR camera available in the market.
Hyper-Cam Cameras will visualize detection, identification and quantification images of remote substances previously invisible. Defence and Security applications include

- Standoff chemical detection and identification
- Signatures of rockets, missiles and flares
- Military target signature analysis
- Detection of mines and improvised explosive devices (IED)

www.acalbfi.com

AIRSENSE Analytics GmbH

To ensure the maximum possible security for the public with regard to critical infrastructures, AIRSENSE Analytics GmbH develops highly specialised detectors for dangerous substances.
For a number of years now, AIRSENSE has been producing an equipment portfolio aimed at guaranteeing the safety and security of participants and visitors alike, particularly during such major events.
Our patented inventions have won many awards and distinctions as well. The instruments, produced in Germany, are used in the areas of disaster protection, public safety and aerospace, as well as logistics and the environment, to deal with CBRNE threats.
Thanks to the patented combination of four different sensor technologies, it is now possible to use only one mobile gas detector to sniff out all kinds of hazardous and dangerous substances with the aid of chemical-physical reactions. This relates in particular to toxic or gaseous substances which have toxic effects even at low concentrations, explosive substances, weapons-grade materials, and radioactive material. Our safety and security equipment can warn and protect the staff and the visitors at major events of impending risks, thus creating a particularly high level of safety. These units can detect and identify threatening substances and materials within seconds when checking of individual persons or sensitive locations.
The Gas Detector for Explosive Substances (GDA-X) is an advanced development of the GDA2 (Gas Detector Array), which, as well as the more conventional toxic effect industrial chemicals and weapons-grade materials, can also detect explosives.
Based on the original version of the GDA2, there are now a number of innovative further developments for special applications. These include a stationary version for constant monitoring at a fixed location, in government buildings or infrastructure facilities such as underground railway stations, or fitted with a lance for preliminary checking of import containers with regard to gasification agent residues to provide safety for customs officers and port workers.
A newcomer in the AIRSENSE range is the unique mobile warfare agent detector, developed especially for the protection of personnel. This can be optionally fitted with additional sensor elements, allowing for more substances to be identified which might have been missed by earlier detectors. This is particularly important when it comes to combating terrorist organisations, or if the response forces are also charged with civilian tasks. Quality, reliable long-lasting operation, with high sensitivity and low false-alarm rate.
Significant reference clients are, among others, the Brazilian security authorities, both civilian and military, who used gas detectors from AIRSENSE to protect the FIFA World Cup in 2014.

Exhibitor Profiles

Safety technology from AIRSENSE has proved its worth in the past, tried and trusted at a whole range of major events such as the Turin Olympics, the World Cup in Germany, the G8 Summit in Heiligendamm, and EU Council Presidency gatherings.

www.airsense.com/de

analyticon instuments

analyticon instruments focuses on technologies that have been made handheld. The idea is to bring analysis into the field and make it so easy to operate that non-technical people can get a result whenever and wherever needed to make decisions. For this purpose analyticon offers various technologies for the analysis of biological- as well as explosive threats, chemical hazards, narcotics, etc. The handheld field instruments can safely identify biological and chemical materials ranging from Anthrax to TNT and Cocaine to Sarin.
Giving the response teams in the field a possibility to identify hazardous substances or differentiate between a real threat and a pure fraud, makes their lives safer. Moreover these teams are faster out of the danger zone again, as they have reliable results right at hand.
The scope of products ranges from Raman- and FTIR-spectrometers for chemicals to handheld PCR systems for biologicals and x-ray fluorescence analysis for the quantification of elements. The newest model is a combined Raman / FTIR instrument that provides two different technologies in one unit, in order to cover more substances and make results even more reliable. In addition analyticon offers the first real handheld masspectrometer, that can detect traces of hazardous substances either as vapor, traces or bulk.

www.analyticon.eu

Argon Electronics

If CBRN / HazMat training is important to you, visit Argon at booth A33 to learn how our training simulators have helped organisations like yours transform their Chemical, Biological, Radiological, Nuclear and Hazardous material exercises and improve student learning outcomes.
Argon's training systems allow you to enact Table Top and Live exercises within buildings or out in the open in a safe, cost effective environmentally friendly manner enabling you to comply with health, safety and environmental regulations with ease.
You will be able see how our training systems enable you to simulate multiple hazard exercises involving multiple chemical warfare agents, radioactivity, nuclear and HazMat.
Our highly realistic simulation systems enable you to create exercise scenarios that will keep your students fully engaged, and with full monitoring and recording of student activity to facilitate powerful after action reviews, you can be assured of high quality, consistent, verifiable training.
A wide range of equipment will be available for you to try at the exhibition booth including simulators for the Bruker RAID-M100, Proengin AP4C, Smiths Detection LCD3.3 and Mirion RDS200.
In addition PlumeSIM, our world class CBRN / HazMat training system shall be presented with actual table top exercises being demonstrated on the exhibition booth – come and see why so many of the world's CBRN and HazMat response organisations are using this excellent training system
Argon works closely with many of the world's leading detector manufacturers and training agencies to ensure our simulators are of the highest fidelity whilst ensuring your ongoing cost of ownership is minimal.

www.argonelectronics.com

Arktis Radiation Detectors

Arktis Radiation Detectors develops and manufactures next generation systems that detect and identify radioactive and nuclear materials to enhance security and facilitate operations. Using Arktis proprietary advanced radiation detection technologies we create solutions that deliver step change improvements in capabilities for a wide variety of applications used by customers and governments across the world.

www.arktis-detectors.com

Autoflug

Thinking Safety – AUTOFLUG is true to this motto. A medium-sized family firm now in the third generation, AUTOFLUG has been a leading provider of products and services since the early days of aviation, specifically focusing on rescuing people and ensuring their safety. As a globally recognized supplier and service partner of the international aviation industry and for defense technology,

Exhibitor Profiles

the company with approximately 250 employees develops, produces and services a wide range of textile, mechanical and electronic components and systems, among others. AUTOFLUG, based in Rellingen (Schleswig-Holstein, Germany), has decades of experience and expertise in the areas of rescue and safety, ergonomics, textiles, mechanical systems, precision engineering, electronics, software as well as measurement and control technology.

The AUTOFLUG range of products and services comprises:
• Safety seats for helicopters, transport aircraft and land vehicles
• Maintenance and repair of Martin-Baker ejection seats for the German Air Force
• Harnesses and restraint systems for aircraft and land vehicles
• Protective equipment for pilots, such as NBC and anti-G suits
• Personal survival packs (PSPs)
• Rescue parachutes, brake-chutes and recovery parachute systems
• Fuel measuring and control systems for aircraft and land vehicles
• Technical/logistical support: Technical logistics, technical documentation, training solutions, obsolescence management

www.autoflug.de

Beth-El Industries

Beth-El Zikhron Yaaqov Industries Ltd. is recognized around the world as a leading Chemical, Biological, Radiological, and Nuclear, (CBRN) protection and filtration system designer. Beth-El manufactures the highest calibre ISO 9001 certified NBC protection systems that are used today against asymmetric, conventional, and NBC threats. Clients, the world over, including more than 60 armies (many of them NATO countries), have procured Beth-El's NBC systems for protection against CBRN / NBC warfare, as well as the daily wear-and-tear from dusty and humid environments for vehicles, containers, and tents. Beth-El patented technologies have produced the next generation of NBC filtration, making expensive and outdated technologies, such as regenerative NBC systems, unnecessary.

www.beind.com

Blücher

Blücher GmbH is a medium-sized, family-owned company based in Erkrath, Germany. With diversified technologies, in its main divisions SARATOGA® and SARATECH®, Blücher is developing and marketing innovative system solutions. Blücher's technological leadership in the area of high-performance adsorbers, sorptive composite materials and Personal Protective Equipment (PPE) is based upon the long-time experiences. With a 40-year-plus track record for innovative product development in CBRN skin protection Blücher empowers advanced engineering, analytic solutions, innovations and on-demand technologies within the fields of life-saving protective systems. The commitment of Blücher is to deliver innovative, sustainable, technologies and relevant products that make a real difference and satisfy customers and end-users across the globe.

STRATEGIC AREAS OF EXPERTISE
• Blücher personal protective systems ensure mission effectiveness in the military sector, for civil protection teams, fire fighters and police forces as well as supra-national organizations such as the United Nations and OPCW.
• Blücher spherical adsorbents are the specialized solution for filtration of gases, liquids and particles. The applications range from protective systems for military and first responder forces and liquid and gas purification systems to a variety of fields in the industrial and medical industries.
• Blücher is setting high priority on its research and development programs and continuous improvement processes to serve current customers' needs, latest demands and requirements. Blücher is constantly developing and improving its products to adapt to changing scenarios and requirements. Development is characterized by paying high attention to end-users needs, identifying specific requirements, and pursuing the development along the entire supply chain until a fully validated system can be provided.
SARATOGA® Personal Protective Equipment

SARATOGA develops and markets integrative Personal Protective Equipment and is fulfilling high demands for the products' unique features with the focus on end-users needs and satisfaction.

CREATING INNOVATION THAT MATTERS
Blücher is continuously dedicating significant resources to Research and Development. Operating responsibly, executing with excellence, applying latest technologies are the core elements for innovation driven products and the creation of the next generation of Personal Protective Equipment.
For Blücher, innovation means combining new ideas with already proven ones. Blücher ensures to maintain its position by making

Exhibitor Profiles

sustainable investments in Research and Development and in cutting-edge development and manufacturing facilities.

LATEST INNOVATION
Fragment Protective Clothing – a comprehensive and innovative product system that significantly enhances protection from IED explosion effects. SARATOGA'S latest innovative solution of body protection offer maximum wear comfort, unlimited mobility and a constant protection level – also during extended periods of operational duty. It will have a major impact on reducing the number and severity of IED explosion based casualties. The patented clothing concept with its innovative material technology is proven and the full product range is available now.

SARATECH® Industrial Filtration Solutions
SARATECH concentrates primarily on the special application area of adsorption processes , for example applied in drinking water purification, adsorbing odours from the ambient air (e.g. in cabin air filters for aircraft) and removing pollutants and specific gases in industrial processes such as in filters for clean rooms.

www.bluecher.com

Bruhn NewTech

Bruhn NewTech provides a specialized range of CBRNe solutions for Defense operations. The core elements being, CBRNe Information Management software applications that can incorporate the enhancement of Sensor and Instrument integration and additional CBRN Intelligence functions. These solutions are available as Commercial-Off-The-Shelf (COTS) or Modified-Off-The-Shelf (MOTS) to meet individual customer requirements.
Predictions of CBRN hazards and effects are based on NATO defined standards with the option to adopt national standards. Third party software solutions such as plume dispersion and sensor placement models can also be integrated within the CBRN Information Management software solution.

www.bruhn-newtech.com

Bruker
Innovation with Integrity

Bruker Daltonik is the leading company in the field of CBRN detection. Widely regarded as the development, engineering and manufacturing expert of "easy to use" and reliable detection equipment; we have a proven record of excellence spanning over 30 years. Continuous innovation and a resolute commitment to provide "best of its class" products and services to customers is our driving force.

Trusted unrivalled performance
We provide full spectrum CBRNE solutions and consist of a product line that totally satisfies the needs of the market. A wealth of industrial and scientific experience, innovation and constant close and enduring co-operation with customers across the globe; enable us to produce trusted and class leading equipment with unrivalled sensitivity that has real application for the user. Mass and Ion Mobility Spectrometry are supplemented by one of its kind bio organism and toxin detectors as well as feature packed radiological detectors all of which can be fully integrated into vehicles, ships and aircraft. Quality manufacturing ensures that all Bruker equipment produces reliable results.

Reliable and easy to use
Our products are built with the customer in mind, utilising clear, unambiguous interfaces and user friendly controls and software. Maintenance is kept to the lowest possible level and consumables are made with long lasting efficiency. We understand that uninterrupted, accurate and robust performance is a necessity when responding to an incident or deployed on operations. We ensure that all aspects of our service, whether that is supplying consumables, training or technical support; is given equal priority. Efficiency, readiness and flexibility are requirements of our processes and staff alike. The Bruker motto "innovation with integrity" applies to all aspects of the business.

www.bdal.com

Bundeswehr Institute for Microbiology

Als wissenschaftliches Kompetenzzentrum der Bundeswehr berät das Institut die Führung in allen Fragen des Medizinischen B-Schutzes (= Schutz vor Krank heitsverursachern durch biologische Kampfstoffe) und gewährleistet damit die unmittelbare Urteils- und Handlungsfähigkeit auf diesem Gebiet. Das Institut führt neben der Medizinischen B-Schutz- Ausbildung Studien und ange-

Exhibitor Profiles

wandte Forschung zur Epidemiologie, Pathogenese, Erkennung, Vorbeugung und Behandlung von durch B-Kampfstoffe und vergleichbare Biostoffe verursachten (B-) Gesundheitsstörungen durch. Dazu werden Ex per tenlabore für die Spezialdiagnostik potenzieller B-Gesundheitsstörungen (z.B. Tularämie, Pest, Orthopocken, Anthrax), für die einsatzorientierte Aufklärung ungewöhnlicher Krankheits- und Todesfälle sowie zur medizinischen Verifizierung mutmaßlicher B-Kampfstoffeinsätze bereit gehalten. Das Institut kooperiert mit wissenschaftlichen Partnern im In- und Ausland und wirkt in nationalen und internationalen Fachgremien mit.

Aufgaben- und Forschungsfelder:
- Bakteriologie und Toxikologie
- Virologie und Rickettsiologie
- Infektionsepidemiologie und –immunologie
- B-Risikoanalyse und Begutachtung
- Medizinische B-Spezialdiagnostik
- Medizinische B-Aufklärung und -Verifikation

www.sanitaetsdienst-bundeswehr.de

CBNW Magazine

Chemical, Biological & Nuclear Warfare (CBNW) is a twice yearly journal dealing with defence against CBRNE (Chemical, Biological, Radiological, Nuclear Weapons and Explosives). It is published by React Media each winter and summer, with extra editions published online as an ‘e-zine’, CBNW Digital, every spring and autumn.
CBNW brings you in-depth articles by internationally recognised experts and the latest breakthroughs by companies and defence departments in new CBRN defence countermeasures. Up-to-date accounts of the technologies, responses, training, and policies to counter CBRNE threats make CBNW second to none in this expanding and ever-changing field.
Edited by leading CBRNE analyst and author Andy Oppenheimer AIExpE, CBNW is distributed free to defence ministers and procurement officers worldwide and at all major defence trade shows.
Each issue is also available online at the same time as the printed version.

www.chembio.biz

CBRNe World

CBRNe World magazine, published bi-monthly by Falcon Communications Ltd, serves the information needs of professionals around the world charged with planning for or responding to a chemical, biological, radiological, nuclear or explosives (CBRNe) threat or incident.
Spanning the divide of operational and scientific, it brings together opinion formers from the world of civil response, military leaders, academia, government agencies, research labs and industry. Combining the already merging fields of CBRN and explosives together in one magazine, editorial content is a combination of qualitative and researched news, interviews, articles, surveys and regular columns.

www.cbrneworld.com

Cristanini

CRISTANINI S.p.A. Company was established in 1972 and has a very long experience worldwide in the field of high pressure water technologies – with a very strong presence around the world – and offers a complete range of equipment of civilian, industrial, military and civil protection use. CRISTANINI’s unparalleled experience and know-how is the result of years dedicated to research, applied engineering, equipment and accessories production in order to propose innovative solutions in the CBRN decontamination field. CRISTANINI S.p.A. close customer relations and wide range of experience have allowed the development of an extensive line of products designed to satisfy a myriad of customer needs and often to settle up important problems before unsolved. The R&D program is conducted in cooperation with the most famous University Institutes, including the Department of Chemical Engineering Processes of the University of Padova, Italy and Military Labs around the world. The state-of-the-art R&D is validated by 25 pa ents This is the result of a creative work and an integrated approach, searching for new solutions to highly complex scientific, technological and engineering problems. Official importers and representatives authorized in 73 different countries all over the world.

www.cristanini.it

Exhibitor Profiles

Environics

Environics is the world leading supplier of Chemical, Biological, Nuclear and Radiation (CBRN) detection devices and integrated solutions ranging from personal safety to national security.
Environics provides innovative solutions for the whole safeguarding society from civil defence and homeland security to the military. Behind our comprehensive range of products and solution is a highly competent team of experts having years of experience in the implementation of demanding projects in the fields of CBRN and industry.
Environics is strongly committed to meet its customer requirements and to continue the development of state-of-art technologies for CBRN detection and analysis. Our goal is to provide innovative solutions to defeat the constantly evolving CBRN threat and to safeguard the industrial environment.

