# Table of Contents

## Supply Chain and Critical Infrastructure Protection

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Concept for Security in Mass Transportation</td>
<td>1</td>
</tr>
<tr>
<td>Jan-Peter Nicklas, Nadine Schlüter, and Petra Winzer</td>
<td></td>
</tr>
<tr>
<td>Improved Emergency Management by a Loosely Coupled Logistic System</td>
<td>5</td>
</tr>
<tr>
<td>Dirk Thorleuchter, Joachim Schulze, and Dirk Van den Poel</td>
<td></td>
</tr>
<tr>
<td>Monitoring Security and Safety of Assets in Supply Chains</td>
<td>9</td>
</tr>
<tr>
<td>Ganna Monakova, Cristina Severin, Achim D. Brucker, Ulrich Flegel,</td>
<td></td>
</tr>
<tr>
<td>Andreas Schaad</td>
<td></td>
</tr>
<tr>
<td>Standards for the Protection of Transport Infrastructures</td>
<td>21</td>
</tr>
<tr>
<td>Norbert Siegel and Simone Wurster</td>
<td></td>
</tr>
<tr>
<td>Security in Supply Chains in the Scope of Surface Transport of Goods</td>
<td>25</td>
</tr>
<tr>
<td>by Secure Information Patterns on the Freight – Trans4Goods</td>
<td></td>
</tr>
<tr>
<td>Hagen Borstell, Liu Cao, Klaus Richter, and Christian Schäfer</td>
<td></td>
</tr>
<tr>
<td>A Process for Secure Supply Chain Evaluation</td>
<td>29</td>
</tr>
<tr>
<td>Maria Akbulatova and Matthias Winkler</td>
<td></td>
</tr>
</tbody>
</table>

## Security Situational Awareness

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsupervised Techniques for Audio Summarization in Acoustic</td>
<td>33</td>
</tr>
<tr>
<td>David Damm, Dirk von Zeddelmann, and Frank Kurth</td>
<td></td>
</tr>
<tr>
<td>Integrating Persistent Surveillance Systems into ISR Architecture</td>
<td>37</td>
</tr>
<tr>
<td>Çağatay Soyer, Florian Segor, Barbara Essendorfer, and Wilmuth Müller</td>
<td></td>
</tr>
<tr>
<td>Collaborative Mapping for Pedestrian Navigation in Security</td>
<td>49</td>
</tr>
<tr>
<td>Maria Garcia Puyol, Martin Frassl, and Patrick Robertson</td>
<td></td>
</tr>
<tr>
<td>Image-Based Situation Assessment in Public Space</td>
<td>61</td>
</tr>
<tr>
<td>Hagen Borstell, Bernd Gebert, Liu Cao, Cathrin Plate, and Klaus Richter</td>
<td></td>
</tr>
<tr>
<td>DSO Cognitive Architecture in Mobile Surveillance</td>
<td>65</td>
</tr>
<tr>
<td>Gee Wah Ng, Yuan Sin Tan, Xuhong Xiao, and Rui Zhong Chan</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Using NMF for Analyzing War Logs</td>
<td>73</td>
</tr>
<tr>
<td><em>Dirk Thorleuchter and Dirk Van den Poel</em></td>
<td></td>
</tr>
<tr>
<td>Safety and Security, Dealing with Risks</td>
<td>77</td>
</tr>
<tr>
<td><em>Kurt Osterloh and Norma Wrobel</em></td>
<td></td>
</tr>
<tr>
<td>SECURITY2People – Functionality of the Final Demonstrator</td>
<td>81</td>
</tr>
<tr>
<td><em>Wolfgang Raskob, Ellen Gers, Peter Meyer zu Drewer, Stefan Möllmann, Lars Tufte, and Frank Ulmer</em></td>
<td></td>
</tr>
<tr>
<td>Moving Advanced Safety to the Cloud: Some Outcomes of SafeCity Project</td>
<td>85</td>
</tr>
<tr>
<td><em>Roberto Gimenez, Diego Fuentes, Daniel Oancea, Diego Gimenez, Judith Pertejo, Tassos Dimitriou, Sakis Giannetsos, Sofia Tsekeridou, Mario Carabaño, and Sofia Virgos</em></td>
<td></td>
</tr>
<tr>
<td>Coordination Challenges for Global Disease Outbreaks Security</td>
<td>89</td>
</tr>
<tr>
<td><em>Fadl Bdeir, Liaquat Hossain, Jafar Hamra, and John Crawford</em></td>
<td></td>
</tr>
<tr>
<td>Intelligent Multi Sensor Fusion System for Advanced Situation</td>
<td>93</td>
</tr>
<tr>
<td><em>Georg Hummel, Martin Russ, Peter Stütz, John Soldatos, Lorenzo Rossi, Thomas Knape, Ákos Utasi, Levente Kovács, Tamás Szirányi, Charalampos Doulaaverakis, and Ioannis Kompatsiaris</em></td>
<td></td>
</tr>
<tr>
<td>Crisis Management</td>
<td></td>
</tr>
<tr>
<td>Collaborative Methodology for Crisis Management Knowledge Integration and Visualization</td>
<td>105</td>
</tr>
<tr>
<td><em>Ana Lauge, Josune Hernantes, Leire Labaka, and Jose M. Sarriegi</em></td>
<td></td>
</tr>
<tr>
<td>Prioritisation of Simulation Models for Ensuring Safety and Security in Underground Stations on the Basis of a Detailed Requirements Analysis</td>
<td>117</td>
</tr>
<tr>
<td><em>Steffen Schneider, Therese Friberg, Tobias Becker, and Rainer Koch</em></td>
<td></td>
</tr>
<tr>
<td>Location and Routing Models for Emergency Response Plans with Priorities</td>
<td>129</td>
</tr>
<tr>
<td><em>Ali Oran, Kiat Chuan Tan, Boon Hooi Ooi, Melvyn Sim, and Patrick Jaillet</em></td>
<td></td>
</tr>
<tr>
<td>Security for Critical Infrastructure And Urban Areas</td>
<td></td>
</tr>
<tr>
<td>New Building Concepts Protecting against Aircraft Impact</td>
<td>141</td>
</tr>
<tr>
<td><em>Alexander Stolz, Werner Riedel, Markus Noeldgen, and Andreas Laubach</em></td>
<td></td>
</tr>
</tbody>
</table>
Safety and Security of Urban Areas through Innovative Architectural and Structural Concepts .......................... 153
Norbert Gebbeken, Torsten Döge, and Martin Larcher

