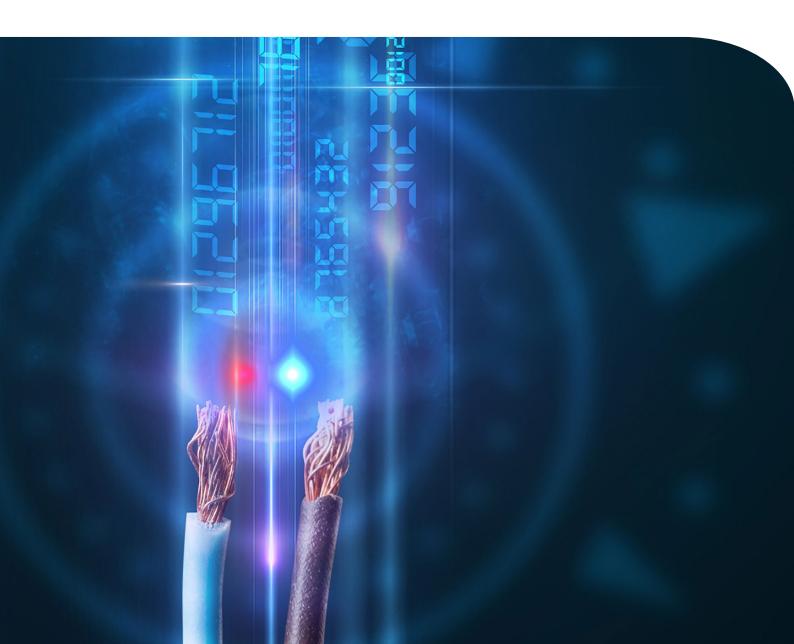Conference Report
eu-LISA International Conference

The future tested:
Towards a Smart Borders reality

8 October 2015
Tallinn, Estonia

Contents

Opening statement
by the Executive Director of eu-LISA

Mr. Krum Garkov
Executive Director of eu-LISA

Opening the annual conference of eu-LISA, Mr. Garkov welcomed all participants, noting that their presence demonstrated the increasing contribution of eu-LISA to Europe and its citizens.

Mr. Garkov began by outlining how the conference was being held at an important time and was particularly relevant. Firstly, he noted that the Smart Borders package has been discussed for years, most recently in the frame of the legislative proposals tabled by the European Commission in 2013 and the subsequently executed study. These discussions now appear to be reaching concrete outcomes, he indicated, with certain proposals that were previously made based on assumptions now being supported with operational evidence from the Smart Borders pilot. When it comes to Smart Borders, he suggested that the proposed systems could contribute to more efficient border management as well as the facilitation of travel. He looked forward to discussions with and amongst practitioners attending the conference who will be active in the implementation and follow-up of Smart Borders, suggesting that they share their visions for the future development of border management in Europe. Secondly, he placed the conference into the context of the challenges that Europe faces today, particularly the migratory pressures well covered in the news. All Member States face difficulties, he noted, and their citizens witness daily how Europe is trying to develop a common response. Mr. Garkov put forward his belief that the facilitation of legal migration in order to make Europe more open to the rest of the world would be one means to address the present challenges in the long-term. Smart Borders, he suggested, would play a significant role in achieving this goal. Thirdly, he noted that the conference provided an important opportunity to start thinking about the border management of the future, especially in light of the enumerated challenges. EU Institutions and Agencies together have to start thinking about how future border management will be shaped, he suggested, working with the industry and others to assess how technology today and in the future can support and facilitate this development. He asserted that it was almost certain that border management in the future would be more complex and more challenging because the number of people coming to Europe will increase. The magnitude of such increases matters little, he argued, as any increase will pose challenges for border management. New technologies will not resolve all such challenges, he said, arguing that cooperation and collaboration between the public and private sectors will play an increasingly important role and will facilitate advancement in the most desirable directions.

Mr. Garkov looked forward to the panels, anticipating discussions on general outcomes of the Smart Borders pilot, lessons learned and some forward-looking debate on the future of border management beyond Smart Borders.
He expressed his hope that each participant would take something concrete and useful away from the conference and, as was the case at previous similar eu-LISA events, that the conference would facilitate and drive forward joint thinking and action to address Europe's present priorities while keeping Europe open to the rest of the world.