www.environics.fi

Federal Office of Civil Protection and Disaster Assistance (BBK)

Civil protection is an essential component within the overall concept of the national security architecture of the Federal Republic of Germany. After the attacks of 9/11 and the flood disaster of the River Elbe in 2002, the Federal Office of Civil Protection and Disaster Assistance (BBK) was founded 1 May 2004.
Thus, civil protection in Germany obtains a new basis which is adapted to current threat scenarios. The BBK was founded as an important contribution of the Federal Government to the new strategy for the protection of the population in Germany.
The BBK as a supreme federal office within the portfolio of the Federal Ministry of the Interior (BMI) fulfils tasks relating to civil security measures, above all in the sector of civil protection and disaster assistance. It supports the BMI in these areas and also, by consent of BMI, the responsible supreme offices. Above all, the BBK is responsible for the following tasks:
• Development of a national risk analysis
• Development of standards and framework concepts for civil protection
• Warning and information of the population
• Development of a modular warning system with the core element of satellite-based warning information by including the existing and future alert and warning media
• Information of the population about protection and support possibilities
• Promotion of training measures for the population
• Education, further education and training of decision makers and managers from the sector of civil security measures
• Support of the municipalities concerning self-protection measures
• Technical and scientific research
• Evaluation and collection of publications
• Assessment of equipment and procedures as well as participation in their standardisation and registration
• Complementary equipment and training of units active in disaster management, i.e. in the areas of fire prevention, CBRN-protection, medical service and support
• Complementary procurement of first aid equipment
• Protection of cultural assets according to the Hague Convention
• Office of the Commission for the Protection of the Civil Population

www.bbk.bund.de

First Line Technology

First Line Technology designs, manufactures, and supplies disaster preparedness and response equipment like our medical ambulance bus (the AmbuBus® Kit), our PhaseCore® Personal Cooling Vests, and our line of decontamination equipment (including FiberTect® Dry Decon Wipes and Dahlgren Decon). We work with subject matter experts, first responders, and the military to develop innovative products that make their jobs easer and their lives – and the lives of those they serve – safer with the help of our innovative, simple products.

www.firstlinetech.com

FLIR Systems

FLIR Detection is a leading supplier of field-ready products that accurately detect, classify, and identify critical Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE), and drug threats. Our multi-purpose products easily transition into new roles as the mission changes allowing our customers to extract the most value for their dollar. We integrate mission-based user interfaces to expedite decision making for both field operators and advanced technicians. Not only do our advanced detection technologies provide

Exhibitor Profiles

lab-quality confidence, the results are field-proven in third party tests and in real life missions. Our product portfolio provides high-performance solutions for defense, counterterrorism, homeland security, law enforcement, public safety, health, environmental, and commercial organizations around the globe. The FLIR Detection toolkit includes:
• Fido® Series Products: Sampling & Presumptive Screening
•identiFINDER® Series Products: Remote Detection & Identification
• Griffin™ Series Products: Confirmation & Analysis
For more information on FLIR detection solutions, visit

www.flir.com/detection

Fraunhofer INT

The Fraunhofer Institute for Technological Trend Analysis INT creates, and continually updates, a comprehensive overview of the general research and technology landscape and of the entire spectrum of technological development, national and international. Our clients are bodies from state and industry. We consolidate the general overview with our own specialized analyses and forecasts in selected technologies. With the support of our highly-versatile, state-of-the-art measurement infrastructure, the Institute also carries out theoretical work and experiments on electromagnetic and nuclear effects.

www.int.fraunhofer.de

German Association for Defence Technology (DWT

The German Association for Defence Technology (DWT) is a non-profit organization dedi-cated to matters dealing with national security.It was founded in 1957 as an initiative of the GE FMOD and today numbers about 240 sustaining members and some 950 individual members. The DWT has firmly established itself as a neutral forum for debate and information exchange in the German security policy community and is well on the way to gaining that same reputation also at Brussels, the capital of the EU and the seat of NATO's political headquarters.

It pursues the objective of promoting the knowledge of
- defence and security policy and
- defence and security technology.

In this context, defence and security economics are always subjects that are important to deal with. The DWT organizes numerous events to provide a forum for interested individuals and representatives from politics, business, the German armed forces, defence-oriented associa-tions, science and research, as well as from the general public.
The DWT's executive bodies – Presidency and Executive Committee – comprise high-ranking representatives from the above organizations. Their commitment is a tangible sign of the esteem that the DWT enjoys in the security policy community as well as in defence technology and industry circles.

www.dwt-sgw.de

IB Consultancy

IB Consultancy is an independent defense and security company dedicated to making this world a safer and more secure place. To achieve this we provide rapid, innovative defense and security services to government, trade & industry.

Our services include:
* Defense and Security Research
* The Non-Conventional Threat (NCT) CBRNe and eXplosive Event Series
* Business Consultancy and Public Affairs
* Threat Assessment Reports
* Publication of the monthly NCT/CBNW Newsletter
* CBRNePortal.com for the latest news on CBRNe and EOD/IED issues

For more information please visit

www.ib-consultancy.com

Exhibitor Profiles

IUT Medical

The IUT Medical GmbH, located in Berlin / Adlershof, is developer and producer of trace gas analyzers for industrial and environmental monitoring and for solutions homeland security and building protection. The applications which can be covered range from ambient air monitoring, process monitoring, stack monitoring to semiconductor and safety at work application to the detection of Chemical Warfare Agents (CWA) in homeland security. The trace gas analyzers of IUT Medical will also find applications in food control, particularly of quality inspection, as well as in the medical field. It should be mentioned that the analysis of exhaled breath in patients who have markers compounds can be identified that provide early information about any diseases, but also information about possible exposure of hazardous substances has been exposed to the patient. The analysis of perspiration can provide information about the effectiveness of medicaments, as well as statements about any drug consumption or doping in professional sports field, are another area of application. Mold detection particularly for the hidden architectural structures indoors also provide as risks to health and can already be detected early with the trace gas analyzers. This possibility of early identification of mold, but also of decay caused by bacteria, can be transferred to the food industry. Here is the storage of grain, potatoes, onions and other foods mentioned, in which at early detection appropriate action can be taken to minimize the damage.
The main technologies for the high sensitive detection and identification base on Ion Mobility Spectrometry (IMS) and Photo Ionization as Photo Ionization Detector (PID). These technologies are even coupled to gas-chromatographic column (GC) to GC-IMS and GC-PID systems. All these technologies which has been developed by IUT/IUT Medical, offer high sensitivities in the lower ppb-range, especially with the combination of GC columns for the enhancement of the selectivity with IMS and PID sensor.

www.iut-medical.com

Kärcher Futuretech

Kärcher Futuretech GmbH with its headquarters near Stuttgart (Germany) develops, manufactures, and markets modular products and systems worldwide for rapid deployment missions in disaster areas and complex emergencies. The company offers solutions in the product categories: Water Supply Systems, Mobile Catering Systems, Field Camp Systems and CBRN (Chemical, Biological, Radiological, and Nuclear) Protection Systems. Futuretech was spun off in 2005 and became an independent subsidiary of Alfred Kärcher GmbH & Co. KG. Today the company employs around 140 people.

www.kaercher-futuretech.com

Kommando Sanitätsdienst

Das Kommando Sanitätsdienst wird als einzige höhere Kommandobehörde den Organisationsbereich führen. Im Wesentlichen wird das Koblenzer Kommando die Fach- und Amtsaufgaben des bisherigen Führungsstabes am Bundesministerium für Verteidigung (BMVg), des Sanitätsamtes der Bundeswehr und des Sanitätsführungskommandos übernehmen. Das Kommando Sanitätsdienst der Bundeswehr führt die Fähigkeitskommandos und die Bundeswehrkrankenhäuser sowie die Zentralen Institute des Sanitätsdienstes der Bundeswehr. Somit konnte die Anzahl der Kommandobehörden von sechs auf drei reduziert werden. Im Juli 2013 wird die Sanitätsakademie nach deren Neugliederung die Struktur komplettieren.

www.sanitaetsdienst-bundeswehr.de

Krauss Maffei Wegmann

Krauss-Maffei Wegmann GmbH & Co. KG leads the European market for highly protected wheeled and tracked vehicles. At locations in Germany, Brazil, Greece, Mexico, the Netherlands, Singapore, the United Kingdom, the USA and Turkey some 3.500 employees develop, manufacture and support a product portfolio ranging from air-transportable, highly protected wheeled vehicles (MUNGO, AMPV*, DINGO, GFF4 and BOXER*) through reconnaissance, anti-aircraft and artillery systems (FENNEK, GEPARD, LeFlaSys*, Armoured Howitzer PzH2000, DONAR* and AGM) to main battle tanks (LEOPARD 1 and 2), infantry fighting vehicles (PUMA*) and bridgelaying systems. In addition, KMW has wide-ranging system competence in the area of civil and military simulation, as well as in command and information systems and remote-controlled weapon stations with reconnaissance and observation equipment. The armed forces of more than 50 nations worldwide rely on tactical systems by KMW. Please visit us at our booth A19.

www.kmweg.de

Lachen Helfen e.V.

Deutsche Soldaten und Polizisten beteiligen sich seit 1989 an friedensichernden und friedenerhaltenden Einsätzen internationaler Organisationen. Seitdem erleben sie in den Krisen- und Konfliktgebieten dieser Welt hautnah das teilweise unbeschreibliche Elend

Exhibitor Profiles

der betroffenen Kinder. Im ehemaligen Jugoslawien beschlossen Bundeswehrsoldaten Anfang der 90er Jahre, sich neben ihren dienstlichen Aufgaben auch privat mit humanitären Projekten für Kinder zu engagieren. Neben Brennholz und Bekleidung schenkten sie ihnen auch Plüschbären in der Hoffnung, dass sie ihr Lachen zurückgewinnen. Um den traumatisierten, verwundeten oder elternlosen Kindern auch dauerhaft, schnell und unbürokratisch zu helfen, gründeten sie 1996 einen gemeinnützigen Verein.

www.lachen-helfen.de

LORENZ Messgerätebau

LORENZ Messgerätebau has been developing and producing measuring equipment for the last 20 years.
During this time our initial production of electronic thermometers in glass casings for the chemical industry has grown into a broad range of products and services. A team of technicians, engineers and physicists work on developing and producing equipment and complete facilities in the field of measuring, controlling and monitoring technology.
Our equipment is designed in such a way that it can be easily adapted to suit our customers' specific requirements.
Our product ranges:
- Measuring equipment to assess the airborne fine dust proportion of bulk materials
- Measuring equipment for airborne contaminant filter tests, for monitoring immissions and determining concentrations of gas-borne solid and liquid particles
- Extinction measuring equipment to determine the concentration of airborne contaminants in air channels
- Aerosol generators to generate test aerosols
- Wind tunnels with the required facilities for testing smoke alarms and fire alarms
- Ringer Bath Handler for working with tissue cultures

We specialise in adapting our equipment to suit our customers' specific requirements.

www.lorenz-messgeraetebau.de

Miprolab

The biotech company miprolab was founded in 2005, and is located in Göttingen (Germany). It currently has 12 staff members. Over the years, methods for the purification of a variety of bacterial toxins and the production of antibodies have been developed. These toxins, specific antibodies and anti-sera are supplied according to customer’s requirements. The diagnostic section of miprolab offers the detection, isolation and identification of toxins and microbes from a variety of matrices. Additionally, miprolab offers a broad range of services in the development, validation and contract manufacturing of immunochemical assays (e.g. lateral flow assays) starting from the production and selection of suitable chemical and biological reagents (e.g. antibodies, buffers, conjugates) to the final assay lay-out. In 2012 rapid tests for the detection of bio-threat agents were successfully launched as “miPROTECT® Rapid Test for Biological Threat Agents” becoming a reliable tool for civil protection agencies and the militaries world-wide. Prior to the market entry, the Bundeswehr Research Institute for Protective Technologies and NBC Protection (WIS, Germany) as well as the Federal Office of Civil Protection (SPIEZ LABORATORY, Switzerland) tested and validated miPROTECT® Rapid Test in a joint project with miprolab.

www.miprolab.com

Mirion Technologies

Our organization is comprised of over 1000 talented professionals, passionate about delivering world class products, services, and solutions in the world of radiation detection and protection. From our 13 operating facilities across North America, Europe, and Asia, Mirion Technologies offers products and services in 5 key areas:
- Health Physics - Radiation Detection and Protection Instruments
- Radiation Monitoring Systems - In-Plant and Safety Monitoring Systems
- Imaging Systems - Cameras for Extreme Environments
- Dosimetry Services - Radiation Monitoring Services
- Sensing Systems - Nuclear Reactor Sensing Systems

In partnership with our customers in nuclear power plants, military and civil defense agencies, hospitals, universities, national labs, and other specialized industries, Mirion Technologies strives to deliver cutting edge products and services that constantly evolve based on the changing needs of our customers.
Combining state of the art technology with exceptional customer service, Mirion Technologies is dedicated to providing an unmatched experience in radiation detection and instrumentation.

www.mirion.com

Exhibitor Profiles

NATO WMD Non-Proliferation Centre and NATO Counter Terrorism Section

NATO's Strategic Concept made clear that the proliferation of nuclear weapons and other weapons of mass destruction (WMD), and their delivery systems, could have incalculable consequences for global stability and prosperity. During the next decade, proliferation will be most acute in some of the world's most volatile regions. A WMD Non-Proliferation Centre at NATO Headquarters is strengthening dialogue among Allies, assessing risks and supporting defence efforts to improve Alliance preparedness to respond to the use of WMD or chemical, biological, radiological or nuclear (CBRN) agents.
NATO's work on counter-terrorism focuses on improving threat awareness and preparedness, developing adequate capabilities and enhancing engagement with partner countries and other international actors. The Alliance's Defence Against Terrorism Programme of Work (DAT POW) is focused on short term capability development in order to prevent non-conventional attacks, such as suicide attacks with improvised explosive devices (IEDs), and mitigate other challenges, such as attacks on critical infrastructure or threats posed by WMD.

www.nato.int

NBC-Sys
CBRN protection systems for defense forces and population

From design to production to customer support, NBC-Sys covers numerous technologies against Nuclear, Radiological, Biological or Chemical (CBRN) hazards. Its product range includes chemical and biological detection, air treatment for personal protection (gas masks, filter cartridges,…etc.) or group use (climate control and filtration system, incorporated in vehicles or buildings), as well as decontamination (aicraft, vehicles, sensing equipement and persons). Military and civilian applications Composed mostly of technicians, engineers and managers, NBC-Sys relies on the know-how underlying its creativity, project management and customer service. Our skills are in chemicals, biology, thermics, aeraulics, plastics processing, electronics (hard and soft), mechanics, measurement, testing and ergonomics. In order to better meet our customers' expectations (both military and civilian), NBC-Sys is implementing a proactive future-focused policy by allocating some 20% of its turnover to R&D activities. Our engineers work in close collaboration on advanced research with private, public and university laboratories (CEA, DGA…etc). NBC-Sys products can be seen the world over, in particular in Europe, Asia and the Middle East.

www.nbc-sys.com

Noske Kaeser

Proudly, the company looks back on a history of now 130 years of existence. Companies with such a long tradition as Noske-Kaeser stand for experience, reliability and quality. Developments and their successful implementation, realized over the course of many years form an excellent basis for today's scope of supply.
Noske-Kaeser equips merchant and naval vessels with systems and components in the fields of air conditioning, ventilation, refrigeration as well as fire fighting and CBRN protection. For many years, the company provides first-class air conditioning systems for rail applications and special vehicles. Another major business area is the reefer container technology.
Even back in the 1880s the company was an engineering pioneer in central heating and ventilation. This resulted in numerous patents and government orders. Today this tradition is being pursued by continuously expanding the scope of supply and developing new technologies for the entire product range.

www.noske-kaeser.com

Ocean Optics

Ocean Optics is the inventor of the world's first miniature spectrometer and a global leader in photonics for research, life sciences, food and agriculture, education and OEM applications. Ocean Optics' extensive line of complementary technologies includes spectrometers, chemical sensors, metrology instrumentation, optical fibres, thin film coatings and optics. Ocean Optics is focused on helping the food and beverage industry leverarge spectroscopy to measure quality, ensure consistency and authenticate real vs. fraudulent products. Recognized as an industry innovator, Ocean Optics has specified and delivered more than 250,000 modular miniature spectrometers and systems throughout the world and has enabled thousands of different applications in a diverse range of industries – from cancer detection and colour matching to plasma monitoring and particle size analysis. Our spectrometers have been to the Moon and inside active volcanos and follow our mission to help our customers change the world through optical sensing.

www.oceanoptics.eu

Exhibitor Profiles

OWR

As a manufacturer of decontamination equipment, OWR has been setting the standards for CBRN defence and civil protection for more than 50 years. Using modern techniques and user-friendly application systems, OWR develops and builds efficient mobile decontamination solutions for its customers, offering them a complete service from product development to training and after sales service. With a full range of products ranging from small hand-held spray applicators such as the Cobra, to the containerised multi purpose decontamination systems such as the MPD 100i, OWR can offer a solution to fit the needs of the customer, and with a design team constantly developing new and innovative products, OWR is setting the standards for the future of decontamination and helping to provide a safer and more certain future for the world.

www.owrgroup.net

PALL Corporation

Pall Aerospace, together with its ECS integrator partner, has been chosen tob supply its regenerable chemical, biological, radiological, and nuclear (CBRN) protection systems for the Terrier* military vehicle, operated by the UK Army. The Pall CBRN system protects vehicle occupants from all known chemical warfare agents.It is a self-regenerating “fit and forget” system offering full broadband protection against all known threats. By comparison, traditional carbon technology units are ineffective against some modern chemical agents known as ‘carbon breakers’ and are vulnerable to certain toxic industrial chemicals (TICs). An optional catalyst installation provides excellent protection against gun fumes as well.

