

Workshop on Innovation in Border Control

13-14 August
Uppsala, Sweden
SCHEDULE

Tuesday 13 August

Time	
9.00 – 9.15 Room: Aula 6159	Welcome and Introduction to WIBC 2013 Programme Chairs
9.15-10.10 Room: Aula 6159	KEYNOTE TALK: Joseph Cannataci (University of Malta) <i>“Issues in evidence-based policy making in surveillance: some reflections from the SMART and RESPECT projects”</i> The policy makers in Brussels and in Strasbourg are once again examining the pros and cons of large new IT-based systems aimed at improving the security of Europe's borders through increased surveillance. Against this background, Professor Cannataci's keynote speech will first examine the distinctions between surveillance and smart surveillance and then outline the significance of the advent of MIMSI or Massively Integrated Multiple Sensor Installations. It will also raise the question 'To what extent are the new proposals for solutions effective and proportional to the threat?'. The speaker will examine how the methodology of EU FP7 projects like SMART and RESPECT, which include at least one Work Package devoted to border control, attempts to provide a more solid evidence base for decision-making by policy makers. He will reflect on the growing reliance on integration of systems as the greatest single factor which may affect the balance between security and safety on the one hand and privacy and data protection on the other hand.
10.10 -10.30	Coffee break
10.30 -11.00 Room: 6140	INVITED TALK: Ian Neill (UK Border Force) <i>“Challenges and needs of Border Control authorities”</i> In 2013 Frontex created an end-user driven Advisory Board on Border Security Research, whose main goal is to inform Frontex on current and future challenges the Border Control authorities in the EU Member are going to face and to advice on mid- and long-term border security research agenda. This presentation will give an overview of the most important challenges identified so far and some ideas on potential research topics.

11.00 - 12.30
Room: 6140

RESEARCH TRACK (Session I):
Chaired by: Monica Gariup

Joe Valacich, David Wilson, Jay Nunamaker, Elyse Golob

“Modeling Border Traffic Flow using Cell Phone Header Packets”

This research in progress paper describes a novel approach for improving resource allocation decision-making at ports of entry along a border. The approach involves the collection of cell phone header packets to estimate density of a population around a port of entry, and proposes that such data, if collected in real-time, could allow border agents to more effectively respond to random increases or decreases in border traffic. It is further suggested that such data could be incorporated continuously to update border flow models and help identify trends in traffic flow. The overall result of these advantages could lead to decision-makers at ports of entry being able to reduce queue times and thereby use resources more efficiently.

Jakub Piskorski, Hristo Tanev, Alexandra Balahur

“Exploiting Twitter for Border Security-Related Intelligence Gathering”

Nowadays, an ever-growing amount of information is being transferred through web-based social media. In particular, Twitter emerged to be an important social medium providing most up-to-date information and comments on current events and topics of any kind. This led to a continuous growth of the interest of various security-related organizations in tools for real-time monitoring of Twitter streams to collect information there from. In this paper some initial explorations on how to exploit Twitter for border security-related intelligence gathering are presented. To be more precise, the techniques presented are for: (a) retrieving and analyzing tweets posted in third countries, in which opinions and information are provided on migration to Europe or related issues (sentiment analysis for improving the retrieval performance was experimented with), and (b) enhancing the information extracted from online news on border security-related events in third countries with information extracted from Twitter.

Jyri Rajamaeki

“Mobile Digital Services for Border Protection: Standardization of Emergency Response Vehicles”

Law enforcement authorities (LEA), such as border guards, suffer from shortage of resources to perform the tasks immaculately. Due to the economic situation, the main need of LEAs is to maintain their core services with significantly reduced budgets. According to the multi methodical development research project MOBI (<http://mobi.laurea.fi>), the only realizable solution in view is better piggybacking of information and communications technology (ICT) and digital services. This also means in field operations and thus in emergency response vehicles (ERV), ICT applications and digital services play a more and more important role. This paper presents a new layered approach for standardizing the electrical, electronic and ICT devices of ERVs. Thus on the basis of this infrastructure, the mobile digital services needed for public safety responders could be supplied.

Jeffrey Jenkins, Jim Marquardson, Jeffrey Proudfoot, Joseph Valacich, Elyse Golob, Jay Nunamaker, Jr.