Keynote Presentations
The Smart Borders pilot: A status update

Mr. Marc Sulon
Head of the sector 'Biometrics, systems and relations with eu-LISA' for Smart Borders DG Home Affairs, European Commission

On the Way to Smart Borders
- Views of the European Commission

Mr. Sulon started by noting his many years of involvement with and work on Smart Borders. He spoke of his involvement in drafting the new Smart Borders legislative proposals and the associated impact assessment, expressing his joy at being able to share the first results and findings from the pilot project at the conference.

In order to provide context to his presentation, he spoke briefly about the recent history of the Smart Borders proposals, emphasising the long and complicated process that had already been followed in order to arrive at the 2013 Smart Borders proposals that were nonetheless received with mixed feelings. These proposals brought forward questions that required further analysis. Some answers were given through a technical study that was completed in 2014, he noted, and can be found online.

He noted that some more issues critical to the implementation of Smart Borders were addressed in the eu-LISA pilot. These issues had no real answers based on concrete evidence prior to this pilot, he suggested. Amongst the most prevalent were issues related to biometrics and, hence, the main focus of the pilot was on biometrics generally and specifically, the goal was to assess, which biometrics should be used and how biometrics and associated technologies can act as process accelerators to speed up border controls. Other aspects analysed included fall back solutions for system outages and the provision of web services for different categories of user.

Mr. Sulon went on to thank eu-LISA, the participating Member States and industry partners for their support to the pilot project. He emphasised how important it had been to conduct the pilot in real conditions and, thus, how crucial it was that the industry has provided their devices to undertake tests in such conditions. Executing the pilot in this manner had been difficult, he suggested, as there was no legal basis for testing yet legal considerations that could not be circumvented, particularly in terms of data protection, ruled out some proposed approaches to testing. Another challenge had been working within the border control environment and adapting testing to local arrangements, he noted. He thanked Member States, the border guards and the administrative authorities for their flexibility to change processes and adapt for the short period of time needed to accomplish testing.

Amongst the pilot findings outlined, Mr. Sulon spoke about how enrolment of 10 fingerprints created queues and wasn't easy to handle. A specific issue was noted with travellers having to enrol fingers from both hands while carrying baggage or other objects. The evidence gathered in this regard was clearly useful to aid decision-making, he suggested. The pilot has shown what can and should be implemented, how it can be implemented and what the consequences for the process are. Thanks to the pilot, he noted, it is now known what the consequences of using different biometric indicators are on the border crossing time. It is also known what consequences the use of certain accelerators such as self-service kiosks will be. A distinction now needs to be made on what is possible, feasible, necessary, proportionate and acceptable, he said. In the latter regard, it became apparent that traveller acceptance of tested technologies is high and that border guards also consider many of them to be useful.

Examining some of the themes introduced in more depth, he suggested that the main goal must be to aid border guards in their work, helping them to identify those overstaying their visas and helping them to better identify undocumented travellers while facilitating border crossings for the majority. Regarding proportionality, he wondered whether collecting all 10 fingerprints is really necessary or whether such enrolment could it be done in a less intrusive, more socially acceptable way that is also easier for the border guards.

The impact assessment and legal basis are now being created taking the findings into account, based on some of the mentioned considerations and incorporating some of the tested biometrics and process accelerators, he noted. The technical pilot results are important in this work, he noted, but must be considered as just one element in the chain of processes. The findings need to be viewed together with work and examinations on elements such as data protection, privacy and compliance with the EU Charter of Fundamental Rights – hence eu-LISA's monitoring of travellers' acceptance of the technologies and processes deployed within the pilot. Returning to the example of enrolment of 10 fingerprints, results have shown that border guards would have difficulty accepting such a process, while travellers associate fingerprints with law enforcement activities, he noted, reducing their acceptability in terms of use at borders. While the facial image is generally considered to be less intrusive, he pondered whether extensive use of CCTV enabling the collection of facial images without consent is itself more acceptable.