Pall Aerospace has developed a number of leading edge CBRN filtration technologies including;
·Regenerable CBRN systems for vehicles
·COLPRO for aircraft, warships, shelters
·Man-mounted CBRN system for aircrew protection

Pall Aerospace, a division of Pall Europe Ltd, designs and manufactures filtration and separation products for a wide range of military & civil applications including air intakes, fuel, water, hydraulics, lubrication and CBRN. Our advanced engine air protection systems are used on military vehicles world-wide whilst the latest integrated membrane (IMS) water purification/desalination systems are used to provide clean, potable drinking water from any source.

www.pall.com

Proengin
PROENGIN Biological and Chemical Detection Systems

Proengin has developed biological and chemical warfare agents (CWA) field detectors using flame spectrometry.

Chemical detection
AP4C is a hand held chemical detector able to detect all CWA and many TICs, precursors, derivatives or unknown (No-vichok), with main advantages: continuous measurement, fast clear down and easiness of use. Range of products, with same detection performances and fitted characteristics (autonomy, data networking):
• AP4C-V, aboard wheeled and tracked reconnaissance vehicles,
• AP4C-F, on critical buildings and ships.

Biological detection
The biological detector MAB has the unique capacity of detecting and categorizing biological particles with a proven extremely low false alarm rate. It is designed to trigger sampling and analysing devices.

Chemical and biological detection
AP4C-FB offers both chemical detection and biological warning within the same instrument (24/7).

www.proengin.com

Schülke & Mayr

Schülke & Mayr GmbH is an international leader in the areas of hygiene and prevention of infection, and also in Microbiological

Exhibitor Profiles

Quality Management (MQM) and chemical technical preservation. We supply disinfectants, antiseptics, preservatives, biocides, medical skin care products, an active substance for deodorants, and system cleaners. Thus we offer comprehensive protection against harmful organisms – whether they be disease pathogens or spoilage organisms.

www.schuelke.com

Smiths Detection

Smiths Detection equips customers around the world with high integrity solutions to safeguard society, protect life and support the free flow of trade. It has developed government regulated advanced technologies to detect and identify dangerous or illegal materials, contraband, and constantly evolving chemical, biological, radiological, nuclear and explosive (CBRNE) materials. Its range of threat detection equipment includes powerful X-ray screening systems (more than 75,000 systems have been supplied globally), trace detectors, chemical agent detectors and identifiers and body screening systems which are used extensively in transportation, critical infrastructure, ports and borders, military and emergency responder markets.
Smiths Detection is part of Smiths Group, a global leader in applying advanced technologies to markets in threat as well as contraband detection, energy, medical devices, communications and engineered components. Smiths Group employs around 23,000 people in more than 50 countries.

www.smithsdetection.com

Rheinmetall Defence
Rheinmetall – The technology group for security and mobility

Part of the globe-spanning Rheinmetall Group – also a major supplier of automotive components – Rheinmetall Defence has long been a prominent member of the international defence and security industry. Last year, Rheinmetall Defence's 9,200 employees generated annual sales of €2.15 billion. As a top European supplier of army technology, we offer an extensive array of military hardware that enhances the mobility, reconnaissance capabilities, lethality and survivability of troops deployed in harm's way, and also enables the networking of national and international systems. Rheinmetall has spent years pioneering new technologies for protecting friendly forces, systematically expanding its range of products in this critical field.
Globally acclaimed, Rheinmetall Defence's core competencies stand for capabilities- oriented innovation: new generations of vehicles with optimized protection concepts, network-enabled sensors and optronics, platform-independent weapon systems, C-RAM-capable air defence and high-performance ammunition, including non-lethal variants. It makes no difference whether the task at hand relates to your country's ground, air or naval forces or all three, or whether what is at stake is your external or internal security: Rheinmetall's unrivalled capability of integrating individual components into network-based total solutions makes us a natural partner for the world's armed forces and security services of Germany, its allies and other like-minded nations.

www.rheinmetall-defence.com

Saab - defence and security

Saab serves the global market of governments, authorities and corporations with products, services and solutions ranging from military defence to civil security.
Contact: Saab International Deutschland GmbH, Pariser Platz 3, 10117 Berlin.
Telefon: 030 4 08 99 66 00, Telefax: 030 4 08 99 66 09, saab.deutschland@saabgroup.com,

www.saabgroup.com

Spherea

A 50-year history in the service of the most ambitious aviation programs have enabled SPHEREA to develop unequaled expertise in critical electronic and optronic system testing.
The quality of SPHEREA's products and services has long been recognized by the major companies in the aviation, defense, space, energy and transportation sectors.

www.spherea.com

Exhibitor Profiles

Thermo Fisher Scientific

Thermo Fisher Scientific Inc. is the world leader in serving science, with revenues of $17 billion and approximately 50,000 employees in 50 countries. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and increase laboratory productivity. Through our premier brands – Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services – we offer an unmatched combination of innovative technologies, purchasing convenience and comprehensive support. For more information, please visit www.thermofisher.com.
Within the Thermo Scientific brand we also offer instruments for security and military CBRNE applications. Our solutions comprise radiation measurement and detection systems for alpha, beta, gamma and neutron radiation as well as systems for the identification and quantitative detection and measurement of chemical components and elements. Further we offer LLR mobile detection systems for gammas and neutrons with training/simulation capabilities using realistic scenarios. For more information please visit www.thermoscientific.com/rmp or call +49 (0) 9131 998 226.

www.thermofisher.com

tms
technisch-mathematische studiengesellschaft

tms was set up in 1970 as an employee partnership.
The services we offer are based on extensive expertise and many years of experience in the field of defence applications.
Today tms has more than 30 permanent employees: Specialised computer scientists, engineers, mathematicians, physicists and technicians. Apart from modern hardware and software, the electronics laboratory and the development workshop provide support for the solution of specific client tasks.
We are the experienced technology service provider who answers your questions on complex technology. Our main client is the Bundeswehr. We have more than 40 years of experience of working on sophisticated, high-quality defence technology, which we can apply to solve your problem.

www.tms-bonn.de

Vitmo

Vitmo® offers a range of products for clinical and home care, for civil protection, disaster prevention, disaster and emergency management. Our products are targeted on perfect support on CBRN decontamination and for quarantine such as "Barrier Nursing" and for MRSA-prophylaxis.
Vitmo® products are innovative and practical solutions to optimize work routines and to lower at the same time the risk of infections. Our products offer an optimum help for emercency services. They are simple to use, easy in handling and perfectly adapted to the needs of emergency service staff.

www.vitmo.de

W. L. Gore & Associates

W. L. Gore & Associates has made its name by creating innovative, technology-driven solutions, from medical devices that treat aneurysms to high-performance GORE-TEX® fabrics. A privately held company with annual sales of more than $3 billion, Gore is committed to perpetuating its 50-plus year tradition of product innovation.
Gore focuses its efforts in four main areas: electronics, fabrics, industrial and medical products. The company's electronic products division develops and manufactures high-performance copper and optical signal transmission products. Gore's fabrics provide protection from the elements and enable wearers to remain comfortable across a broad range of activities and conditions. The products made by Gore's industrial division meet diverse contamination control and processing challenges throughout industry. Implants from the medical division provide creative healing solutions to complex medical problems.
Today, Gore employs more than 10,000 employees, called associates, with manufacturing facilities in the United States, Germany, the United Kingdom, Japan and China, and sales offices around the world.

www.gore.com

Exhibitor Profiles

Wehrwissenschaftliches Institut für Schutztechnologien - ABC-Schutz (WIS)

Das Wehrwissenschaftliche Institut für Schutztechnologien - ABC-Schutz (WIS) gehört zum Geschäftsbereich des Bundesamtes für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr (BAAINBw). Es befindet sich in Munster (Niedersachsen).
Das WIS ist das einzige größere deutsche Institut, das sich mit dem Schutz vor der Wirkung biologischer, chemischer oder nuklearer Massenvernichtungswaffen beschäftigt.
Es verfügt über zahlreiche biologische, chemische und physikalische Laboratorien, Technikumseinrichtungen und Großversuchsanlagen, in denen vom analytischen Nachweis von Kampfstoffen über die Rückhalteeigenschaften von Schutzfiltern, bis hin zum Verhalten kompletter Waffensysteme gegenüber Wirkungskomponenten einer Nuklearwaffe ein weites Spektrum von Untersuchungen durchgeführt werden.
Das Wehrwissenschaftliche Institut für Schutztechnologien – ABC-Schutz nimmt folgende Aufgaben wahr:
- Management bei der Projektierung, Einführung und Nutzung von Wehrmaterial im ABC- und Brandschutz
- Integrierte Nachweisführung (ABC- Brandschutz und Wasseraufbereitung)
- Bearbeitung und selbständige Durchführung von F & T-Vorhaben im ABC- Brand- und EME-Schutz
- Betrieb der Gefahrstoffmessstelle Nord
- Betrieb des Referenzlabors für das CWÜ
- Betrieb der zentralen Sammelstelle für radioaktive Abfälle aus dem Bereich der Bundeswehr
- Vertretung des Rüstungsbereiches in Fragen des ABC- und Brandschutzes in nationalen und internationalen Gremien
- Ausbildung und Schulung der TSK (Einsatzunterstützung) in Sonderfragen des ABC-Schutzes

Zudem unterstützt das WIS die Bundeswehr in Fragen des Umweltschutzes, des Strahlenschutzes und der Arbeitssicherheit.
Beim WIS sind derzeit zirka 220 Mitarbeiterinnen und Mitarbeiter beschäftigt.

www.baainbw.de

Transportable filter leak test unit FLT3 for testing protective ventilation systems

Test substance production, detection and automated ***quantitative assessment of protection of gas- and particle-filters in one transportable independent test unit***

The filter leak test Unit FLT3

The leak test unit has been especially developed by Lorenz Meßgerätebau to fulfill requirements for in situ testing of protection ventilation systems. The test unit comprises one device with two integrated test substance generators and a second device with the measurement equipment and the data analysis system to detect the respective test substance. An integrated micro processor and robust touch panel for entering commands are used to control the two devices of the test unit. The two devices communicate via radio module or a standard RS232 data cable. **Protective ventilation systems in e.g. vehicles or containers can be tested in situ without disassembling any components. The execution of the test is fast and straightforward**. A well defined amount of test substance is added to the air intake of the built in protective ventilation system. Detection of downstream out coming part of introduced test substance provides direct information on the protection level. The protection level is quantified by the permeability in percent. Specially designed algorithm, installed on the inserted microprocessor runs the test substance dosage, the signal processing and calculation of the protection factor. The advantage of the designed algorithm is the ability to differentiate a signal from background and to make an online background correction. The algorithm is largely robust against background fluctuations by improper environmental conditions. The system passed different tests at extreme temperatures and is suitable for outdoor use. A protective housing saves electronics and test substance detectors against adverse surrounding conditions.

Specifications

Usable for protective ventilation systems with flows of:
60 – 600 m³/h upgrade able to 3600 m³/h

Device with test substance generators

- Aerosol generator for particle filters
  Test substance: Paraffin oil mist
- Test gas generator for carbon filters
  Test substance: evaporated Acetone
  (with option Xylol depends on boiling point and climate zone)

Device with measuring equipment

- High sensitive optical particle detector
- Two photo ionization detectors to detect VOCs.
  Wide Range: 1 ppb to 2000 ppm
- Microprocessor and touch panel
- USB interface for data logging

Power supply: 230 V, 24 V
Special power cable for connection at on board power supply and different other additional equipment.

LORENZ Meßgerätebau GmbH & Co. KG
phone +49 5556 995597-0
Im Siechenanger 5
e-mail: info@lorenz-messgeraetebau.de
37191 Katlenburg-Lindau, Germany
www.lorenz-messgeraetebau.de

Visit us on booth #B3 at CBRN

Beth-El Industries

ENVIRONMENTAL PROTECTION SYSTEMS WITH CBRN-FILTRATION

CBRN-protection
for Shelters

EPCS 180 VM-1

- CBRN protection;
- Ventilation;
- Air Conditioning;
- Toxic shooting fumes filtration **for Vehicles.**

FA 120 VM-17

FA 160 ZM-2

CBRN-protection
for Tents

IsoArk N36 Stretcher

Mobile Biological
Protection / Isolation
For transport and Patient Treatment

Beth-El Zikhron Yaaqov Industries, the largest manufacturer and developer of complete environmental protection systems for collective protection, offers a wide variety of highly efficient ventilation and CBRN filtration units for customized integration into any armoured vehicle and mobile shelter. The systems provide full CBRN/NBC protection, TIC/TIM filtration, air conditioning, heating, ventilation, dust protection, tear gas filtration, and toxic shooting fumes filtration. The ZM series for tents operates in either positive or negative pressure offering a versatility of protection for either an isolation facility (negative over pressure) or clean room facility (positive pressure).
The IsoArk mobile isolation series allows for the safe transport and isolation of infectious persons. The IsoArk series complies with accepted standards, including CDC guidelines for airborne infectious agent control and is a professional solution to biological isolation.

NATO-Supplier-No.
SH785

Certified Quality
Assurance Program

Abstracts of the Main Programme (chronological)

The Future of Weapons of Mass Destruction

John P. Caves Jr., Deputy Director, WMDC, National Defence University, USA

This paper explores the possible nature and role of weapons of mass destruction (WMD) in the 2030 timeframe. It is a product of the Center for the Study of Weapons of Mass Destruction's Project on the Future of WMD, an effort that began in late 2010 and involved consultations with a range of government officials and other experts as well as a literature review on relevant technological and geopolitical trends. The authors conclude that the longstanding efforts of the international community writ large to exclude weapons of mass destruction (WMD) from international competition and conflict could be undermined by 2030. The proliferation of these weapons is likely to be harder to prevent and thus potentially more prevalent. Nuclear weapons are likely to play a more significant role in the international security environment, and current constraints on the proliferation and use of chemical and biological weapons could diminish. There will be greater scope for WMD terrorism, though it is not possible to predict the frequency or severity of any future employment of WMD. New forms of WMD—beyond chemical, biological, radiological, and nuclear weapons—are unlikely to emerge by 2030, but cyber weapons will probably be capable of inflicting such widespread disruption that the United States may become as reliant on the threat to impose unacceptable costs to deter large-scale cyber attack as it currently is to deter the use of WMD. The definition of weapons of mass destruction will remain uncertain and controversial in 2030, and its value as an analytic category will be increasingly open to question. The full paper can be accessed at: http://wmdcenter.dodlive.mil/2014/07/01/the-future-of-weapons-of-mass-destruction-their-nature-and-role-in-2030/.