“The Checkpoint Simulation: A Tool for Informing Border Patrol Checkpoint Design and Resource Allocation”

	<p>Proper resource allocation at Border Patrol checkpoints is essential for effective and efficient screening. Improper resource allocation can lead to flushing—i.e., allowing cars to pass through a checkpoint without screening—or cost inefficiencies. To better inform resource allocation, a prototype simulation that models the major processes of an operational checkpoint is presented. Data for the simulation was collected during extensive site visits to checkpoints on the U.S. northern and southern borders. In a case study, the simulation was configured to model the Tucson Sector, I-19 checkpoint. It was found that the checkpoint can handle current traffic demands, but additional screening capacity is needed to accommodate traffic in the next 20 years.</p>
12.30- 13.30	<p>Lunch</p>
<p>13.30 -15.30 Room: 6140</p>	<p>INDUSTRIAL PRACTICE & EXPERIENCE TRACK: Chaired by: Jakub Piskorski</p> <p>Gregory Duckworth, Archibald Owen, Jerry Worsley, Henry Stephenson <i>“OptaSense distributed acoustic and seismic sensing performance for multi-threat, multi-environment border monitoring”</i></p> <p>The OptaSense Distributed Acoustic Sensing (DAS) technology turns any cable with single-mode optical fiber into a very large and densely sampled acoustic/seismic sensor array, covering up to a 50-kilometer aperture per system with “virtual” sensor separations as small as one meter. The system uses Rayleigh scattering from the imperfections in the fiber to return optical signals measuring local fiber strain from seismic, air and water acoustic disturbances. The scalable system architecture can provide border monitoring over long distances at low cost, high sensitivity, and high location accuracy. This paper presents system performance examples for detection, localization, and classification of multiple threats (e.g. digging and tunneling, personnel footsteps, gunshots, and aircraft) in a variety of environments, including snow cover.</p> <p>Bart Adams, Frank Suykens <i>“Astute: Increased Situational Awareness through proactive decision support and adaptive map-centric user interfaces”</i></p> <p>The Astute project is an ongoing European Artemis project that researches methods to improve the effectiveness of embedded and mobile systems. It does so by providing human machine interfaces (HMIs) that automatically and proactively adapt, based on the sensed environment and user state. One of the implemented demonstrators supports emergency workers during field operations using on-sleeve and tablet-sized mobile devices. Extensive field and usability studies have proved that a geospatial, map-centric user interface (UI) is essential to provide a low barrier interface that is easy to learn. The integration of context and user-state reasoning enables proactive decision support that makes HMIs smarter and more effective in stressful and critical situations. It is argued that the promising results obtained for the emergency domain have great potential to improve the current practice in border control use cases as well.</p> <p>Daniel Cuesta Cantarero, David Antonio Perez Herrero, Fernando Martin Mendez <i>“A multi-modal biometric fusion implementation for ABC Systems”</i></p> <p>In this paper, a multi-modal approach for traveler biometric identity verification is introduced, in the context of the Spanish Automated Border Control (ABC)</p>

	<p>implementation. An ABC is an automated system which reads and authenticates the electronic travel document, verifies the identity of the document holder, performs background checks and resolves the eligibility for border crossing. This paper focuses on the second stage of the automated process, the identity verification, based on the biometric data available in the electronic travel document. According to the nature of the travel document, a standardized facial image (1st and 2nd generation electronic Passport, Spanish electronic ID card), two standardized fingerprint images (2nd generation electronic Passport) or fingerprint Match-on-Card features (Spanish electronic ID card) are available. While the facial image can be considered the de facto standard biometric modality for ABC systems, fingerprint availability allows for security enhancement and false rejection rates improvement.</p> <p>Chris Hurrey <i>"The 'Swiss Army Knife' Approach to Border Control: Multitasking in a Multi-Threat World"</i></p> <p>The Border Control community uses a number of skills, techniques and technologies to achieve its objectives: everything from the skilled eye, ear and feel of the border officer to sophisticated data, image and biometric analytics. These are often used singly or in small combinations or at different stages. What might a border control system look like which used a larger number of near-simultaneous scans, checks and queries on each passenger? And how might it be evaluated? This paper examines what a 'Swiss Army Knife', multi-tool approach to border, visas and internal migration control might involve and how this multi-tool approach might solve a number of common problems. It briefly touches on the erasing of boundaries between traditional 'immigration' information systems and those of port security, carrier reservations, economic and demographic statistics, police and counter-terrorism agencies.</p> <p>Sandrine Trochu, Olivier Touret <i>"Managing the Border, Smartly"</i></p> <p>Whatever the future holds in terms of new regulations and processes, the trend will be to record and secure border crossings for an increasing share of eligible passengers. In order for this trend to be derived into effective and efficient execution as well as for passengers to experience a fluent journey despite this increase of security requirements, performing an identification of passengers through a unique identifier, providing facilitated and automated checks and being capable to identify and then trace persons of interest will be needed and very valuable tracks to follow in order to achieve these objectives. The extent and pace to which these tracks will be followed and soundly articulated together will define how smartly the borders will be managed in the future.</p>
15.30-16.00	Coffee break
16.00-17.00 Room: 6140	<p>PANEL DISCUSSION:</p> <p>Moderated by: Guenther Schumacher <i>"Innovation in Border Security Research & Development"</i></p> <p>What is or should innovation be? Do we need innovation at all? What do border control end-users expect from Research and Development? What are the expectations of researchers and industry? Are existing funding schemes and initiatives appropriate or what should be changed in order to foster innovation? The panel brings together various players in Border Security-related R&D representing end users, research community,</p>