William Hynes and Stephen M. Purcell

Vulnerability Identification and Resilience Enhancements of Urban Environments ........................................... 176
Kai Fischer, Werner Riedel, Ivo Häring, Albert Nieuwenhuijs, Stephen Crabbe, Steen S. Trojaborg, William Hynes, and Ingo Müllers

Determining the Effectiveness of Safety Measures for Self-rescue in the Built Environment .................................. 180
Inge Trijssenaar-Buhre, Sandra Wijnant-Timmerman, Remco Witberg, and Gerard Veldhuis

Enhancing Robustness of Tubbing Tunnels in Case of Extreme Loads . . . 184
Christoph Niklasch and Peter-Michael Mayer

Security Evaluation of Street Bridges for Fire Exposure: Current Findings of the Project SKRIBT\textsuperscript{Plus} .................. 188
Ulrich Bergerhausen and Sven Priestaff

Sensor Technology

Influence of Orientation Fields of Fingerprints to Matching Performance .......................................................... 192
Sebastian Bodó and Thorsten M. Buzug

Jamming and Spoofing in GPS/GNSS Based Applications and Services – Threats and Countermeasures ......................... 196
Manuel Cuntz, Andriy Konovaltsev, Achim Dreher, and Michael Meurer

Millimeter-Wave Monolithic Integrated Circuits and Modules for Safety and Security Applications ................................ 200
Michael Schlechtweg, Axel Tessmann, Axel Hülsmann, Ingmar Kallfass, Arnulf Leuther, Rolf Aidam, Christian Zech, Ulrich J. Lewark, Hermann Massler, Markus Riessle, Martin Zink, Josef Rosenzweig, and Oliver Ambacher

Georg Hummel, Levente Kovács, Peter Stütz, and Tamás Szirányi
Unmanned Inspection of Large Industrial Environments: Insights into the Research Project RoboGas

Thomas Barz, Gero Bonow, Jens Hegenberg, Karim Habib, Liubov Cramer, Jochen Welle, Dirk Schulz, Andreas Kroll, and Ludger Schmidt

The LabDisk – A Fully Automated Centrifugal Lab-on-a-Chip System for the Detection of Biological Threats

Thomas van Oordt, Oliver Strohmeier, Daniel Mark, Roland Zengerle, Michael Eberhard, Josef Drexler, Pranav Patel, Manfred Weidmann, Andrea Zgaga-Griesz, Wolfgang G. Bessler, and Felix von Stetten

Susceptibility of Two Deployable C4I Systems to HPM – Improvement by Hardening

Christian Adamü, Christian Braun, Peter Clemens, Michael Jöster, Michael Suhrke, and Hans-Joachim Taenzer

Detector Array with Gas Chromatograph for On-Site Analyses

Hendrik Fischer, Jörn Frank, Bert Ungethüm, Matthias Drobig, Andreas Walte, and Gerhard Matz

Social, Psychological and Political Aspects

User-Centric Protection and Privacy in Smart Surveillance Systems

Hauke Vagts, Erik Krempel, and Jürgen Beyrer

Methodology for Analysing Unstructured Usability Evaluation Data

Therese Friberg, Christina Schäfer, and Rainer Koch


Jose M. Sarriegi, Eliot Rich, Ana Laugé, Leire Labaka, and Josune Hernantes

How Is Positive-Sum Privacy Feasible?