The Importance of Multilateral Cooperation in Preventing CBRN Attacks and Incidents

Dr. Oliver Meier, International Security Division, German Institute for International and Security Affairs (SWP), DEU

Multilateral non-proliferation regimes have the primary goal of preventing states from acquiring chemical, biological and nuclear weapons of mass destruction (WMD). Yet, despite their intergovernmental nature and focus, they also play a growing role in preventing attacks and incidents involving CBRN materials and technologies. Multilateral treaties such as the nuclear Non-proliferation Treaty, the Chemical Weapons Convention and the Biological Weapons Convention oblige states parties to translate international rules into national laws and enforce those rules. They provide transparency by establishing rules for accounting and verification of relevant materials and technologies. International organisations charged with implementing WMD non-proliferation regimes, such as the International Atomic Energy Agency and the Organisation for the Prohibition of Chemical Weapons provide implementation assistance. Finally, international agreements help to strengthen norms against the misuse of CBRN materials and technologies by criminalizing such transgressions.
Multilateral non-proliferation regimes have unique characteristics that set them apart from international arrangements based on coalitions of the willing, such as export control regimes. Multilateral regimes have universal reach, are legally-binding, provide a coherent framework of regulations and they are politically inclusive. These added values are crucial given the global and transnational nature of the CBRN terrorist threat. These strengths outweigh inherent weaknesses of multilateral regimes such as the slow and bureaucratic decision-making and the tendency to arrive at lowest common denominator solutions. To capitalize on these strengths, increased funding should go hand-in-hand with efforts to strengthen the autonomy of international non-proliferation organisations. The focus of such support should be on areas of dual-benefit, i.e. those programmes and activities which simultaneously reduce the risk of CBRN attacks and improve civilian capacities to prevent and respond to accidents and incidents.

Experiences from Operation RECSYR

Commander John G. Refsnes, Norwegian Navy, NOR

The presentation is told as I experienced the OP RECSYR during my 133 days at sea as Leader of the Consquence Management team and Military Commander of MV Taiko. In my presentation I will not go into details about the processing of the chemical weapons and their preccursors on board Cape Ray. My presentation covers mainly the 219 days my crew was embarked on board the norwegian transporter MV Taiko. How we prepared the operation and conducted it. I will say some about the ten tours we had into Syria Arab Republic with our vessel to pick up more than 650 tons of syrian cargo, including the day the city of Lattakia was attacked by GRAD's while under loadingprocess and I will say some about our return to Syria for the repacking of more than 45 leaking drums of PTC. And I will say something of the callenges we had with the cargo.

The Use of the Mobile Laboratory Units in Support of the Ebola Outbreak Response in West Africa

LtCol MD Dr. Roman Wölfel, Bundeswehr Medical Service Academy, DEU

Over the last 30 years Ebola outbreaks repeatedly occurred in the Sub-Saharan Africa. However, until recently most West African countries were spared from this burden. In March 2014 health authorities in Guinea, reported the outbreak of a deadly disease characterized by severe diarrhoea, fever and vomiting. After confirmation of an Ebola Zaire strain as the causative agent, the World Health Organization asked for international support of an outbreak response mission by the deployment of mobile lab units. Five days later the first lab unit and a team of the European Mobile Laboratory (EMLab) consortium arrived at the Médecins Sans Fron-

Abstracts of the Main Programme (chronological)

tières isolation ward in Guéckédou, Guinea, the epicenter of the outbreak. In the further course of the outbreak, two additional EMLab units were deployed to Liberia, Nigeria and finally Sierra Leone. More mobile lab units were deployed to other West African countries like Mali and Ivory Coast. Since March 2014, over 5000 samples have been analysed by the EMLabs and more than 18 European team rotations took place. Here, we introduce the concept of the EMLab, which originally has been developed at the Bundeswehr Institute of Microbiology as a rapid response element for military biological defence operations. Furthermore, lessons learned from this deployment, including logistics and daily routine will be presented. The EMLab consortium consists of partners from more than eight European countries, including the Bernhard-Nocht-Institute, the Bundeswehr Institute of Microbiology, Instituto Nazionale per le Malattie Infettive, Public Health England, the Institute of Virology Marburg, Laboratoire P4 INSERM and Spiez Laboratory.

Biological Outbreaks: Containment and Consequence Management

Dr. Stefano Miorotti, Cristanini, ITA

The spread of ebola in West Africa and the emergence of isolated cases in Western and other countries caused widespread alarm among international and non-governmental organisations, governments and populations. Decontamination is sometimes considered the lesser of the pillars of CBRN protection, but the point will be made that you need decontamination to prevent an event becoming a crisis in the first instance, not only to support an emergency that is ongoing. The paper will consider the contribution of Industry to consequence management of biological hazards in the context of the Ebola outbreak and outline a case history were a full spectrum decontamination approach was rapidly deployed to support a suspect event in South America. Key aspects cover the requirement for multi-functional and modular equipment solutions, rapidly deployable and with a low training burden, as well as proven and environmentally friendly universal decontaminant. Various decontamination scenarios will be considered, ranging from decontamination of personnel, platforms including aircraft, equipment including sensitive equipment, and the decontamination of infrastructure (internal and external) and finally, terrain. Preventive decontamination and sanitization of equipment prior to repatriation will also be considered.

Abstracts of Panel Session 1

Revolutionizing the traditional way of chemical agent decontamination with chemical agent disclosure spray and next generation enzymatic decontamination

Markus Erbeldinger, Ph.D., FLIR Systems, Inc., USA

Recent events have demonstrated a need for improved chemical agent decontamination of surfaces. This presentation will show how the revolutionary Fido® C2 chemical agent disclosure spray and upcoming enzymatic decontamination system improve the responder tool kit by offering greater sensitivity than existing sensors and reducing decontamination costs up to 5-fold. Fido C2 is the key component of the Contamination Indicator Decontamination Assurance System (CIDAS) an US acquisition program in excess of 50 Million US$ run by the US Joint Program Executive Office for Chemical and Biological Defense (JPEO CBD).
Fido C2 is a sprayable, water-based formulation that uses highly sensitive enzymes to detect the exact location of chemical agents at trace level on surfaces by changing color. Available in formulations to detect Nerve Agents (G- & V-series) or sulfur mustard (HD), Fido C2 is intended to provide improved mapping of chemical agent contamination for sensitive site exploitation missions and personnel / equipment decontamination. Fido C2 reacts directly on surfaces to disclose trace contact hazards, and revolutionizes the traditional way of decontamination by making the invisible threat visible. This provides significant savings in time and money for decontamination.This paper will also discuss the CIDAS program, and will introduce a new enzyme based aqueous decontamination system under development, which works in conjunction with the disclosure spray. This system utilizes a next generation agent decontamination enzymes, which have a broad agent activity. Enzyme based systems are significantly better in material compatibility and logistics compared to traditionally used chemical agent decontamination systems.

Application of an IR standoff detector for estimating surface contamination

Thomas Wolf, WIS, DEU

Current decontamination procedures are based on the assumption that the device to be cleaned has a pollution of hazardous material all over. The aim of the introduced project is to determine the real contamination of a surface. For this purpose, a passive FT-IR spectrometer with a focal plane array detector (FPA-Detector), which is currently being used in the standoff detection of hazardous clouds, was combined with an active IR-source [1]. Originally the device was designed for the detection in long range (1-10 km). In order to match the area at an ultra-short range (<1 m) it was necessary to develop a special lens system for this field of view.
In the first preliminary tests with the modified FT-IR spectrometer it was possible to detect and identify explosives on surfaces [2]. Proving the detection of low-volatile chemicals like explosives leads to the assumption that a detection of low volatile toxic industrial chemicals (TICs) or chemical warfare agents (CWAs) could be done as well. Thereby, the process of decontamination could be carried out much more targeted in the future. In addition, thus offering the possibility for online monitoring of the decontamination processes itself. Consequently, resources can be saved and material can be conserved.

Rugged, Handheld Mass Spectrometry for Priority CWA and TIC Detection

Dr. Christopher Brown, 908 Devices Inc., USA

Despite the range of detection and identification equipment available to first responders, capability gaps exist for down range CWA/TICs missions and Sensitive Site Exploitation (SSE). Recent release of rugged, handheld devices based on High-Pressure Mass Spec (HPMS) technology can address many of these gaps with fast detection and confirmation of priority CWAs, TICs, and precursors. Samples can be measured from trace to bulk quantities in solid, liquid, and vapor form. The presentation will provide an overview of HPMS technology and discuss its implementation in down-range tools with particular attention to field CONOPs and integration with other deployed meters. Several incident scenarios will be reviewed to present hot zone deployment options for HPMS tools including continuous monitoring, wipe samples, and identifying target chemicals in the presence of interferents. The presentation will consider results of third-party performance testing and of field evaluations in relation to other available technologies.

Surveillance of Chemical Threats by Combining Active and Passive Standoff Detection Systems

Frank Wilsenack, WIS, DEU

Passive systems are common due to the fact that their FT-IR systems are robust and spectral information can be obtained easily. As these systems are based on open path measurement, they miss in general the ability to determine the distance and the size of a hazardous cloud. Thus nothing can be said about the concentration or the concentration distribution of the TIM[1,2,3]. Active systems could reveal this information but have problems to measure spectra. Most systems rely on differential absorption LIDAR (DIAL) measurements which measure only very few lines of the spectra. Up to now all standoff systems, regardless whether active or passive, measure along a line of sight [4,5,6]. Passive systems are based on a single spot detector, whereas active systems rely in general on a laser base[7]. To survey an area their pencil beams need to scan the area by certain search patterns.To overcome all these obstacles we try to find a solution by combining a passive focal plane array FT-IR with an active component. The outline of this concept and first results will be presented.

Abstracts of Panel Session 2

CRBN Mixed Samples - Safe Handling and Preparation

Bärbel Niederwöhrmeier, WIS, DEU

In the event of a chemical (C), biological (B), radiological (R), and/or nuclear (N) incident or any kind of health threatening agent in military operations and civilian environments, it is crucial to identify these agents to initiate countermeasures for medical treatment and protection. Fast and reliable analysis of samples containing single or a mixture of C, B, RN or other health hazardous agents is a crucial CBRN capability. Analysis of such “mixed” samples requires adequate reception units, personnel safety procedures and specific containment facilities for handling and identification analysis. The EDA JIP CBRN BFREE Project (2013–2015) project was initiated to provide European harmonized approaches for civilian and military laboratories and to assist in developing and validating recommended operational procedures (ROPs) for handling of mixed CBRN samples. A challenging issue is to identify optimal methods allowing efficient sample processing and risk mitigation for ensuring bio-agents removal and/or inactivation without influencing any C/RN concentrations/dose rates. In addition, the total analysis turn-around-time should not increase too much. The results from two workshops, two inter-laboratory exercises and a thorough evaluation of different methods experimentally, the BFREE project have made the following recommendations: CBRN mixed samples should be handled in a four step approach from arrival of the sample at the analytical facility until analysis of respective threat agents in specific dedicated laboratories. In order to remove any biological contamination from subsamples to be analyzed for chemical agents, the consortium propose using a three step protocol of double filtration through 0.2 µm (removal of bacteria) and 30 kDa (removal of virus) filters followed by ultra violet (UV) irradiation for the inactivation of residual microorganisms.

Hair External Contamination as a Tool for Detection of Individual Contamination after Vapour Exposure to Chemical Warfare Agents Simulants

Marie Spiandore, Laboratoire de Chimie de l’Environnement, FRA

As recently shown with the use of sarin in Syria in 2013, chemical warfare agents (CWA) are still a threat for civilian and military populations. In mass exposure situation, emergency decontamination and medical care are the main priorities. Detection of individual contamination can be valuable for victims’ triage in order to determine which ones must be treated first. In this respect, use of exposure markers could be helpful. Hair analysis is now routinely used to monitor consumption of various molecules (narcotics, medicines or metals for example) which incorporate in hair and are stable for long time-windows. Our objective was to evaluate hair analysis as a tool to detect vapour exposure to CWA. We studied the relationship between exposure durations or challenges and importance of subsequent hair external contamination. Hair locks were exposed to vapours of two sulphur mustard simulants at various doses and for several durations, reaching a large scale of Ct products including the sulphur mustard’s LCt50. Results showed that exposure intensity could be related to the amount of simulant recovered from hair with a simple solvent extraction. A single hair lock was able to trap up to 13% of the initial dose, depending on the simulant and the exposure conditions.

C-IED/CBRN Exploitation: Procedures for Sampling of Potentially Contaminated Forensic Samples

Günter Povoden, BMLVS AT NBC Defence School, AUT

C-IED (countering improvised explosive device)/CBRN Exploitation is an issue which is currently discussed at NATO level. The challenge is how to deal with (potentially) contaminated forensic samples. In the CBRNe exercise Precise Response 2014 Austria contributed with one forensic specialist (investigator) in cooperation with a SIBCRA (sampling and identification of biological chemical radiological agents) team. The procedures of optimum cooperation and suggestions for best practices will be presented. This is also valid for WIT (Weapons Intelligence Team) in case of devices containing CBR payloads how to deal with potentially contaminated components of CBR devices. Additionally the use of the Austrian Sample Control Site is presented where potentially contaminated material may be screened for chemical, radiological and chemical contamination for further safe forensic analysis. The topic is therefore touching the intersection between field exploitation level 1 and theatre exploitation level 2.

Experience of Medical Forensics in Poisoning Cases and Possible Relevance for CBW Investigative Mechanisms

Dr. John Hart, SIPRI, SWE, Dr. Sadik Toprak, University of Zonguldak, TUR

The paper describes the experience of medical forensic pathology with a focus on post-mortem exposure to chlorine and cyanide. Selected civilian poisoning cases (deliberate and accidental) involving chlorine and cyanide are reviewed, including number, type, manifestation and investigative mechanisms and experience. Forensic best practices including questionnaire templates are presented. Evidence chain definition and standards of proof that are acceptable/required in legal inquiries are reviewed. A comparison is then made of the UN Secretary-General CBW investigative mechanism against OPCW standard operating procedures, etc. Conclusions and recommendations are then presented.

Abstracts of Panel Session 3

Forensic Analysis of Protein Adducts in Plasma as Prove of Exposure to Nerve Agents and Sulphur Mustard: Capabilities of the German Medical Chemical Defence Program

PD Dr. rer. nat. Harald John, Bundeswehr Institute of Pharmacology and Toxicology, DEU

Nerve agents and sulfur mustard still represent an adherent harmful threat for military and civilian personnel as documented by the incidents in e.g. Tokyo in 1995 and during the Syrian Arab Republic conflict in 2013. Especially in terroristic scenarios, asymmetric conflicts or during decontamination processes for destruction of these compounds poisoning might happen. As chemical warfare agents (CWA) are banned by the Chemical Weapons Convention (CWC), evidence of poison deployment and incorporation might cause far reaching consequences according to the international and criminal law. Consequently, selective and sensitive analytical methods are required for reliable forensic analysis (verification).
In principle, CWA might be detected in biological specimens as either i) the original unaltered small molecules or ii) as their hydrolysis products or iii) as biotransformation products. The latter group includes adducts with endogenous proteins. Unaltered and hydrolyzed poisons are excreted quite rapidly from the body within hours to a very few days thus highly limiting the time frame for successful postexposure analysis. In contrast, adducts exhibit a much longer half-live in vivo being beneficial for detection even if blood sampling is done some weeks after exposure.
This talk presents recent advances in bioanalytical method development established at the Bundeswehr Institute of Pharmacology and Toxicology targeting adducts of nerve agents and sulfur mustard. Modern mass spectrometric techniques optionally on-line coupled to liquid chromatography provide optimum selectivity and appropriate sensitivity for analysis following elaborated procedures for sample preparation including protein isolation and proteolytic degradation.

Medical Management of CBRN Casualties from Role 1 to Role 2: A French Perspective

Colonel MD Prof. Frederic Dorandeu, IRBA, FRA

As clearly shown in 2013 when sarin was used in Syria, the threat from chemical agents has not diminished although its nature has evolved. The threat from CBRN agents remains thus clearly identified by NATO, especially if acquired and used by terrorists, and needs to be properly addressed. Despite more than 10 years of operations in Afghanistan where CBRN was not considered important, the French Military Health Service kept a close attention to these scenarios and developed new doctrines, equipment and training. The management of CBRN casualties requires a standardized framework to optimize medical response, especially in a multinational setting. The principles of CBRN casualty management are recognition (detect & diagnose), safety, first-aid, casualty assessment and triage, life saving interventions, and casualty hazard management (contain, decontaminate & isolate); then will come the supportive and definitive treatment before rehabilitation. In order to provide emergency medical care, some decontamination should be performed. To help the medical teams at role 1 level, we designed a kit that gives them the necessary equipment to quickly assess the casualty and, after a localized and limited decontamination (individual protective equipment, and skin), give the necessary medical attention. New medical decontamination chains have also entered service. Deployed between a role 1 and a role 2 medical facility, they are tasked to receive all medical casualties, assess and treat them before thorough disrobing and decontamination, and further treatment. In this talk, we will present the main characteristics of the current doctrine, equipment, technics and training.