Mr. Sulon further elaborated on various aspects of biometrics that he considered noteworthy. Biometric processes at border will vary, he suggested, including enrolment processes in which a traveller will obtain a system identity including biometric information and verification at subsequent border crossings. He emphasised that the information recorded in the system and the assessment of the border guard at the first interaction will be reused at subsequent border crossings, allowing for a simple verification. A third task of note, he suggested, was to identify those that have overstayed their welcome in Europe while still present on the territory. This involves checking biometric data against the entire database, he explained. A final use for biometrics introduced was to check whether an individual potentially using different identities, whether legally or illegally, is already known to the Smart Borders systems. Legal identity change might involve something as simple as getting married and changing one's name, he noted. Other travellers have more than one passport yet should be recognised as having the same identity despite carrying different documents, he said. For all of these instances, Mr. Sulon explained that assessment of whether de-duplication of identities in the system is needed at entrance and by extension whether biometrics capable of checking the database for known people are needed. Managing de-duplication means that the enrolled biometric data has to be more complex and it cannot be handled without fingerprints – whether 4 or 8 prints, with or without facial image or other biometrics.

Mr. Sulon promised that the full results of the pilot and the outcomes of the deep reflection that will follow would be available soon. He added that there are a lot of combinations still to consider and a lot of different stakeholders to consult. He concluded by apologising for not being able to divulge more information about the new proposal. The reason for this was not secrecy, he noted, but simply that there were still many options to discuss as the selection of elements is quite complex. Complexity is added due to the existence of the systems and controls already in place too, he noted. To finish, Mr. Sulon added that the noted complexity is one reason why there had been so many consultations on the Smart Borders package and invited everyone to take part in the on-going public consultation.

Mr. Antonio Fulco

Head of Sector – Service design and transversal services and Smart Borders pilot project manager, eu-LISA

An update on the Smart Borders pilot project

Mr. Fulco began by suggesting that although he had a lot of information to share, it did not include any real results from the pilot as such results would be disclosed by Mr. Sulon in due course. Rather, his emphasis was on the pilot's initial findings and lessons learned. He promised to conclude with a view of the future of Smart Borders.

Beginning with a broad view of the challenges to be tackled by Smart Borders, he described the long borders of the Schengen area. There are more than 1800 border crossing points of different sizes and types through which travellers enter and exit the region, he noted, indicating that the task of verifying the identity and purpose of travel for such travellers is challenging particularly considering that there are almost 200 million passengers crossing the borders per annum. This process has to be as smooth as possible, however, as the traveller flow contributes significantly to the economy of the European Union, he argued.

Mr. Fulco described typical border checks as carried out today. Border guards stamp passports in order to create records used for calculating the stay of third country nationals, he noted, but suggested that this is a very time consuming task for the border guards while hardly being their core activity. Border guards should rather be focused on risk-based analyses of traveller risks, he argued, describing the myriad categories of travellers who present risks including imposters, over stayers, criminals, those who have destroyed their passports and those who have simply lost them. He suggested that there is a limited possibility for automation, however. This is particularly critical in instances such as checks on cruise passengers who disembark and board a ship on the same day, often spending multiple hours queuing and being checked twice in one day, he noted.

He added that there are already distinct capacity problems. According to a 2014 estimate from the European Commission, there will be an increase

of about 58% in the number of incoming travellers from non-EU countries by 2025, he explained. In order to cope with this increase, Mr. Fulco put forward three options: namely to do nothing and hence allow for increased queue length, delays and possibly decreased security; to undertake construction to expand border crossing points and to invest in more human resources to meet the demand; or, finally, to introduce biometric technology to enable traveller identification at border crossing points and registration of entry and exit times in order to speed up checks and controls.

Mr. Fulco went on to describe the timeline of the pilot that was delivered in collaboration with 12 Member States. The main objective of the pilot noted was the testing of a limited number of technical options identified in the 2014 Commission Technical Study against specific measurable criteria. The main focus was examining the effectiveness of biometrics for identification and whether various biometrics can facilitate border control. In the latter case, the main assessment was whether the introduced technologies impacted the border crossing duration. The assessments had been conducted within a very tight timeline, with the design of the test phase beginning in September 2014, a formal delegation agreement from the European Commission being received at the end of December 2014, and first dialogues with the Member States and industry beginning early in 2015. The execution phase of the pilot ran from March 2015 to the 30th of September, he noted. Mr. Fulco reported that the reporting phase was underway and would lead to production and publication of the final report at the end of November 2015.