	<p>industry and the European Commission to raise and discuss issues and perspectives on current and future applied research in border security.</p> <p><u>Panelists:</u> Elyse Golob (University of Arizona, USA), Dieter Klawunder (MODI, Germany), Ian Neil (UK Border Force), Alexander Nouak (Frauenhofer Institute), Patrick Padding (ENLETS), Paolo Salieri (DG ENTR, European Commission)</p>
17:00 - 17:15 Room: 6140	Introduction to a special session organized by the EU-funded FASTPASS project on " <i>Future Scenarios for Border Control Processes</i> " which will take place on 14 August at 14:30
19:00	Conference dinner (depending on registration option)

Wednesday 14 August

Time	
9.15 -10.10 Room: Aula 6159	<p>KEYNOTE TALK:</p> <p>Roman Yangarber (University of Helsinki) <i>"Language technology for large-scale surveillance of open information sources"</i></p> <p>This talk discusses techniques for analyzing large streams of documents coming from on-line news sites, for monitoring events of interest in certain knowledge-intensive domains, such as monitoring cross-border security incidents and crises. It starts with a high-level introduction to Open-Source intelligence, and how and under what conditions it can be useful in the context of border security-related intelligence gathering. It will discuss technical challenges posed to this task by "traditional approaches", such as keyword-based search and Boolean queries. It will then present methods for analyzing the content on a deeper (semantic) level, and the benefits that such analysis brings. Particular attention will be paid to learning from the extracted information via aggregation across individual facts, by leveraging trends that emerge by considering facts linked across time, different sources and different languages. Practical examples will be demonstrated using PULS (http://puls.cs.helsinki.fi) -- an on-line system developed at the University of Helsinki that implements the discussed ideas and methodologies.</p>
10.10 -10.30	Coffee break
10.30 - 12.30 Room: 6140	<p>RESEARCH TRACK (Session II): Chaired by: Elyse Golob</p> <p>Monica Gariup, Gustav Soederlind <i>"Document Fraud Detection at the Border: Preliminary observations on human and machine performance"</i></p> <p>How many false documents (forged and counterfeited) cross the border undetected? What is the real extent of the phenomenon of document fraud at the border? How good</p>

are border officers and their technical equipment at detecting fraud in the first line? How can the impact of capacity building measures (training and technology) in the field of document fraud detection be measured? This paper proposes to approach the traditional problem of “known unknown” of risk analysis by taking the performance of detection capabilities – human and machine-supported – seriously. It argues that capability-based vulnerabilities need to be systematically assessed quantitatively and qualitatively in order to make sense of the risk and to devise, test, and measure the effectiveness of countermeasures. The paper reports the preliminary results of an exercise simulating the first line of document inspection at the border. European document experts and automated document inspection systems were challenged to recognize genuine and false documents under a very tight time constraint. Although the experiment suffered of many methodological weaknesses due to the limitations of the context in which it was conducted, a number of initial observations can be drawn on the importance of human skills and experience; the strengths and shortcomings of automated systems; and the need to further test and study how human and machine capabilities can be improved and combined in order to increase their detection effectiveness and thus strengthen border security.