A Novel Device for Preventing Acute Radiation Syndrome and Reducing Cumulative Marrow Dose

PhD Oren Milstein, StemRad Ltd., ISR

At present, there is no effective personal protection from gamma radiation. In Chernobyl, first-responders wore makeshift lead sheeting for protection. In Fukushima, emergency personnel undertook disaster mitigating activities without any protection from gamma radiation. In order to shield as much of the body as possible, existing personal shielding solutions use only thin layers of inherently heavy radiation-attenuating materials. These types of solutions are ineffective in blocking energetic gamma radiation.
Receiving a high dose of gamma radiation over a short period of time may result in Acute Radiation Syndrome. Protracted exposures to gamma radiation may result in malignancies such as leukemia.In the case of high-dose exposure, the survival-limiting factor at doses up to 10 Gy is irreversible bone marrow (BM) damage. Notably, in past radiological catastrophes doses were largely under 10 Gy. Thus, numerous fatalities in a catastrophe may be avoided by protecting BM. Remarkably, due to its extraordinary regenerative potential, it is enough to protect only a small fraction of BM to preserve its function.
In the case of protracted exposure, BM is very susceptible to carcinogenesis. Thus, exposure of large areas of BM to radiation significantly increases the risk of leukemia.
Approximately 50% of the of the body's active BM is contained within the pelvis. As such, shielding this region holds great promise for both high dose and protracted exposures. In this paper we present a first-of-its-kind device providing potentially life-saving protection from gamma radiation. Equipping personnel with this device should have great impact on future radiological emergencies.

The 3rd International Symposium on Development of CBRN-Defence Capabilities
Berlin CBRN Symposium | 19 - 21 October 2015

Abstracts of Panel Session 3

Assessment of Radiation Induced Individual Health Injuries and Prognostic Clinical Evaluation using Integrative "Dosimetry" Strategies

Colonel MD Dr. Matthias Port, Director Bundeswehr Institute for Radiobiology, DEU

Radiological events like deployment of nuclear weapons, improvised nuclear devices, dirty bombs, radiological or nuclear accidents require rapid and precise medical classification ("triage") of a large number of patients. Estimates on the absorbed dose and in particular predictions of the radiation induced health effects of soldiers is mandatory for optimized allocation of limited medical resources and initiation of patient centered treatment. Among the German Armed Forces Medical Services the Bundeswehr Institute of Radiobiology offers a wide range of tools to cope with different scenarios. The forward deployable mobile Medical Task Force has access to state of the art methodologies summarized into approaches such as physical dosimetry, clinical "dosimetry" (H-Modul) and different means of biological dosimetry (e.g. dicentrics, high throughput gene expression techniques, gamma-H2AX). The integration of these different approaches enables trained physicians of the Medical Task Force assessing individual health injuries as well as prognostic evaluation, considering modern treatment options. To enhance the capacity of single institutions, networking has been recognized as an important emergency response strategy.
The capabilities of physical, biological and clinical "dosimetry" approaches spanning from low up to high radiation exposures will be discussed and exemplified by a recent case history.

Abstracts of Panel Session 4

Protection and Disinfection in Mobile Laboratories – Lessons-learned during the Ebola Outbreak

LCol Dr. Kilian Stöcker, Bundeswehr Institute of Microbiology, DEU

The unprecedented dimensions of the 2014 Ebola epidemic in Western Africa posed a variety of challenges to civilian and military international organization that were involved in crisis management. In the face of such exploding numbers of Ebola infections in several West African countries, many of the previous established protocols and procedures have been thoroughly scrutinized in order to provide rapid and effective support while still maintaining the highest possible standards regarding biosafety and quality of results. Laboratory based diagnostics of Ebola infections turned out to be a key element for successful outbreak containment. As well established laboratory procedures of stationary high containment laboratories could not be directly transferred to the limiting conditions of rural Africa, novel solutions for protective lab equipment and disinfection had to be applied. Here, we present a novel concept for save and secure handling of highly infectious samples in low resource settings. It includes the development results of a military medical resource project for the development of a foldable, negative-pressurized containment system, personal protective equipment suitable for use in tropical regions and an effective laboratory strategy for virus disinfection and sample inactivation.

GIS-Use Cases in Epidemic Situations

Thomas Gersthofer, ESRI Deutschland GmbH, DEU

- Abstract not available -

The Challenge of Purifying Extremely CBRN-Contaminated Raw Waters – Water Purification System 'WAA Dekon' of the German Armed Forces

Dipl.-Ing. Franz Weber, Kärcher Futuretech, DEU

If raw water is extremely contaminated with CBRN-contaminants (e.g. concentration of chemical warfare agents: 10 mg/l, according to FINABEL test requirements), it might happen that the very high retention rates of reverse osmosis (RO) membranes in single-stage operation (each water molecule passes through on RO-membrane) are not sufficient to meet the applicable limit values of the respective drinking water standard (e.g. STANAG 2136). For these cases, KFT developed the so-called Double-Pass (each water molecule passes through two RO-membranes) mode especially for its RO-systems. The Double-Pass equipment can be installed in all water purification systems based on RO-membrane-technology from KFT.
The German Armed Forces Scientific Institute for Protection Technologies NBC Protection (WIS) in Munster showed during different life-agent testing, according to the FINABEL testing standards, with the WATERCLEAN 1600 system from Kärcher Futuretech that all long-term limit values for drinking water according to STANAG 2136 are met for most of the tested contaminates already in single pass. Only for a few contaminants the Double-Pass mode was necessary to reach values far below the long-term limits of STANAG 2136.
In 2013 Kärcher Futuretech delivered to the German Army (Bundeswehr) a new container-based water purification system called "WAA Dekon", which is designed to treat mainly highly CBRN-contaminated raw waters to drinking water. The drinking water of this system will be then mainly used for decontamination purposes of the Bundeswehr for example in the state-of-the-art decontamination system TEP 90 from Kärcher Futuretech. The WAA Dekon is designed so that it can be easily operated with wearing full CBRN-protective clothing and that no contamination is spread during the changing of prefilters or RO-membranes.

Room and equipment decontamination using H202 vapour (HPV technology)

N.N., Bundeswehr Hospital Hamburg, DEU

The new ward block at the Bundeswehr Hospital Hamburg was completed in July 2013. Numerous challenges regarding hospital hygiene arose before it started admitting patients in 2013.
The following questions on hygiene needed to be clarified:
• How can the risk of transferring microorganisms from the old building to the new building via medical and other equipment be reduced to a minimum?
• How can the treatment and patient rooms in hygienically sensitive areas, including the medical equipment already installed in the new building, be cleaned and disinfected thoroughly so as to effectively reduce the high levels of bacteria that result from the building measures?
In most cases, it is not possible to thoroughly decontaminate rooms and equipment with conventional cleaning and disinfection methods alone. Combined use of conventional and new decontamination methods such as H202 disinfection seemed appropriate. To date, this method has not been used for the relocation of a hospital.

Abstracts of Panel Session 5

Space perspectives and possible tools in support of CBRN issues in local and global scale

Professor Amnon Ginati, ESA

- Abstract not available -

The use of standards and Web Services for CBRN Information Management

Eric Juel Ellinghaus, Bruhn NewTech, DEU

CBRN Warning and Reporting is evolving based on new NATO doctrines into the new area of CBRN Information Management. This leads to a requirement to bring together elements from all the pillars of CBRN into Information Management systems.
The purpose of this speech is to review how standards are used within CBRN and highlight how the standards available today are insufficient to cover the needs of a CBRN Information Management system. The NATO ATP-45 standard has just been released in Edition E and has undergone enormous development since its origin in the cold war. Edition F is under development and is likely to include additional information management topics such as CBRN Intelligence and Reach-Back and Fusion. The CBRN Information Management Panel (JCBRND CDG IMP) is supplementing this with STANAG 4586 to achieve new levels of sensor connectivity.
This is a good starting point, but from a practitioner viewpoint what nations now seek is the integration of their current Warning and Reporting systems into their C2 and BMS systems. Many nations are in the process of developing these interfaces and a few have already completed the integration. The risk we see is that these integration efforts will become tied to national specific interfaces. In other areas standards like NFFI and NVG are in use, but within CBRN there is not yet a clear vehicle to drive this standardisation.
We believe there is potential for combining Service Oriented Architecture using Web Services with ATP-45 standardised content to achieve an internationally recognised re-usable way of integrating CBRN into C2 and BMS systems.

Situational Awareness for CBRN with Software as a Service (SaaS)

Andreas Schiel, ESG, DEU

- Abstract not available -

Applied Knowledge Management in the JCBRN Defence COE – Organizational measures, Semantic Web Technologies and Visualization Tools for a constructive CBRN-KM

Captain Dietmar Trees, JCBRN Defence COE, CZE

The upcoming Final Operation Capability of the NATO Chemical Biological Radiological Nuclear (CBRN) Reach Back within the Joint Chemical Biological Radiological Nuclear Defence Centre of Excellence (CBRN Defense COE), the growing NATO demands to support operations and the NATO Defense Planning Process (NDPP), the started work on the newly released NATO CBRN Capstone Document and several other upcoming new topics with crucial relevance to NATO has led the leadership of the JCBRN Defence COE to initiate the establishment of an internal Knowledge Base as one part of the JCBRN Defence COE-Knowledge Management.
The three dimensions People, Organization and Technology are known to be the core of an integral organization-wide Knowledge Management. Undeniably for everybody who has to cope with all the everlasting challenges of (CBRN-) Knowledge Management is the interdependence of these dimensions. Taking this into account, in January 2013 the initial launch of a new comprehensive CBRN IKM-project work “CBRN-Knowledge Base” was given by the director of the COE.
The JCBRN Defence COE-Knowledge Base is a computer system based tool-suite used to store complex structured and unstructured information and allow new exploitation possibilities for the users on stored information. In addition the Knowledge Base utilizes organization oriented business rules and other forms of logic to deduce new facts or highlight inconsistencies. With the implementation of semantically linked data in a modern CBRN- Knowledge Base along with dedicated Knowledge Management-related organizational measures, the JCBRN Defence COE breaks new ground. The use of visualization-tools combined with semantic search-tools within complex data sets already illustrated the amazing potential while exploring CBRN-related data repositories. The projects next highlight will be the targeted declaration of the COEs Final Operating Condition of the NATO Reach Back in December 2015.

Abstracts of Panel Session 6

logical Reconnaissance within the Constraints of both - Analytical Requirements and Legal Limitations

Dr. Hermann Dreyer, Rheinmetall MAN Military Vehicles, DEU

Mobile detection and analysis of nuclear and chemical warfare agents are established. However the maturity of the analytic and the implementation of regulations in the field of bio reconnaissance have not reached the same level. Unlike stationary bio laboratories mobile analysis and detection units are often directly located in a potentially or actually contaminated environment. The systems need to be compact and lightweight and have to withstand the climatic and mechanical loads. They also have to be quick and easy to use. In addition to the analytical capability the protection of operators and environment is paramount when working with infectious material. This requires special technical measures in compliance with legal regulations. The requirements are explained and technical implementation will be shown. Existing mobile high security systems and essentials of future innovations are presented.

Approach to a Total CBRN Commitment

Peter Wahlin, Saab, SWE

There is an increasing need within the modern warfare to manage the entire CBRN chain, ranging from early detection, warn, sample and to safe transport. Our presentation will cover all of these aspects to create a complete technical, with high reliability and at the same time affordable solutions.
The aim of a CBRN Automatic Warning and Reporting (AWR) system is to enable an automatic accurate warning. In order to get closer to the actual CBRN event, several different CBRN sensors have to be spread out in strategic positions, such as on humans, vehicles and buildings etc. The AWR system links these sensors in a network, and when using sensor fusion it can minimize the occurrence of false alarms. A decision support module helps the operator make fast and accurate decisions.
Sampling equipment used for making correct forensic samples as well as following the NATO Standard AEP 10 and AEP 49, more than 300 different articles are needed. Collection includes everything needed for sampling of chemical, biological and nuclear warfare agents, toxins and industrial chemicals as well as radiological substances. The equipment must be optimized for sampling CBRN in air, water, liquids, soil, powder, objects and vegetation.
A safe correct transport of hazardous CBRN samples as well as toxic industrial chemicals is crucial for the identification. Package must be approved for air, land and sea transports with no risk of leakages or dispersal of the sample matter and certified according to the transport regulations such as ADR, RID, IMDG-code and ICAO-TI/IATA

CBRN Detection Using UGV

N.N., Cobham Mission Equipment - Unmanned Systems, DEU

- Abstract not available -

CBRN Reconnaissance – a Dual Use Capability

Alexander Müller, Bruker Daltonik GmbH, DEU

The capability to detect identifies and monitor CBRN threats was born in a purely military driven scenario environment. Especially the cold war era as well as the conflicts in the Gulf area has been significantly influencing the character and the development of this kind of capability. However, these days are gone! During the last approximately 10 – 15 years the need for CBRN reconnaissance has been restructured, updated or even changed. In this context especially the phrase Dual-Use has grown to importance.
Within this context Dual-Use means that the general detection capability can be utilized for military applications as well as for civil applications. Soldiers are operating first responders equipment resp. first responders supporting military operations, e.g. to cope with domestic crisis scenarios. Within this context the presentation will show how a state-of-the-art reconnaissance system could be configured, will display which core capabilities are covered and finally draw the bow to the operational, dual-use, use-case by introducing a selected number of operational examples.

Abstracts of Panel Session 7

Mobile, Compact and Reliable CBRN Decontamination Systems for Different Scenarios

Dr. Patrick Marcus, Kärcher Futuretech GmbH

Still today, in public discussions CBRN-contamination scenarios are often connected to war scenarios between two countries/blocks. The truth is that in the modern world CBRN-contaminations evolve from a variety of events. The recent developments in Syria and Iraq show that in asymmetric warfare scenarios, the use of chemical warfare agents is likely to happen. Also toxic industrial chemicals (TIC) are used to do harm and spread fear in such asymmetric scenarios2. But not only the intentional use of CBRN-weapons and TICs might lead to CBRN-contaminations, also disasters in industry or accidents during transports of dangerous goods have to be considered nowadays.
Each of these CBRN-contamination scenarios need different decontamination approaches in order to have the most efficient and effective mitigation. Which system suits the given decontamination approach best, is defined by different parameters.

Among these parameters are:
- where has the CBRN-contamination happened (e.g. city, open area)
- what kind of CBRN-contamination is present
- is it a military or a civilian operation
- was it an intentional or accidental event
- what is affected (e.g. persons, buildings, vehicles and equipment which must be used in order to continue with operations)
- if persons are affected: how many people are affected, what individual protection level do/did they have and are the affected persons trained or untrained for such events

From all these parameters a vast number of different scenarios can be derived. Kärcher Futuretech (KFT) with its long lasting experience in the field of CBRN-decontamination is able to provide tailored solutions which exactly fit the different deployment scenarios of its customers. The approach of KFT is based on modern technologies like for example the 20'-ISO-container based DSAP for the decontamination of ambulant and non-ambulant persons, the vacuum decontamination for sensitive equipment like laptops (VDM 135 und VDM 265), the CAGE-systems for larger decontamination solutions (EDMP and MEP) or the light, air transportable decontamination solutions, which can be transported on small trucks or inside a helicopter.