Tests were undertaken in twelve volunteering Member States and at eighteen different border crossing points that were selected based on risk, he noted, i.e. testing was possible to examine performance in identified high risk environments for any future system including in outdoor areas, at land and sea borders, on moving trains and vessels and in various weather conditions. Testing was also undertaken within different configurations of the border control, examining technologies and processes for both entry and exit. Generally, this demanded use of different technologies. In total 78 test cases were executed across 18 test locations.

Mr. Fulco further explained the nature of these test cases – in all, 13 test cases had been identified as interesting with 9 of these involving biometrics. In these latter cases, measurements of the duration and quality of the biometric enrolment were amongst the most crucial outcomes. In the specific case of testing using the facial image as a biometric, emphasis was also put on comparing the quality of the live image with the image on the chip of electronic travel documents, he noted. He also described how environmental probes had been installed in different locations in order to collect temperature, humidity and luminosity data and, thus, assess the influence of the environment in a measurable manner. For biometric tests, different types of equipment had been deployed from different providers and in different configurations, with some test cases being combined at various locations. This approach was taken to provide a comprehensive picture on the various time and quality impacts, he noted, but also to measure the extent to which travellers and border guards accepted the introduced technologies and processes. Mr. Fulco indicated that this quantitative and qualitative feedback would be presented in the final report.

As Smart Borders pilot project manager, Mr. Fulco conveyed his experience that running a project of this scope in just 11 months is no easy task and required significant investment of time, knowledge and efforts from many parties. Successful implementation of the pilot had required, amongst other things:

- Project oriented organisation
- Empowerment of the project manager and a fast escalation procedure in case of need (for example, by involving the European Commission in the Steering Committee)
- Strict procedures for issue and risk reporting
- Effective communication (including institutional meetings on a regular basis)
- Close and regular follow up with participating Member States (a real partnership with the 12 partners as well as a lot of communication with border guards)
- Establishment of a win-win relationship with the vendors (the vendors have been involved since January)
- An experienced consulting partner (who would be able to quickly learn about the state-of-the art in biometrics, for example).

The magnitude of the project was emphasised using references to some numerical indicators. It was noted that more than 57,000 volunteer passengers participated in the pilot, clearly a big success considering one major question at the outset was whether passengers would participate, particularly in countries where written consent had to be provided based on national

data protection regulations. Different means of providing consent applied because eu-LISA cannot be a data processor according to European data protection regulations, he noted, and thus the task of collecting data and depersonalising it before submission was the responsibility of the Member States. 49% of the participating passengers were female with 42% aged between 31 and 50 years old and 76% older than 31 years of age. Mr. Fulco noted that 46% of passengers volunteered in non-airport border crossing points. In terms of end satisfaction, he reported that 89% had expressed high or very high satisfaction rates after testing at air borders and 80% at land borders.

Continuing further, he noted that the project had involved 7 monthly webinars with national project managers and around 100 bilateral audio meetings with Member States for test follow-ups. The eu-LISA team had been involved in 45 border crossing point visits, corresponding to around 174,000 kilometres of travel. 3 expert meetings had been convened focussing on desk research topics. Throughout, some 400 slides had been produced for the meetings with Member States, and more than 300 files were received from the Member States along with approximately 450MB of data.

Amongst lessons learned, Mr. Fulco explained that most of the available mobile fingerprint technologies are not fit for use by border guards on a moving train, where the enrolment of 8 or more fingerprints proved to be complicated. The use of mobile devices to enrol more than one fingerprint had also proved to be very challenging as the scanner plate was sometimes not large enough for some travellers. Use of contactless scanners had caused some issues, as the typical algorithms used in testing were apparently not appropriate. Enrolment of 10 fingerprints had been observed to be challenging both for border guards and travellers at all types of border crossing points and had significantly impacted border-crossing durations. Fingerprint enrolment was also influenced by the environment - in very cold weather, the scanner plates had frozen while direct sunlight had negatively impacted optical devices and hot weather caused technical problems for some mobile devices. Provision of feedback to the traveller during enrolment was seen to result in more positive outcomes, meanwhile. Continuing his analysis of fingerprint enrolment, he noted that there had been no possibility to test verification of fingerprints against a database and, thus, metrics assessing enrolled quality and time taken were the main outcomes known. He noted that these outcomes would be explored in more detail in the final report.

Mr. Fulco noted that the enrolment of iris data in moving trains was even more problematic than for fingerprints, meanwhile, due to the influences of vibration and flashing lights. Enrolment was also reported to have been difficult when dealing with travellers of certain ethnicities and when working in low light conditions.