Christoph Bier, Pascal Birnstill, Erik Krempel, Hauke Vagts, and Jürgen Beyrer

Concept for Scenario-Development for Foresight Security Scenarios: Mapping Research to a Comprehensive Approach to Exogenous EU Roles

Thomas Benesch, Johannes Göllner, Johann Höchtl, Andreas Peer, and Walter Seböck

Establishment of the European Reference Network for Critical Infrastructure Protection (ERNCIP)

Naouma Kourti, Ferenc Borsos, and Peter Gattinesi
# Table of Contents

## Cyber Defense and Information Security

Designing a Cyber Attack Information System for National Situational Awareness .......................... 277
   *Florian Skopik, Zhendong Ma, Paul Smith, and Thomas Bleier*

Towards Sound Forensic Acquisition of Volatile Data ........................................ 289
   *Sebastian Eschweiler and Elmar Gerhards-Padilla*

The New Counter-Espionage Concept at Deutsche Telekom ........................................... 299
   *Thomas Königshofen*

   *Björn-C. Bösch*

Modularizing Cyber Defense Situational Awareness – Technical Integration before Human Understanding .............................................................. 307
   *Gabriel Klein, Heiko Günther, and Susan Träber*

---

## Maritime and Border Security

Underwater Inspection Using the AUV SeaCat .................................................. 311
   *Joerg Kalwa*

Probing the Seafloor in Order to Find Dumped Ammunition and Other Hazardous Materials .................................................. 315
   *Wolfgang Jans, Matthias Reuter, Stefan Behringer, and Sabine Bohlmann*

An Experiment for Detection of Underwater Intruders with Different Kinds of Sensors .................................................. 327
   *Dietmar Stiller, Stephan Benen, and Paula Berkel*

Electro-optical Surveillance in Maritime Environments .......................................... 334
   *Joerg Kushauer, Nicolai Kuenzner, Stefan Katzenbeisser, and Klaus Wingender*

PITAS: Pirate and Terrorist Aversion System .................................................. 337
   *Boris Culik, Thomas Lehmann, and Christoph Zebermann*

Small-Target Radar Detection and Tracking within the PITAS Hard- and Software Environment .................................................. 347
   *Viet Duc Nguyen*

Open and Interoperable Maritime Surveillance Framework Set to Improve Sea-Borders Control .................................................. 359
   *Cengiz Erbas, Fulya Tuncer Cetin, Burcu Yılmaz, Erdem Akagunduz, Yildiray Kabak, and Aykut Bulca*
Threat and Potential of High Power Electromagnetics Technology (HPEM) .......................................................... 363
  Robert H. Stark, Franke Sonnemann, Jürgen Urban, and
  Dieter Weixelbaum

Detection of Hazardous Materials

Designer Drugs and Trace Explosives Detection with the Help of Very Recent Advancements in Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) .................................................. 366
  Philipp Sulzer, Simone Jürschik, Bishu Agarwal,
  Thomas Kassebacher, Eugen Hartungen, Achim Edtbauer,
  Fredrik Petersson, Johannes Warmer, Gerhard Holl, Dave Perry,
  Christopher A. Mayhew, and Tilmann D. Märk

On the Detection and Localization of Radioactive Sources in Public Facilities .................................................. 376
  Monika Wieneke, Wolfgang Koch, Hermann Friedrich, and
  Sebastian Chmel

Imaging Standoff Detection of Explosives by Diffuse Reflectance IR
Laser Spectroscopy .......................................................... 388
  Frank Fuchs, Jan Philip Jarvis, Stefan Hugger, Michel Kinzer,
  Quankui Yang, Wolfgang Bronner, Rachid Driad, and Rolf Aidam

Development of an Experimental Multi-robot CBRNE Reconnaissance Demonstrator: System Description and Technical Validation ............. 400
  Frank E. Schneider, Dennis Wildermuth, Markus Ducke, and
  Bernd Brüggemann