Protected Airmobile CBRN Defence

Dipl.-Ing. Rainer Lutz, Kraus-Maffei Wegmann GmbH & Co.KG

- Abstract not available -

A Comprehensive Approach to Warning & Reporting for CBRN Incidents

Computer Scientist Holger Effertz, Technisch-Mathematische Studiengesellschaft mbH

- Abstract not available -

Abstracts of Panel Session 8

Recent R&D Advances in Modelling and Decision Support Systems at CEA – Examples of Use in the Framework of CBRN-E Exercises

PhD Patrick Armand, CEA, FRA

CBRN-E threats have numerous expressions among which deleterious atmospheric releases originating from industrial accidents or malicious activities (sabotage, terrorist attack…) may lead to numerous civilian or military victims. In such situations, it is more and more admitted by rescue teams and decision makers that dispersion modelling and health impact assessment are not only interesting, but an integral component of crisis preparedness and management. Last years, increasing computational capabilities accompanied the development of advanced 4D (3D space and time) models of AT&D (atmospheric transport and dispersion) which are indispensable in complex built environments, like industrial sites or urban districts, precisely the places where CBRN-E events may arise. These models are integrated in decision support systems intended to satisfy the comparable needs of civilian security and military authorities to protect the population or the troops on the battlefield. To reinforce emergency response tools and foster good practices for using them, three conditions are to be met: (i) the models must be intensively validated on an experimental basis, (ii) their results must be available in a short time consistent with crisis dynamics, and (iii) the results must adequately fit the needs of end-users (first responders, plants' operators and other stakeholders…). In France, the Atomic and renewable Energies Commission has a concrete experience in developing modelling and decision support systems adapted to CBRN-E threats. The presentation will address the most recent R&D advances relating to explosive source terms, AT&D in complex environments, source term estimation, and in-situ measurements assimilation. Then, examples will be given how practical 2D / 3D results (danger zones, intervention zones…) were produced by CEA and used by rescue teams like Paris fire-fighters in the frame of CBRN-E exercises.

Car-borne Measurements of Radioactive Material

Monika Risse, Fraunhofer Institute INT, DEU

The Fraunhofer-INT performed extensive measurement campaigns for the search and identification of radioactive material. The main focus was car-borne searching. The Fraunhofer-INT has long time experience with car-borne searching and equipped a station wagon with sensitive gamma and neutron detectors. The system is called DeGeN, the abbreviation stands for DEtection of Gamma and Neutron sources. It is taken from the German word "Degen" which names a rapier and is our weapon against nuclear terrorism. The neutron component is realized by slab counters incorporating 3He tubes and the gamma detection is done using plastic scintillators with NBR functionality. The latter enables the user to distinguish between natural and artificial radiation. In the continuous process of updating and developing the whole system the gamma system has been enlarged in 2014/2015 from two 5 l probes to two 12 l probes.
Results will be presented obtained during a measurement campaign before the change of the system and afterwards. In the first campaign a series of measurements with several different measurement teams was carried out. Each team went through a course searching for hidden radioactive gamma sources using the DeGeN. As a result it was proven that the system is extremely powerful and the majority of the sources was found by all paticipants independent on previous experience with this system.
In the second campaign the larger gamma probes were used and the efficiency with the new detectors was estimated. In addition, measurements with neutron sources were carried out which could not be performed during the first campaign.

LLR Mobile Detection Systems for Gammas and Neutrons with Training/Simulation Capabilities using Realistic Scenarios

Dr. Jürgen Böttcher, Thermo Fischer, DEU

The LSA-R (R (MDS-GN, Mobile Detection System for Gammas and Neutrons) is an advanced Gamma-neutron reconnaissance system for helicopters and vehicles. The periodical detection within 1 s of only few n/Sv/h of "artificial" gammas is the key feature of the system.
This sensitive reconnaissance system has now a training system with scenery based simulation of radiological events for realistic training without use of radioactive sources or radios. The training scenarios will be created on a scenario software platform using the movable maps of the LSA-R. The LSA-R can use MIL GEO Pc maps, vector graphic maps, OSM-maps but also special maps as visualization platform. Rather all scenarios can be constructed: 1 up to 3 radioactive point sources or the plumes of a dirty bomb or of a nuclear detonation.
The coordinate-dependant scenario gamma-and /or neutron dose rate values are re-calculated to pulses as they came from the detectors directly. These pulses are given to the preamplifier of the detection systems. This GPS-supported method allows the realistic training during movement from car or helicopter. The training of strategies how to find a hidden source or to localize the field of a radioactive contamination is a focal task. The detected values are inserted with coloured dots in the movable map.

Abstracts of Panel Session 8

The trainees learn to develop the best methods to find and localize a possible danger. Like the LSA-R the simulation/training includes the use of the sensitive NBR-method (Natural Background Rejection) which shows possible “artificial” gammas of few nSv/h embedded in natural background. The speed of the moving platform can be up to 120 km/h with a height of 100 m. So a fast scan of an area of interest is possible. The simulation/training system is also realized for the SVG2.

Mobile Nuclear Detection Technology: Reducing the illicit Trafficking Haystack

Dr. Rico Chandrasekharan, Arktis Detectors

Screening for radiological and nuclear materials is increasingly performed at international border crossings and seaports. While such scans are a critical piece in the effort to prevent illicit radiological and nuclear trafficking, challenges remain to further strengthen the global nuclear detection architecture:

• The mere presence of detection equipment can impact the behavior of the trafficker; they will seek alternate and non-traditional routes.
• An ad hoc approach to scanning does not leverage information gained by intelligence and more traditional law enforcement mechanisms.
• With scanning only performed at specific choke points, a trafficker is less likely to be stopped once beyond a scanning point.
• No border can be fully monitored.
• Fixed scanning points do not address scenarios where material is not transported across any borders but rather within borders, for example when material is lost or stolen in the same country where it is used.

This paper describes a solution to these challenges in form of a novel mobile detection platform originally developed under a European Commission (EC) FP7 funding grant (MODES_SNM) and developed further by Arktis Radiation Detectors. To maximize the efficiency of detection efforts, the best technology is useful only to the extent it meets the needs of law enforcement and intelligence agencies. For this reason, the MODES_SNM project and its extension by Arktis has involved the end user in development of the system since its inception. The mobile platform integrates novel detection technologies and software to enable operations in three scenarios:

• Short notice and random scan operations, at otherwise unmonitored location.
• Search and retrieve, including preparing with a baseline reading for background radiation.
• Supporting post event assessment efforts.

Abstracts of Panel Session 9

Field Based Multiplex Detection of Biothreat Agents

Christopher Pöhlmann, Bruker Daltonik GmbH, DEU

Natural outbreaks and the willful use of highly pathogenic organisms or toxins for acts of terror have had tremendous impact on human populations. Currently, nucleic acid based detection platforms as well as immunoassay based technologies are applied for pathogen or toxin detection, respectively. However, these techniques cannot be performed by untrained personnel in the field and they are time-consuming.
Here, we present an electrochemical sandwich immunoassay based detection platform for universal detection of five biothreat agents in parallel including inherent positive and negative controls. Capture antibodies against specific biothreat agents are immobilized on the 16 interdigitated gold electrodes of a biochip. The detection platform allows simultaneous identification of biothreat agents such as proteotoxins (botulinum neurotoxins, staphylococcal enterotoxins, ricin), bacterial pathogens (e.g. Bacillus anthracis, Yersinia pestis, Francisella tularensis) as well as viruses (e.g. orthopoxviruses) within less than 25 minutes. The detection platform is integrated in a robust suitcase and can be operated both with mains voltage and in battery mode. Limits of detection for toxins and bacterial agents are in the low ng mL-1 range or in the range of 103 - 105 colony forming units mL-1, respectively. A standardized protocol for sample preparation of liquid and solid samples allows robust detection of biothreat agents in various sample matrices. These results demonstrate the potential of electrochemical biochips for sensitive on-site detection of biothreat agents.

Rapid, Reliable and Easy On-Site Identification of Biological Threats

Dr. Sebastian Ziewer-Arndts, analyticon instruments gmbh, DEU

Compared to the detection of chemical and nuclear threats the First Responder's skills to identify biological attacks directly on-site in a fast and trustworthy manner were strictly limited. The "verification" of biological threats was only a confirmation of general biological activity and therefore very unspecific. New technical developments now allow an explicit identification by verification on pathogen-specific genetic sequences.
The used method (PCR) is one of the most sensitive molecular detection methods at all and is used in professional laboratories for decades. Now, this technique has been transferred into field-suitable analysers. The RAZOR EX is handheld and battery-powered, the FilmArray can be installed in military vehicles, and both are fully integrated and excellent for the use on-site.
Former strategies to interpret biological threats included sample taking, transport and preparation and of course final identification and took days until the outcome was clear. Now, results are available in only one hour. The whole process takes place on-site and does not need further sample preparation or laboratory equipment. Analysers can be operated with protective clothing and results are depicted on-screen in a clear "detected / not detected" manner. Thus, both are in particular feasible for first responders like soldiers.
All common biological threats, e.g. Anthrax-letters or Ricin-attacks can be handled within shortest time what allows to elicit the most appropriate response. And that will protect or even save human life.
This talk illustrates the used method and the analysers, and shows how the military can integrate this fascinating new detection technique into its routine.

Rapid and Easy Detection of Biowarfare Agents – A Field Exercise

Dr. Sybille Pagel-Wieder, miprolab GmbH, DEU

Terrorist attacks have recently shown that most of the biological threat agents are designed to cause fear and panic in the population. Therefore, rapid field-methods, which can be used by minimally trained personnel, are required for an efficient on-site-detection of biological threat agents. These requirements are fulfilled by miPROTECT® rapid tests as these handy sized test cassettes consist of lateral positioned grids. The test system itself is a lateral flow assay, based on the immunochromatographic technology. After collecting and applying the diluted sample onto the sample port of the test cassette, a red line in the control zone (C) confirms in less than a few minutes that the test is working properly. Another red line in the test zone (T) shows a positive signal and the presence of biological threat agents. Although these tests are designed for a visual read-out, test cassettes could be measured with a portable reader allowing a quantification of the test signals.
Development and validation was done in collaboration with SPIEZ Laboratory (Switzerland) and the Bundeswehr Research Institute for Protective Technologies and NBC Protection (WIS; Germany). Validation studies include both the detection/quantification of several toxins, bacteria and pox viruses as well as the recovery rate of the targets in spiked samples. In order to determine the detection limits, serial dilutions of the targets were prepared. A good linearity between the signal ratio and the target concentration was observed. Batch-to-batch variance was quantified by the determination of the intra and inter assay-precision. After validation studies, miPROTECT® rapid assays were tested during various military and civil protection field exercises.

Abstracts of Panel Session 9

Hyperspectral Laser Induced Fluorescence as a Method for Standoff Detection and Classification of Biological Hazardous Materials

Anita Hausmann, DLR, DEU

The high and still increasing number of attacks by hazardous bioorganic materials makes their detection extremely difficult, since they need to be discriminated from other substances in various natural surroundings. In addition, living material may reproduce itself. Already one single bacterium may constitute a huge risk. Thus, a very high detection sensitivity and selectivity are essential, as well as a rapid identification with low false alarm rates. Laser based standoff detection can immediately provide information on propagation and compound type of a released hazardous material, while point sensors can collect and identify them. The coupling of both methods may be a promising solution to optimize the acquisition and detection of hazardous substances.
At DLR Lampoldshausen, bioorganic substances are measured applying hyperspectral laser induced fluorescence (LIF) technique in order to subsequently classify them. In this work, a procedure is presented, which utilizes time-dependent spectral data and predicts the presence of hazardous substances by statistical data analysis. For that purpose, measurements are carried out on a free transmission range at a standoff distance of 22 m, with two excitation wavelengths in alternating mode (e.g., 280 and 355 nm). A gated ICCD spectrometer system records spectral and time-dependent fluorescence data, which are processed and fed automatically into the classifier. Attention is drawn to physical states, concentrations, and to the photodecomposition of the samples assisted by absorption spectroscopy before and after each LIF measurement. This has a strong impact on the measurement procedure and, especially, on the training of the classifier.

Abstracts of Panel Session 10

Use of Chlorine Oxidants and Butyldiglycol for Decontamination of Skin, Equipment and Vehicles

OFAp Dr. Martin Weber, ZI SanDstBw Munster, DEU

In the context of acts of war and terrorist attacks contamination of people, vehicles and equipment with chemical or biological weapons is a real threat. The persons concerned need an agent for rapid decontamination of clothing and equipment in their environment. These include gloves, door handles on vehicles, bags, weapons or protective mask containers. Mostly it is sufficient to reduce the contamination to a minimum to avoid the displacement of contamination. Similarly, a safe undressing, especially of wounded must be ensured. A complete decontamination (decomposition) is preferable to a pure mechanical removal. The possible mixing of warfare agents with thickeners or oils is also to consider with.
To decontaminate chemical and biological warfare agents both solvent and active chlorine compounds are required. Bicomponent decontaminant solutions are non-dangerous and stable during storage, can be activated by mixing and easy applied. The two products presented are able to dissolve and detoxify chemical warfare agents, ricin and anthrax quickly, including thickened versions, in operational and combat situations.

alldecontMED
The two components of alldecont are located in separate bottles. Upon actuation of the spray, the two solutions are mixed and activated. A residential time of at least 1 minute is required for detoxification of CWA, ricin and anthrax. Numerous other objects that come in contact with the skin, are also decontaminated in the same time.

Decon Set OWR
Component A (solid) and B (liquid) can be stored in a vehicle, even for long time and large variations in temperature. The chemicals are non-flammable and the set can also be carried in the aircraft (IATA). In operation component A is quickly mixed with component B in a spraying device. The solution is applied onto the contaminated areas. A reaction time of 20 minutes is recommended.

Vacuum Decontamination Chamber - The next Generation

Dr. Markus Hellmuth, Kärcher Futuretech, DEU

The BAIIN (Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr) and the French authority DGA (Délégation Générale pour l'Armement) have placed an order in the area of CBRN protection named "System for the Decontamination of Sensitive Equipment" DSSM (Dekontaminationsausstattung Sondergerät) in German, and SDMS (Systèmes de décontamination de matériels sensibles) in French. It is a project from the "EURODECONT" Consortium, which includes the two companies Kärcher Futuretech (Germany) and its partner NBC-Sys (France). For the decontamination of sensitive equipment the DSSM/SDMS ensure the thorough decontamination of sensitive equipment (optical and electronic devices) and parts of personal equipment (handguns, combat helmets); decontamination can be carried out independently from the carrier vehicle. Thanks to the modular design and construction of this entire new generation of decontamination technology, it has been possible to configure the systems according to the country-specific decontamination requirements using the same technologies. As a result, in consideration of the national transport concepts, the modules can be optimally integrated into the existing CBRN decontamination capabilities available in the two countries. Whereas the German Federal Armed Forces rely on 10 ft containers, the French Army prefers compatible trailer solutions. The procurement of the systems for the fast, easy, material compatible vacuumdecontamination of sensitive equipment for the French Army and German Federal Armed Forces represents an essential contribution. Bridging the gap caused by the increased demand for the decontamination of sensitive equipment as a result of the introduction of modern infantry equipment . The systems meets the efficiency criteria of AEP-58.

Gaseous Hydrogen Peroxide Gassing - The Solution for the Inactivation of Fungi and their Spores Inside of Military Vehicles and Tanks

Udo J. Werner, MBS MaschinenBeratungsService, DEU

Contents of the speech: gaseous hydrogen peroxide gassing - the solution for the inactivation of funghi and their spores inside of military vehicles and tanks
- basic principles of the technology
- examples from the field
- recipies and technical set-up
- microbiological results
- surface decontamination
- trends / possibilities
- Wiesel / PZ 2000 / Leopard II / Fuchs / Dingo

Abstracts of Panel Session 10

Tailored Systems and Solutions: Decontamination and Disinfection in Military and Civil Scenarios - Challenges and Developments

Thilo Schuppler, OWR, DEU

Overview of different scenarios from military missions (e.g. Operation Active Fence), pandemic outbreaks (Ebola West-Africa), terrorist threats (thinkable escalation of the Paris attacks) to civil incidents (e.g. Fukushima).
Preparations and counteractions against the impact of the threats within different organisations.
Concrete solutions and descriptions of systems e.g.
- highly flexible containerized Multipurpose Decontamination Systems
- animal disease prophylaxis before redeployment
- casualty decontamination system in a multinational civil-military exercise
- Ebola counteractions in a hospital in Liberia
- hand-held decontamination kits in the first front line
- using enzymatic solutions to detect traces of nerve agents on surfaces
- etc.

Each solution will be described in a chapter of 2 – 3 minutes.
Summary of actual challenges and related developments, mostly explained with practical experiences.

Abstracts of Panel Session 11

Comprehensive Air Treatment – A Decisive Requirement for Future Collective Protection Systems (COLPRO)

Colonel (ret.) Ernst Elbers, Beth-El Industries, ISR

„No matter what type of air is outside, there is a definite requirement for user air quality inside“
We take this opportunity to describe the ethos and aims of the House of Beth-El, and the development and production of filtration systems for civilian and military customers which are a consequence of them. These systems are based on an entirely new conceptual approach and are therefore not directly comparable to conventional systems. As a result of this development, the company has become the main supplier to almost all NATO armies in just 3 years.