Initial outcomes from testing with facial image biometrics were also reported. Within the pilot, Mr. Fulco noted that one principal focus was assessment of whether it is feasible to extract the facial image from the e-MRTD and to verify it against the live image at all types of borders and potentially using different set-ups. The following points were put forward as noteworthy:

- it is difficult to set one camera position for all traveller heights; automatic height-adjustment of the camera can obviate this issue
- lighting placed behind the traveller or reduced lighting generally impacts verification success

- complete reading of the e-MRTD was problematic in some instances and for passports from some countries (e.g. USA, Brazil, China). In these cases, it is generally impossible to verify the live facial image using automated methods.

Mr. Fulco concluded by indicating that some issues still needed to be clarified and examined further. The industry roundtable event organised by eu-LISA on the previous day had provided one opportunity in this regard.
Finally, as promised at the outset, he spoke about the future of border management and why Smart Borders is of great importance. He expressed an opinion that Smart Borders could guarantee better experiences for travellers, better efficiency in border control processes, and hence time and money savings for national authorities and, generally, could have a positive effect on internal security while enhancing passenger privacy. Challenges remain, however, for which answers are needed, he suggested. These challenges included finding ways to make sure that the implemented solutions are cost effective, he said, noting that re-use of some aspects of the existing systems could be one means of achieving this. Other critical success factors for the future that he put forward were the alignment of legislation and technology, stakeholder engagement, trust and privacy by design in any future systems.

Police Major Panagiotis Mertis

Ministry of the Interior and Administrative Reformation, Hellenic Police IT Directorate, Greece, National Project Manager for the Smart Borders pilot in Greece

Testing the borders of the future: National Perspectives

At the outset, Mr. Mertis expressed his satisfaction with the fact that Greece had participated in the Smart Borders pilot project and also his gratitude to all of those who had worked hard to make the testing a reality in Greece. He also extended his congratulations to eu-LISA and especially to the eu-LISA Smart Borders pilot team for the planning and fine management of the pilot.

Mr. Mertis noted that the Greek Smart Borders Strategic Plan 2014-2020 is based on the Hellenic Police's doctrine of Research-Pilots-Operations. In this regard, he stated that the work done during the pilot in Greece has provided a baseline for the future implementation of Smart Borders in the country and indeed elsewhere. In Greece, he added, national Smart Borders is planned for 2018.

Setting the scene for his presentation, he said that for his country, sea borders were noted to be worthy of special attention as Greece has a total of 57 sea border crossing points that are closely connected with the economy and the test at Piraeus port had, therefore, been particularly important Mr. Mertis further expressed interest

in the human impact Smart Borders will have, for both travellers as well as border guards. Elsewhere, he noted developments that have been carried out with Smart Borders in mind - Athens Airport, the biggest airport in Greece, will soon receive the country's first Automated Border Control gates.

Mr. Mertis went on to discuss the Greek Smart Borders Pilot in more detail. It had been conducted at two border crossing points, namely Kipoi Evrou, where handheld devices were used to enrol fingerprints and iris images and the Port of Piraeus, where biometrics were enrolled on-board a moving vessel using devices in a portable suitcase.

At the busy Kipoi Evrou BCP, located at the border with Turkey, two hand-held devices had been deployed that each had an MRZ reader, a fingerprint scanner and a camera for iris capture. Tests conducted in Kipoi examined enrolment of 4, 8 and 10 fingerprints and the capture of iris patterns. Mr. Mertis indicated his main initial finding that the device could be helpful to process passengers at the BCP in case of large queues. He cautioned, however, that the device was only sufficient for enrolling up to 4 fingerprints in non-exceptional cases due to the slow and uncomfortable process for enrolment of more prints. Iris capture also proved to be complicated, he noted, especially for eastern Asian travellers. He added that it would have been interesting to test the device for facial image enrolment although this was not possible within the pilot timescales.
Subsequently, Mr. Mertis described his initial impressions of testing at the Port of Piraeus, the biggest seaport in Greece. A portable suitcase including an e-MRTD reader, a fingerprint scanner, a camera and a laptop had been deployed for testing on board a cruise ship during a 3-day cruise. Tests had examined the feasibility of enrolling 4 fingerprints and a live facial image, capture of the facial image from e-MRTDs, and the verification of the live image against that from the document. Initial findings included the fact that the facial image was more reliable in the cruise ship situation and also more accepted by travellers compared to fingerprints. Although the process was seen to have potential, the device was found to be rather unreliable, causing issues throughout.
Based on the initial results and other similar experiences, Mr. Mertis expressed Greek scepticism with regards to the operational feasibility of Smart Borders processes at sea BCPs. Greek islands like