Research for the Detection of Explosives at CEA: Towards Operational Use ................................................................ 412
  Didier Poullain, Pierre Montmeat, Lionel Hairault, Thierry Maillon,
  Rodrigue Rousier, Anthony Larue, Aurélie Martin,
  Guillaume Lebrun, François Simoens, Jérôme Meilhan,
  Claude Fermon, Myriam Pannetier-Lecoeur, Joachim Tabary,
  Caroline Paulus, Anne-Sophie Lallemand, Gilles Ferrand,
  Guillaume Sannie, Bertrand Perot, and Cédric Carasco

A Biophotonic Sensor for the Specific Detection of DMMP Vapors at the ppb Level .................................................. 428
  Karine Bonnot, Benny Siegert, Nelly Piazzon, Denis Spitzer,
  Jose Sansano, Manuel Rodrigo, Francisco Cuesta-Soto,
  Antonio Varriale, Sabato d'Auria, Nuria Sanchez,
  Francisco Lopez-Royo, and Jorge J. Sanchez
Light-Weight Optical Sensor for Standoff Detection of Fluorescent Biosensors ........................................ 432
  Martin Wehner, Ulrich Thombsen, Nicole Raven, Christoph Kühn, and Stefan Schillberg

Detecting and Quantifying Toxic Industrial Compounds (TICs) with Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) ................ 438
  Thomas Kassebacher, Philipp Sulzer, Simone Jürschik, Bishu Agarwal, Fredrik Petersson, Eugen Hartungen, Hans Seehauser, and Tilmann D. Märk

Food Chain Security

Vulnerability Assessment in the Food Chain – A Way to Do It ............. 448
  Anja Buschulte, Britta Müller-Wahl, Annemarie Käsbohrer, and Bernd Appel

Improving the Security of Food Chains against Natural, Accidental and Deliberate Contaminations ...................................................... 454
  Bernd Appel, Anneluise Mader, Juliane Braeunig, Heidi Wichmann-Schauer, and Annemarie Käsbohrer

An Open-Source Community Resource for Creating, Collecting, Sharing and Applying Predictive Microbial Models (PMM-Lab) .............. 462
  Armin A. Weiser, Matthias Filter, Alexander Falenski, Jörgen Brandt, Annemarie Käsbohrer, and Bernd Appel

Model for the Assessment of Microbiological Risks Originating from Intentional Contaminations in Feed Chains ................................. 466
  Annemarie Käsbohrer, Matthias Filter, Angela Körner, Anneluise Mader, Jürgen Zentek, and Bernd Appel

Exploitation of Commercial B2B Data for Risk Assessment Tasks in Foodborne Crisis Events ...................................................... 471
  Matthias Filter, C. Thoens, Annemarie Käsbohrer, and Bernd Appel

Aviation Security

Micro Aerial Vehicles in Disaster Assessment Operations – The Example of Cyprus 2011 ................................................................. 475
  Martin Frassl, Michael Lichtenstern, Michael Angermann, and Giulio Gullotta

Lighter-Than-Air UAVs for Surveillance and Environmental Monitoring ................................................................. 480
  Michael Gerke, Ulrich Borgolte, Ivan Masár, František Jelenciak, Pavol Bahnik, and Naef Al-Rashedi
Protection of Spaceborne Systems ................................. 484
   Jan Eilers and Thomas Neff

CHICAGO – An Airborne Observation System for Security
Applications ............................................................. 488
   Hartmut Runge, Josef Kallo, Philipp Rathke, Thomas Stephan,
   Franz Kurz, Dominik Rosenbaum, and Oliver Meynberg

Analysis of Future Threats to Civil Aviation within the Project
COPRA (Comprehensive European Approach to the Protection of Civil
Aviation) ............................................................. 493
   Julia Ziehm, Frank K.F. Radtke, and Tobias Leismann

Ergonomic Aspects

Cross-Organizational Preplanning in Emergency Management with
IT-Supported Smart Checklists ......................................... 497
   Gertraud Peinel, Thomas Rose, and Alexander Wollert

Resilience: Approach, Definition and Building Policies .................. 509
   Leire Labaka, Josune Hernantes, Ana Laugé, and Jose M. Sarriegi

User-Centered Elaboration of an Integrated Crisis Management
Modeling and Simulation Solution ..................................... 513
   Johannes Sautter, Wolf Engelbach, and Sandra Frings

Towards a Real-Time Situational Awareness System for Surveillance
Applications in Unconstrained Environments .......................... 517
   David Münch, Stefan Becker, Wolfgang Hübner, and Michael Arens

ISPS Port Risk Assessment: Is the True Value in the Numbers or in the
Process? ................................................................. 522
   Gina Linkmann and Eric Holder

Securing Area with Robots under BML Control ........................ 526
   Thomas Remmersmann and Ulrich Schade

Author Index ............................................................... 531