Operational Conditions and Threats Facing Modern Armed Forces
The starting point at Beth-El is always consideration of the many and diverse threats to the air which soldiers breathe while deployed on global operations. The aim is to protect them, and to provide a single source of ‘clean’ air.
The most important diverse threats to the air are asymmetric terrorist attacks with unconventional means, industrial chemicals released intentionally or unintentionally, the influence of extreme weather conditions with high concentrations of dust and fine-dust and hazardous fecal bacterial germs which are found in the air in many operational theatres.

The Solution from Beth-El
Mindful of this, Beth El has developed systems which offer successful solutions for modern armed forces with “complete protection“ that:
- Start with legal requirements (i.e. Protection from carbon monoxide in the work place).
- Consider the local weather conditions (temperature, humidity, dust, fine dust, germs)
- Also consider industrial pollution (Release Other Than Attack/ROTA, Toxic Industrial Chemicals/TIC)
- Account for the possibility of terrorism/enemy attacks on the air (dirty bombs, poisoning in the air, use of biological and chemical warfare agents).

The product platform of Beth-El
Today, the company delivers combined ventilation-, air-conditioned-, CO-, NBC protection systems for “around the clock, 24/7“operation in any climate zone. Thus military customers have a single-source supplier for worldwide operations, of the permanent and preventative protection of breathing air.

Solar Light-Activated Photocatalysts and Functionalized Textiles for Self-Decontaminating Individual Protection Against Toxic Agents - ”Safe Coat”

Jan Voigt, WIS, DEU

Photocatalysts like TiO2 have the ability to degrade chemical and biological pollutants to non-toxic products. Therefore only the presence of sunlight and oxygen is necessary. A great challenge is the modification of textiles and paints with photocatalysts. These materials could be a useful tool for people working in chemical environment like firemen, emergency medical technicians or soldiers. Such modified surfaces dispose of a latent capability for self-decontamination; render unnecessary the supply of additional personnel, tools or systems.
The aim of the “SafeCoat” project is the application of photocatalytic active coatings to textiles. After the modification we are testing these modified materials towards their self-decontaminating properties against highly toxic chemicals. Therefore we built different experimental set-ups to measure the atmospheric composition during the irradiation of the modified materials and to estimate the intermediates formed during the reaction. Additionally we will implement an IR-stand-off detection system (HI-90®) in our set up for observing the course of reaction at the surface in situ.

Physical Protection for Pilots under NBC-conditions

Dr. Oliver Burkhardt, Autoflug GmbH, DEU

Autoflug is an innovative family led company since 1919. The company is divided in two business-units and occupies approximately 250 employees. Due to mostly handling with military customers the production is placed in Germany, which is important to guarantee the highest possible quality.
Autoflug has experiences in CBRN defense for personal protection. One of our successful inventions is a military fully qualified NBC-garment for jet-pilots (named AFP). A similar garment is also developed for every other kind of crew station. The special features of this garment are a long mission time (8 up to 24 h), air-condition of body and helmet, minimized shelters which are close to the body, which offers optimal freedom of movement. As Autoflug is a customer orientated company, Autoflug develops entire solutions and delivers modular and individual rescue equipment for each kind of mission. Therefore, Autoflug provides for e.g. personal survival packs and CBRN-protection kits.

Abstracts of Panel Session 11

As the company has an innovative research and development department, Autoflug deals with modern technologies, such as using smart textiles for personal and equipment protection.

Collective Protection – the Swiss Approach

Daniel Jordi, Labor Spiez, Switzerland, CHE

The purpose of the civil protection system is to protect the population and its vital resources in the event of disas-ters, emergencies, or armed conflicts, and to contribute to bringing these events under control and limiting the damage they may cause. In order to implement this, each Swiss inhabitant has a personal protection space which has to be constructed simply, robustly and effectively. The concept and main features of the Swiss Protective Structures will be shown. Previous political trends to ground the whole system will be discussed. Today Switzer-land has a concept of long-term maintenance of value for the Protective Structures. The technical instructions for the construction of shelters are regularly revised and if necessary adapted. A few new topics in the technical in-structions will be briefly touched.

Abstracts of Panel Session 12

Synthetic Biology – The next "Dual Use" Risk

Dr. rer. nat. Annika Vergin, Bundeswehr Planning Office, DEU

With methods of synthetic biology (SynBio) simple biological systems can already be generated artificially. The long term goal of SynBio science is to create artificial complex biological systems with new defined properties. In addition to a wide range of profitable applications these technologies also have the potential for abuse und dangers. On the one hand aspects of the deliberate as well as the unintentional sturgeon components are to be considered. On the other hand the dual use opportunity of SynBio technics can lead to misuse of the tech-nologies such as dual use of concern/DURC. The consequences of it besides health and environmental implications can also have important political impact and high economic damage potential. Against this background it is clear that the Bundeswehr has to deal with this issue. Whether SynBio should be considered as an own weapons system or just as an evolution of the already known B and C weapons must be clarified. In the first part the following four main areas of interest are identified: research in, detection of, response to and forensics of SynBio. In the second part it is clarified whether and how current Counter B and C weapon concepts can be transferred to artificial biological systems. In order to assess the potential damage of these new emerging technologies, our stock of Conflict pictures - developed by scenario analysis methods - are examined whether they can be adapted to cover the use of artificial biological systems, or if we will need completely new scenarios in order to fully capture their disruptive potential.
Finally a combination of a risk and a damage analysis is performed for a selected group of scenarios.

Fostering Biosafety and Biosecurity in a Changing World: The Toolbox Approach of the German Partnership Program for Excel-lence in Biological and Health Security

Joachim von Bonin, GIZ, DEU

- Abstract not available -

Critical Infrastructure Protection and CBRN – The Forgotten Dimension?

Martin Neujahr, Bruker Daltonik GmbH, DEU

- Abstract not available -

Critical Infrastructure for Biosafety and Biosecurity in the Context of Surfaces in Laboratory Buildings

Dr. Gabriele Bartel-Lingg, Vitmo + Barit GmbH, DEU

- Abstract not available -

Abstracts of Panel Session 13

Threat Identification and Emergency Response to CBRN Emergencies: TIER

Ahmadreza Djalali, CRIMEDIM, ITA

Introduction: CBRN emergencies impose great human impacts, either physically or psychologically. To develop a comprehensive and integrated strategy for emergency response to CBRN events, an EU funded project was run by a consortium including 8 entities from Italy, France, Spain and Germany (HOME/2012/ISEC/AG/4000004317).
Methods: TIER strategy is built on treat identification and risk assessment of CBRN emergencies, using IT technologies and experts' based calculation. Competency based training courses and two functional exercises are planned to make medical first responders ready to act in response to CBRN emergencies. To evaluate the efficacy of interventions, different methods including performance indicators, economic impact, and TIER strategy efficacy are considered. http://www.tierproject.eu/
Results: Text mining process was developed to investigate a set of online textual document to detect possible threats, and to fill a conceptual model of risk management. Sixteen criteria, categorized in hazard, impact and preparedness groups are formed as TIER risk calculator, in respect of HAZMAT emergencies for medical facilities. A blended method is used for training of health first responders. The training package consists of 20h e-learning and 16 h brick and mortar approaches. An online evaluation system evaluates 100 preparedness indicators and response performance measures to check if TIER strategy is effective on medical system readiness in case of CBRN emergencies.
Discussion: New approaches, action plans, and guidelines are necessary to enhance health system preparedness in respect of CBRN events in EU states. TIER strategy is a combination of IT innovations, along knowledge and skill based interventions to fulfill this goal. TIER proposes multiple criteria to evaluate if the response system performs effectively in responding to CBRN emergencies. The whole TIER strategy could be used by EU states to mange possible risks and enhance readiness of response systems.

Competence-based Training: With Simulation to Success!

Dr. Uwe Katzky, szenaris GmbH, DEU

- Abstract not available -

Training in the Detection of Homemade Explosives (HME)

Dr. Sebastian Wiegmann, CDSEP School, DEU

Examining a hostile laboratory or chemical workplace, the CBRN defence forces face the challenge of determining the purpose for which the place is used. It could be the production of fine chemicals for civil use, but it could also be the illegal manufacturing of HMEs.
This presentation gives an overview of the training provided in the on-site detection of HMEs or their precursor chemicals with the help of a handheld Raman spectrometer at the CBRN Defence, Safety and Environmental Protection School of the Bundeswehr. The training topics are the following: safety procedures for the handling of potential explosives, possibilities and limits of Raman spectroscopy, basic understanding of the techniques and chemicals used for different HME syntheses.
The first impressions of a clandestine laboratory can be overwhelming with there being a variety of chemicals, lots of glassware, documents and items not related to chemical production. The service members should be alarmed when they detect chemicals such as ammonium nitrate, hydrogen peroxide or nitric acid as they could be in a potential HME laboratory. The objective is then to verify if the other chemicals needed for certain HME syntheses or a HME as such are also present. Practical training takes place in a mock clandestine laboratory at the CBRN Defence, Safety and Environmental Protection School so that all procedures can be trained in a realistic setting.

Facilities and Support Provided to Help SIBCRA Teams Train Sampling and Identification Techniques and Procedures in (realistic) B Scenarios

LtCol Dr. Sebastian Weis, CDSEP School, DEU

- Abstract not available -

Abstracts of the Poster Sessions

Identification of Biological Warfare Agents as Contaminants in Spices and Herbs

Myriam Kruse, Sylvia Schirmer, Bärbel Niederwöhrmeier, WIS, DEU

Securing the food chains from primary production to consumer-ready food against major deliberate, accidental or natural contaminations is directly related to the safety of food products. In almost every processed food, including ready-to-eat products, spices and herbs are natural products that can be contaminated with several toxins, which can lead to food-borne intoxications. The characterization of the heterogeneous matrices of spices and herbs and their respective production and supply chains in context with relevant biological hazards and the improvement of the knowledge on biological hazard properties as well as on-site and high throughput diagnostic methods for appropriate detection are main tasks within the EU FP7 project SPICED. Our research within the SPICED project are mainly focused on the toxins Ricin, which is the highly toxic poison from castor beans of Ricinus communis, and the Enterotoxin type B produced by the gram-positive bacteria Staphylococcus aureus (SEB). Their qualitative and quantitative detection in spices and herbs including the development of sample preparation methods were performed. For this purpose different types of spices and herbs were spiked with the toxins, stored at room temperature and analyzed e.g. with immunological based methods. Investigations included also performance of fieldable technologies and methods for the rapid on-site detection. Additionally, decontamination studies for facilities contaminated with toxins were conducted.

On Site Detection of Chemical Contamination on Surfaces via HAPSITE® by Combining SIM with Provisional Swipe Analysis

Captain Gerald Bauer, MSc, BMLVS AT NBC Defence School, AUT

A serious concern regarding CBRN-defence is the manipulation of materiel with contaminated surfaces. In compliance with international regulations, surfaces with less than a certain concentration per cm2 conditional on agent or hazard types are regarded as non-contaminated. Information about level of contamination is highly relevant to decrease or increase of personal safety measures and the redeployment of decontaminated equipment. So far such measurements are mostly performed in fixed laboratories or similar facilities like mobile labs due to sensitivity issues of field approaches.The CBRN Defence School of the Austrian Armed Forces developed a method which provides rapid on site analysis of swabs of contaminated and decontaminated surfaces via GC-MS. The GC-MS used for this analysis is a standard HAPSITE SMART made by INFICON Holding AG. The standard configuration/software portfolio available for HAPSITE SMART does not provide detection limits as required by international regulations. Also HAPSITE SMART was not intended for swab analysis in the first place. To be able to analyse swabs with HAPSITE SMART with sufficient sensitivity a special procedure was developed. A makeshift apparatus was assembled to heat up swabs reproducibly and transfer any contamination to the gas phase. By creating new software methods (selected ion mode) and optimizing them, we managed to decrease the detection limits considerably to meet international regulations. The new method was tested and validated with the most common chemical warfare agents (GA,GB, GD, HD, L und VX).

Direct Mass Spectrometric Laboratory Analyses of Low-Volatile Compounds

Björn Klein, Dr. Vanessa Kunde, WIS, DEU

A first approach to unknown samples, potentially contaminated with toxic substances or explosives, usually employs screening techniques for the estimation of further analytical steps. Within the following laboratory procedures, depending on the matrix, possibly time consuming sample preparation of the complex mixtures is essential to gather the required information e.g. on the detailed composition or forensic aspects. These time consuming effect might be avoided by the use of direct mass spectrometric ionization techniques such as direct analysis in real time® (DART) and desorption electrospray ionization (DESI) combined to tandem mass spectrometry. The advantage of these techniques is the lack of sample preparation combined with data rich information gained by ion trap mass spectrometry. Both ionization techniques allow an ionization of low-volatile organic compounds making these substances amenable for direct mass spectrometric analyses. The benefit of a subsequent mass spectrometric analysis by ion trap mass spectrometry is the possibility of fragmentation reactions to gain structural information of the molecule and thus a further confirmation. In the field of explosives investigations using DART®/MS showed a positive and highly selective detection of e.g. 2,4,6-trinitrotoluene and ammonia nitrate, both substances with very low vapor pressures, in cotton swabs within very short times [1]. In a next step the investigations are extended to simulating substances representing chemical warfare agents with similar low volatilities to estimate the further potential of these technique.

Vapour Pressure Determination of Hazardous Chemical Agents by Simultaneous Thermal Analysis

Dr. Arne Ficks, Dr. Martin Jung, WIS, DEU

The profound knowledge of vapor pressure data is crucially important for CBRN(E) materials, as it defines the volatility and persistency of hazardous substances. For example, the vapor pressure is an important parameter to predict vapor concentration dynamics following dissemination of chemical warfare agents, or to establish conditions for vacuum based decontamination technologies. Tabulated data for less common substances or mixtures is frequently unavailable, and vapor pressure estimation by molecular modeling often gives unreliable results. Thus, the direct measurement of vapor pressures is indispensable for obtaining accurate data. Different methodologies for measuring vapor pressures of CBRN(E) materials are described utilizing a conventional simultaneous thermal analysis (STA) instrument. STA thereby refers to the simultaneous implementation of thermal gravimetric analysis (TGA) and differential scanning calorimetry (DSC). The instrument is equipped with an appropriate vacuum system that permits the controlled application of pressures. Furthermore, liquid nitrogen cooling of the furnace extends the accessible temperature range. Knudsen effusion, isothermal TGA, and isobaric DSC-measurements operate at different pressure ranges and were car-

Abstracts of the Poster Sessions

ried out with slight modifications in the experimental setup. Therefore, measurements for low volatiles (e.g. explosives, thickened warfare agents) as well as volatile compounds become available over a wide temperature range using the same instrument.

A High Performance for Life Support in Mission: Potable Water

Jeldrik Moritz*; Sven Fiebing and Elke Reifer, WIS, DEU

Main Mission of the Branch "Water Treatment" Analysis phase:
•R&T in the field of CBRN contaminated waters ◊ Expansion of competence ◊ Identification of capability gaps ◊ Proposals for technical solutions
•Cooperation with universities and other research facilities Production phase
•Formulation of the statement of work for new systems
•Qualification of new systems
•Government quality control In-service phase
•Scientific and technical support International cooperation and standardization

Microemulsions as Adaptable Reaction Media for Decon Agents

Dr. Martin Jung, WIS, DEU

The design of an universal decont agent for various chemicals including chemical warfare agents and toxic industrial chemicals is a difficult task, due to different solubilities and reaction mechanisms of the involved chemicals. Microemulsions containing a polar water and unpolar oil phase are able to solubilize chemical warfare agents with different grades of lipophily. They also provide a complex system with different phases and interfaces, which could be used for the decontamination of smooth and porous surfaces. In this project the internal solubilization and extraction processes of chemical warfare agents are investigated by a using an environmental benign microemulsion based on a fatty acid methyl ester (FAME) as unpolar phase and oxidative or catalytic substances for the hydrolysis of nerve agents.