Mykonos and Santorini have few border guards and almost no premises for checks, he noted, yet they host up to 3 cruise ships daily carrying up to 4000 passengers each, all of whom have to disembark and embark on the same day. Keeping an open mind regarding possibilities, however, he noted plans to examine further proposed solutions for future Smart Borders or similar systems. He described some relevant plans for work within the FastPass project, for example. The main idea of this project in the sea BCP setting is to introduce the first step of a two-step verification process on board the cruise ship but in contrast to the Smart Borders pilot, using self-service kiosks. The second step would follow during disembarkation and would involve the traveller walking through a minimal e-gate using on-the-move technologies for biometric verification.

Mr. Mertis subsequently shifted his attention to the BODEGA project, elaborating his perspective that investment in human capital is one of the best investments possible and explaining how the project would bring benefits in this regard. Specifically, the project will provide insight into what factors could help to increase the efficiency, effectiveness and productivity of border control personnel within the framework of the Smart Borders implementation.

Within the framework of the EU Horizon 2020 programme, call BES-05-2015 focuses on the topic of mobile devices for use at land borders, and Mr. Mertis noted that his department is involved in a consortium that has made a proposal; the proposed work would benefit greatly from Smart Borders experiences, he noted. One area of interest in the proposed work is examination of whether travellers could use their own devices to help make border crossing faster, and he expressed a personal intrigue regarding such possibilities.

As he approached the final section of his presentation, Mr. Mertis wondered how smart Smart Borders can or indeed will be. He explained that the answer would be evident once the final report is published, but suggested that the ingredients of which the systems will be comprised have nonetheless already been tested. In this regard, key performance indicators that include time, accuracy, cost and end user experience have been introduced and assessed. He looked forward to further analyses on these aspects but anticipated already that the abolition of stamping

might be the most groundbreaking feature of Smart Borders. It will reduce the border control time dramatically, he suggested, and will advance passport technology one step further. Looking to the future even further, he anticipated that border crossings could be paperless in time, bringing forward the use of mobile passport applications in the United States that allow travellers to enter and submit their passport and customs declarations using their handheld devices as support.

To finish, and returning to the more immediate future, Mr. Mertis put forward his preference for biometrics in Smart Borders, concluding that the facial image seems to be the most widely accepted mode of identification for the travellers. However, he noted that fingerprints can be utilised in the fight against crime and terrorism and, therefore, should not be neglected in thoughts and discussions.

Reflections

The Irish ambassador in Tallinn Mr. Frank Flood questioned whether Smart Borders could bring forward some solutions that might help with regard to the large numbers of migrants arriving in Europe.

Mr. Sulon noted that Smart Borders is intended as a package dealing with travellers arriving and crossing the EU's external borders in a standard way and is principally focussed on preventing overstay and limiting irregular migration. Nevertheless, he did note that border management is multifaceted, involving overall management of BCPs, those crossing the borders legally and illegally at BCPs and elsewhere, those over-staying beyond their terms of stay and much more. Smart Borders will help to bring efficiencies in various aspects to benefit border management generally.

Mr. Fulco agreed that the goal of Smart Borders is to register travellers coming to the Schengen area for business, study or similar and in a regular and pre-planned manner. He noted, however, that eu-LISA recognises that migration encompasses much more. Thus, he indicated that within the framework of the recently drafted European Commission Agenda on Migration, eu-LISA is working with FRONTEX and EURODAC on certain issues related to the migrant crisis.

Mr. Mertis agreed that Smart Borders isn't directly linked to the ongoing humanitarian crisis. But technically speaking, the experiences learned from Smart Borders were already helping Greece to face the situation in which it currently finds itself and particularly to allow them to improve their capacities using modern technologies, he noted. Thus, he indicated that Greece is closely cooperating with FRONTEX and eu-LISA on pilots to build increased capacities where needed most.