Debra Tower, Matthew Jensen, Norah Dunbar, Aaron Elkins

“Don’t Lie to Me: The Impact of Deception on Vocalic and Linguistic Synchrony”

Most efforts at improving deception detection involve either the examination of a person’s behavioral and physiological cues or are aimed at improving the ability of an interviewer to distinguish between truth and deception. The research presented here employs a dyadic approach to deception detection. This is a relatively novel method which utilizes the complex interplay and mutual influence between the deceiver and the receiver by examining the relationship between interactional synchrony and deception. This field experiment uses criminal interviews of both guilty (deceptive) and innocent (truthful) persons to explore the impact of deception on different measures of vocalic and linguistic synchrony. Preliminary results indicate that deceivers may strategically synchronize to the interviewer in an attempt to allay suspicion.

Jeffrey Gainer Proudfoot

“Evaluating the Feasibility of Using Noncontact Sensors to Conduct a Targetless Concealed Information Test”

The standard Concealed Information Test (CIT) requires the use of target items to elicit physiological response differences between those concealing information and those naïve to target items. Interpersonal Deception Theory contends that deceivers often exhibit both strategic and nonstrategic behaviors in an attempt to appear truthful. This paper proposes a study designed to ascertain the feasibility of using noncontact sensors to conduct a targetless CIT to elicit cues of strategic and nonstrategic behaviors indicative of concealed knowledge and deception. The ability to implement a CIT without target items increases the feasibility of CIT use in a number of border control, passenger screening, and document adjudication contexts.

Moazzam Butt, Sandra Martiy, Alexander Nouak, Joerg Koeplin, R. Raghavendrax and Guoqiang Lix

“Towards e-Passport Duplicate Enrolment Check in the European Union”

Automated border control gates are now being more and more deployed at airports to smooth border crossings with reduced man power and more convenience to the

	<p>passenger. In order to use these new gates the traveler is required to present an electronic passport (e-Passport or biometric passport). Lots of efforts have been undertaken to improve the security of the infrastructure at borders or by adding various security features to the passport. However, the weakest point in the passport issuance process is the enrolment step for passport applicant including the breeder documents authenticity and the duplicate enrolment check. The goal of duplicate enrolment check is to prevent the issuance of duplicate illegal passports containing possibly fake identities. A solution to this problem needs to be flexible and precise if the solution is meant for large-scale deployments and eventually standardization. This paper describes how a duplicate enrolment check can be realized securely between European Union member states using distributed databases of alphanumeric data and multiple biometric modalities.</p>
12.30 -13.30	Lunch
13.30 -14.30 Room: 6140	<p>KEYNOTE TALK:</p> <p>Aldert Vrij (University of Portsmouth) <i>“Lie detection in border crossings”</i></p> <p>In part 1 of this talk an innovative cognitive approach to lie detection will be discussed. Key of the approach is that questions can be asked that are more difficult to answer for liars than for truth tellers and therefore elicit cognitive cues to deceit. An overview of 23 experiments published in this area showed a significant increase in lie detection as a result of employing cognitive lie detection techniques. Part 2 discusses interview methods to detect deceit designed for intelligence interviewing, such as undercover interviewing (interviewing a suspect without the suspect being aware that the 'chat' is an actual interview) and collective interviewing (interviewing two or more suspects simultaneously).</p>
14:30 - 14:35 Room: 6140	<p>Concluding Remarks (WIBC Chairs)</p>
14.35 -15.30 Room: 6140	<p>SPECIAL SESSION (part I): <i>“Future Scenarios for Border Control Processes”</i></p> <p>The session will brainstorm and innovate on possible new options for future border control processes in different border crossing types. The session will create scenarios on how the border control can reconcile the future requirements (more passengers, fewer border guards, higher risks, increased expectation from customers and infrastructure operators, reduced resources, more responsibility to prevent harm). Future scenarios will include new processes, technological advances, improvements in performance (e.g. in biometrics), legislation and operational conditions. The session is organised by the EU-funded FastPass-project which is designed to establish and demonstrate a next-generation, harmonized, modular approach for Automated Border Control (ABC) points. Target Participants of the session are persons with informed views on the shape and complexity of border control in Europe and its evolvement over the next ten to fifteen years – operational, technical, political or social.</p>
15.30 -15.50	Coffee break
15.50 -18.30 Room: 6140	<p>SPECIAL SESSION (part II): <i>“Future Scenarios for Border Control Processes”</i></p>