Analytical Estimation of Shelf Life for Reactive Skin Decontamination Lotion (RDSL®)

R.Bogan, B. Klaubert, T. Zimmermann, Bundeswehr Central Medical Service, DEU

German Armed Forces stockpile Reactive Skin Decontamination Lotion (RSDL®) [1,2] over a long period and use it in all climatic zones. Therefore stability is an essential matter of concern. In this work we describe the estimation of shelf life for RSDL®. This was accomplished by analysis of the active ingredient (AI) 2,3-butandione monoxime (= diacetylmonooxime, DAM), the putative degradation product dimethylglyoxime (DMG) and of unknown degradation products. Calculations were done according Arrhenius equation [3]. Based on the temperature dependent rate constants, time span was calculated until defined threshold values for DAM, DMG and unknown degradation products subject to specification and valid regulations [4] were exceeded. The quality of RSDL® is warranted for a period of 4 years. According to our calculations in that timespan the content of the AI as one crucial parameter for quality will not fall under an acceptable limit if RSDL® is stored correctly. For specified or unknown degradation products an obvious limitation of shelf life could be shown even if stored at the specified conditions. Our data show that monitoring of storage and a short retest-period is recommended for RSDL®.

Detecting Chemical Warfare Agents using the µRAID™

Franziska Lange, Wolfgang Heller, Thomas Elßner, Bruker Daltonik GmbH, DEU

The personal protection of military personnel against chemical warfare agents (CWAs) and toxic industrial chemicals (TICs) is essential and can only be achieved using reliable, rapid and sensitive detection equipment. The micro Rapid Alarm and Identification Device (µRAID) is a personal detector using Ion Mobility Spectrometry (IMS) that has been designed to detect low concentrations (ppb range) of CWAs and TICs rapidly. It provides direct identification of an agent and quantifies the concentration range. The µRAID is an extremely effective personal chemical detector and can provide essential threat detection in the field. Detection limits are in the ppb level and response times are in the region of a few seconds. Ease of use coupled with a low maintenance requirement make the µRAID highly suitable for all users in combating the threat from CWAs and TICs. The poster presentation shows detailed information on alarm limits compared to relevant toxicological properties and response times of detectable CWAs. Results of laboratory and field tests are given.

Catalytic Oxidation and Pressure Swing Adsorption

Friedrich Hesse, Beate Trier, WIS, DEU

In service CBRN-Air-Filtration Units (AFU) use filters based on activated carbon to remove toxic vapours. As the capacity of the carbon bed is limited, a filter change is necessary after saturation with toxic vapours. Furthermore the involvement of German armed forces in world-wide operations with different climate zones, considering possible CBRN agent or toxic industrial chemicals (TIC) attacks require specific demands on CBRN collective protection, specifically the logistics regarding change and storage of carbon filter elements. Processes that work regenerable are highly desired to cope with these conditions. Catalytic Oxidation (CATOX) and Pressure Swing Adsorption (PSA) are two promising methods for comprehensive and sustainable air purification that were investigated at WIS. The CATOX-Method based on a two-step process. Firstly the contaminated air will be heated and lead into an oxidation catalyst. CBRN agents and TICs will be oxidised using the oxygen from the ambient air. The less toxic remains need to be removed during the second step using special basic functionalised filters (post treatment filter).PSA based on a pressure drop between adsorption and desorption. At high pressure level bed one will adsorb toxic vapours. Bed two will release its toxic content at atmospheric pressure. Both beds alternate after several seconds. Tests done at the WIS research labs demonstrate that Catalytic

Abstracts of the Poster Sessions

Oxidation (CATOX) and Pressure Swing Adsorption (PSA) are processes that could replace carbon based AFUs for specific Collective Protection applications.

Solutions for the Next Generation Permeable CBRN Protective Garments

Karola Hagner, Friedrich Hesse, David Liebscher, WIS, DEU

The development of protective equipment is an on-going process. Achievements in the development of technical textiles allow the realization of additional protective capabilities. Weaknesses can be addressed, solutions can be presented and a more sophisticated protection can be introduced. Warfare agent aerosols are a known threat for permeable CBRN protective garments; depending on their particle size, they can pass the protective layer unhindered. This threat requires further measures to maintain the soldier's protection, e.g. by doffing an additional impermeable layer. The permeability of the protective garment is essential for the missions though, as desired wear times are up to 24 h in warm/hot environments. This means a minimum of insulation and a maximum of the ability to transport heat and moisture away from the body through the protective material.Several years of research at WIS addressed the issue of permeable aerosol protection within the mentioned boundaries. This work led to the introduction of the CBRN suit for the Infantrymen of the Future (IdZ) which sets a benchmark for the next generation of permeable CBRN protective garments. The air-permeable material combination of the suit contains a particle separation layer in addition to the usual activated carbon layer. For the optimal achievable protection factor, both material and suit design must be chosen carefully. A system test in collaboration with the Spiez Laboratories (Switzerland) verified the suit design. The test confirmed an excellent protection due to the selected material combination and the effectiveness of the suit design (seals, closures, interfaces).

Zodiac with Mask 2000 and COTS Boots

Friedrich Hesse, Beate Trier, Karola Hagner, WIS, DEU

The end of service life of the established ZODIAC comes closer after decades of use. Design changes were necessary to keep it interoperable to other equipment (e.g. the respirator M 2000, the new Self Contained Breathing Apparatus (SCBA) and new CBRN Boots). Conducted wear trials confirmed the convenience of the amendments. The obsolete respirator M65 has a very narrow field of vision. Its wear comfort does not fulfill modern ergonomic requirements and spare parts are no longer suppliable. A new face seal with an elastic harness was developed that keeps the suit tight for all sizes of Mask 2000 and face shapes. Elastic rubber socks can be attached to the newly designed interfaces to the legs. The rubber socks allow the wear of commercially available CBRN boots in the size range (EU) of 35 to 50. This will cover most of the male and female feet sizes. The new Zodiac has a bright sandy colour instead of the dark olive of its predecessor. This will reflect sun radiation better. With the new design features the Zodiac will provide an enhanced capability to the soldiers of the CBRN Defence Force.

Oxidative Decomposition Behaviors of Liquid Chemical Warfare Agents on Substrates by Hydrogen Peroxide Vapor and Additional Ammonia Gas

Sam Gon Ryu*, Hyun Bae Park; Agency for Defence Development, KOR

Traditional caustic aqueous alkaline decontaminants for the chemical and biological warfare agents could not apply to the surfaces of sensitive electronic equipments and platform interiors. Thereafter some alternative new technologies have been investigated intensively for the decades. Recently, Hydrogen peroxide vapor technology was known for the promising technique for decontamination of the surfaces of sensitive electronic equipments and platform interiors contaminated with chemical and biological warfare agents. And, it was proven that the technology was very efficacious for the decontamination of the almost biological warfare agents such as bacteria, virus and so on. In the case of chemical warfare agents, a research group reported that the surfaces of glass fiber filter disk contaminated with HD, GD and VX were decontaminated by hydrogen peroxide vapor or with additional small amount of ammonia gas. But there are still some questions for the product distributions of VX decomposition and for decomposition behaviors of liquid chemical warfare agents on various substrates. We have conducted a series of decontamination experiments of nerve agent on various substrates by using hydrogen peroxide vapor and ammonia gas. The substrates were extracted with proper solvents after the decontamination processes and the extracted decontamination products and remaining agents were analyzed by GC/MS, NMR. From the test results, an additional VX decomposition product was identified compare to the former results by NMR analysis only. We could conclude the hydrogen peroxide vapor decontamination process is a promising method for decontamination of sensitive electronic equipments and platform interiors.

The World of Research Working on CBRNe Problems: Laser Remote Sensing Systems for CWA, TICs and TIMs Detection and Identification

P. Gaudio et al., University of Rome "Tor Vergata", ITA

The long-term experience of Quantum Electronics and Plasma Physics Research group in laser techniques like LIDAR (Light Detection and Ranging) and DIAL (Differential Absorption of Light) is evident by improve of four experimental demonstrator (TAEMS, SAI, COLA and TELEMACO) developed by the group itself. SAI and COLA are two mobile LIDAR systems for detection of pollutants in atmosphere (with detection we mean the capability to see a suspicious presence of a substances in atmosphere without information about the composition of the substances). TAEMS is a mobile DIAL systems able to measure some minor constituents in atmosphere and TELEMACO is a laboratory demonstrator that is improving for identification of chemical agents. The ability to rapidly detect, identify and monitor chemical warfare agents (CWAs) is imperative for the efficient use of both military and civilian defense resources. This knowledge allows the severity and extent of a hazard to be assessed so that areas that are clean or contaminated can be identified. (Sferopoulos R. , 2009)

Abstracts of the Poster Sessions

Gap Tool for Evaluation (G.A.T.E.) of CBRNe Drills, Table Top Exercices and Full Scale Exercices

D. Di Giovanni, et al. University of Rome "Tor Vergata", ITA

A tool for gap analysis ("GATE", Gap Analysis for TTX Evaluation) was developed to provide a complete, systematic and objective evaluation of several types of exercises organized in CBRNe fields but applicable to different scientific, economic, legal, medical, industrial, political and social activities. In this work the authors will present the application of GATE to a Table Top Exercise (TTX). TTX consist in discussion-based emergency management exercises, organized in a simulated emergency scenario, involving groups of players who are subjected to a set of solicitations ('injects'), in order to evaluate their emergency response abilities. This kind of exercise aim is at identifying strengths and shortfalls and to identify and propose potential and promising changes in the approach to a particular situation. This tool, "GATE", support the management and the analysis of TTX's outputs, and it allows to identify the 'gap' in term o preparedness and specific areas and actions to improve. The results coming from "GATE" will be discussed and analyzed by the authors.

A Novel Approach to set up a Quasi Real-Time Biological Agents Detection System

M. Carestia et al., University of Rome "Tor Vergata", ITA

Bio-security and biosafety are two key concepts in the CBRNe scenarios. Reduce the risks related to the use of biological agents in civil or military or terroristic actions is a must for the expert. The detection and identification of biological agents is a discipline studied trough the years but the challenge today is develop a quasi-real time stand-off detection system able to detect a potential bio contamination at short-middle range. One of the most promising approach to achieve this goal is the use optical apparatus. Biological samples can be analyzed by means of several optical techniques, covering a broad region of the electromagnetic spectrum. Strong evidence proved that the informative content of fluorescence spectra could provide good preliminary discrimination among those agents and it can also be obtained through stand-off measurements. Such a system necessitates a database and a mathematical method for the discrimination of the spectral signatures.

The Importance of a High Level Academic Approach to the CBRNe Problem to improve the Capabilities of Prevention, Management and Evaluation of Consequences

L. Palombi et al., University of Rome "Tor Vergata", ITA

Nowadays when we talk about security it is essential talk about the CBRNe events because the global crisis related to the reduction of energy fossil resources, the reduction of potable water resources and the war for the control of energy sources are part of the causes which can lead to an intentional CBRNe (Chemical, Biological, Radiological, Nuclear, and explosive) event. These kinds of events could also be the consequence of an unintentional release of substances (i.e., an accident of a truck containing a Toxic Industrial Chemical), or of natural events like a tsunami or an earthquake. Thus the high percentage of risk connected to their occurrence is clear. The evolution and proliferation of safety and security issues in the National and International framework made it necessary to respond in a competent and professional way to any crisis scenarios resulting from non-conventional events (i.e., CBRNe events). In all industrialized countries there are Institutions and Facilities with highly specialized groups facing up to emergencies (first responders), but only a few persons are sufficiently trained to manage these incidents. The complexity of these events requires experts and DUAL USE innovative technologies. (Malizia et all, 2014).
The authors will show how a University like Rome Tor Vergata, working in CBRNe, starting from academic courses is able to create a network able to cooperate in research, industrial developments, didactic and training in an innovative way in order to improve the capabilities of prevention, management and evaluation of consequences.

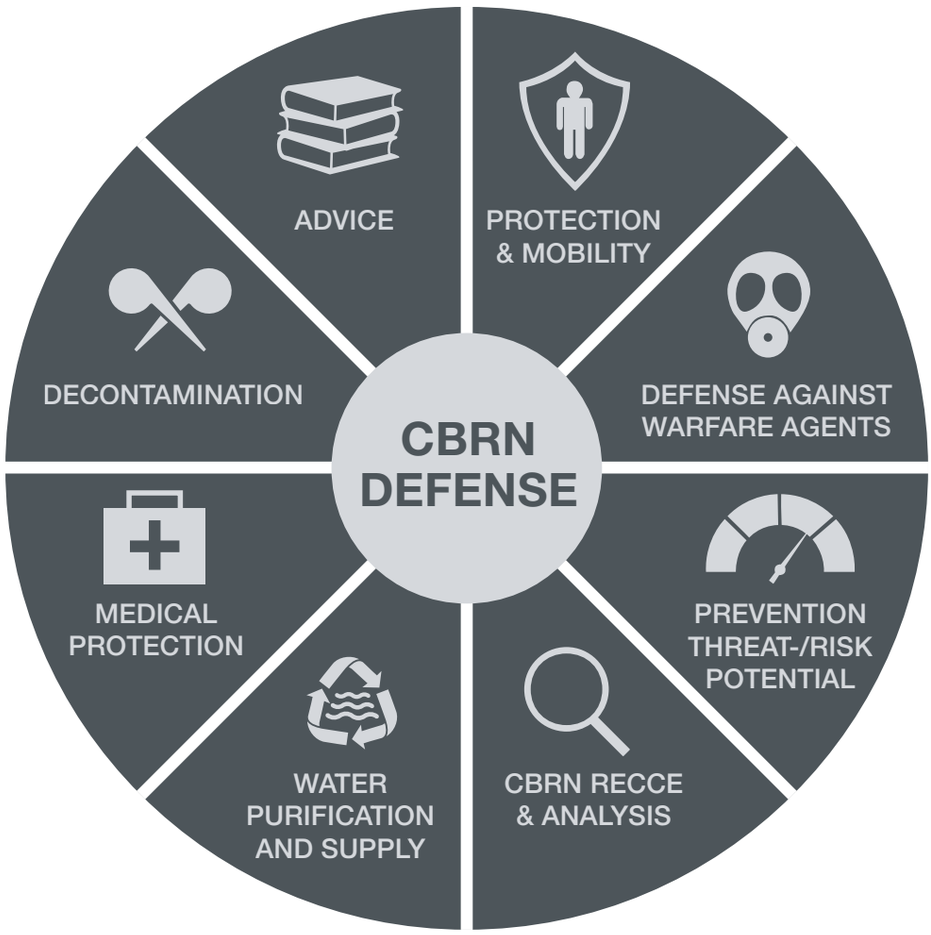
Study on the Adsorption Behaviors of Cyanogen Chloride and Water Vapor by Various Molecular-Organic Frameworks

Hae Wan Lee*, Sam Gon Ryu, Agency for Defence Development, KOR

The activated carbons which are used for military masks and filters have the excellent protection capabilities against the traditional chemical warfare agents (CWAs) especially nerve agents. But, the shortcoming of pure activated carbons is that chemicals with weak intermolecular forces typically have weak physical interactions with the carbon surfaces and therefore require chemical reactivity for removal. So, activated carbon has been modified with a variety of compounds, commonly known as impregnants, to react with higher-volatility compounds (weak interactions with the carbon surfaces). Nevertheless, the activated carbons, such as ASZM-TEDA, are not sufficient for removal of various toxic industrial compounds (TICs). It is apparent that multiple threats of CWAs and TICs exits in the world today. The possibility of both CWAs and TICs being released indicates the need for highly efficient materials capable of protection both military and civilian personnel. Recently, Metal-Organic Frameworks (MOFs) have been examined extensively for their removal of toxic chemicals including CWAs and TICs by some research groups. We conducted a series of adsorption experiments of cyanogen chloride (CK) and water vapor on various MOFs using a microbreakthrough test apparatus and a surface area and porosity analyzer, respectively. The breakthrough curves of CK on dry and humid environments and water adsorption isotherms of MOFs were compared to that of the ASZM-TEDA. From the literature survey, it was found that some MOFs adsorb dry cyanogen chloride in the same order of magnitude as activated carbon, but under humid conditions, none of the MOFs adsorb an applicable quantity of CK resembling the behavior of ASZM-TEDA. In this presentation, we are going to report some new MOF materials could adsorb significant amount of CK compared to the activated carbon in both dry and humid conditions.

CAPABILITY DRIVEN COLLABORATION

EXPLOITING SYNERGIES



KMW
KRAUSS-MAFFEI WEGMANN

BRUKER

FUTURETECH
Kärcher Group

tms
technisch-mathematische studiengesellschaft mbh

TOGETHER WE COVER ALL CBRN DEFENSE CAPABILITIES.
COME AND VISIT US AT BOOTH A 19