A representative from the European Parliament probed further regarding the problems encountered reading e-MRTDs from countries including the United States, China and Brazil previously noted by Mr. Fulco, wondering whether the problems were rooted in a lack of international standards or rather an industry focused on certain countries above others.

Mr. Fulco noted initially that passports must be produced in accordance with the ICAO standards to function appropriate but explained that states contract the manufacture of passports to external vendors who may not actually manufacture the documents to meet the quality standards. Otherwise, even if the documents are manufactured fully according to standards, the Integrated Circuit chips in the documents can simply break. Currently, in such instances, passengers carrying documents with broken chips cannot go through ABC gates but have to use the manual gates with their passports being validated there by non-electronic means. He noted that some statistics on how often this happens will be in the final Smart Borders pilot report.

Mr. Sulon agreed, adding that this was not a new issue and in any future Smart Borders systems, these passports will be treated as non-electronic documents.

Panel discussion: What Now ? - Learning from the Smart Borders Pilot

The panel discussion was chaired by: **Ms. Maj Ritter Klejnstrup, Security Officer and Smart Borders pilot project team, eu-LISA.**

The panellists were:

Mr. Jorge Rodrigues, Portuguese Immigration and Borders Service (SEF), Smart Borders Pilot National Project Manager, Portugal

Mr. Nicolas Goniak, Application Director - Immigration Control, French Ministry of the Interior, Smart Borders pilot National Project Manager, France

Mr. Fares Rahmun, Technical Project Manager for Smart Borders and VIS at the Federal Office of Administration (BVA), Germany

Ms. Anne-Charlotte Nygard, Programme Manager in the Freedoms and Justice Department at the European Union Agency for Fundamental Rights (FRA)

The panel was of a practical nature, examining lessons learned and anticipating discussions that will follow the Smart Borders pilot, particularly the operational testing phase. The panellists elaborated upon their experiences from technical, operational and fundamental rights perspectives and put forward their thoughts on how the results should be used when compiled and published in the coming months.

The first panellist was Mr. Jorge Rodrigues from the Portuguese Immigration and Borders Service (SEF). Prior to the conference, he had acted as the Smart Borders Pilot National Project Manager for testing in Portugal

Mr. Rodrigues introduced the Smart Borders pilot at Lisbon Airport, touching first on the preparations that had been necessary ahead of test execution. An important point had been the implementation of a solid support structure from the beginning, he noted, and he acknowledged the good management support the pilot enjoyed from the central level, especially noteworthy, he suggested, given the time constraints. He also

specifically mentioned the border guards who had been dedicated to the pilot project and been willing to submit to special training to accomplish their new tasks with success and the IT department who had provided continuous and very necessary support. Mr. Rodrigues further noted the role played by the National Data Protection Authority whose participation was crucial, he said. According to the agreement with the NDPA, the pilot stored only statistical data, and every passenger had to give written consent to participate. Finally, he acknowledged the invaluable assistance of the Lisbon airport authorities, who had dealt with simple yet important issues such as provision of lighting around test areas and involvement of carriers in informing travellers about the pilot, as well as the vendors for their strong support. He concluded his introduction by stressing the importance of cooperation between all of the noted stakeholders, which, he suggested, had made the pilot in Lisbon airport the success that it was.

While introducing the operational tests, he admitted that there were early issues around securing passenger participation but noted that participants were generally very satisfied and that the pilot was thus well received. In order to increase participation and ensure full understanding of the purposes of testing, the Portuguese authorities had conducted a communication campaign that was seen to be very successful.

Mr. Rodrigues briefly described the 3 test cases examined in Lisbon. The first focused on ABC gates at exit. The principle goals were to determine whether TCNs could use the e-gates that are currently installed in Lisbon for the processing of EU nationals and to measure the time it takes for TCNs to transit the gates. Although issues had been seen with the reading of passports from certain countries, as already alluded to by Mr. Fulco, tests generally went well. A second test had examined the feasibility of iris enrolment at the airport. Mr. Rodrigues felt that the main use of the iris as a biometric would be as an additional biometric identifier to fingerprints and facial images and, in this regard, very interesting results were obtained. In the third test, questions over the usability and security of self-service kiosks for enrolment of biographic and biometric data as an accelerator of the overall border crossing process were examined. It was noted that the main identified issues were with fingerprint enrolment, but Mr. Rodrigues felt that the tests had shown a potential for future use of these kiosks.

Finally, he offered to discuss the results of the pilot undertaken in Lisbon with all parties, expressing a strong desire that the efforts made by the Portuguese authorities and their willingness to participate in the pilot will result in good decisions on the future of Smart Borders.

The second panellist was Mr. Nicolas Goniak, Application Director for Immigration Control at the French Ministry of the Interior. He had acted as the Smart Borders pilot National Project Manager in France

Mr. Goniak began by expressing his gratitude to eu-LISA for providing the opportunity to speak about the French pilot projects. He then went on to describe the tests undertaken in France at sea, land and air borders, all with the common goal of making border crossings more fluid, efficient and secure. In particular, he focused on the feedback provided by travellers and border guards.
He indicated that feedback from both sets of users participating in tests at Cherbourg was overwhelmingly positive. Within the pilot, the iris images could be enrolled from all 4 passengers in a car in less than 10 seconds. He added that people were excited about iris technology. At Charles de Gaulle airport in Paris, a dedicated lane with a fake

manual booth had been set up for the testing of enrolment of fingerprints and facial images from third country nationals.
It was notable that EU citizens also frequently expressed a wish to participate in tests having seen the speed with which participants passed through the lane - all passengers clearly want to cross the border quickly, he noted. Additionally, a new ABC gate had been set up at Gare du Nord station for passengers embarking the Eurostar train to London. Travellers were asked about their general experiences crossing the border during testing and they frequently questioned why one spent so much time queuing compared to being checked, often feeling that the checks were insufficient for the overall time spent crossing the border. Passengers were generally very keen on executing the checks themselves using ABCs, feeling that such checks provided a high level of security.

Mr. Goniak briefly touched on feedback provided by border guards. Some had been enthusiastic about the new technology but others were negative about the change and rather reluctant to use the new technologies. Statistics regarding the proportions will be featured in the eu-LISA report as well as a report to be provided by the French authorities independently, he noted.

Mr. Goniak concluded by speaking directly to the European Commission, arguing against the one-size fits all approach for the future systems. He brought forward the issue of enrolling biometrics from travellers on large ferry or cruise vessels, noting that in Cherbourg more than 100 vehicles

may disembark within minutes. He emphasised that the solution tested there with iris on the move technologies for enrolment showed promise in such a scenario as well as in cruise ship scenarios like those mentioned by his Greek counterpart previously. Technologies to be implemented should be cost-efficient, he suggested, and although the pilot tests were executed using today's technology, we need to look towards tomorrow's technology, such as facial recognition from video flows, he suggested.

The third panellist was Mr. Fares Rahmun, Technical Project Manager for Smart Borders and VIS at the Federal Office of Administration (BVA), Germany

Mr. Rahmun also expressed his thanks to all stakeholders in the national and European Smart Borders pilot tests at the outset and expressed his happiness that such a good job had been done in a short space of time. He went on to speak about the German tests in the frame of Smart Borders. He noted that in addition to the test cases carried out under the supervision of and in cooperation with eu-LISA, the German authorities had executed their own end-to-end pilot at Frankfurt airport in parallel, taking the Smart Borders technical study published in October 2014 as a basis for definition of the scope of testing. The overall goal of the end-to-end tests was to examine how the introduction of biometric processes would affect the whole border check workflow in real life. In order to facilitate theses tests, he described how it had been necessary to implement a new border control application, new processes and a new back end system that simulated a future entry-exit system, with full integration of the new developments into the national infrastructure.

Mr. Rahmun chose not to delve deeper into numbers and statistics that form a large part of the outcomes of testing, indicating that these will be available in the upcoming reports – both that to be provided by eu-LISA and also the one to be provided by Germany to describe their own tests. Rather, he elaborated on some lessons learned. He first noted the multi-dimensionality of the passport enrolment procedure as envisaged with Smart Borders. The systems as planned will have to detect whether it is the traveller's first entry when the encounter occurs, thereby implying a

biometric enrolment. In such cases, he expressed his opinion that there needs to be a de-duplication process so that duplicate records from the same travellers are found and merged. This had been implemented in the German pilot, he said, and had been shown to render the situation complex and lead to significant work for the border guards. The introduction of these tasks demanded extensive training, he suggested. As an example, he noted that the border guards in charge of enrolment need to ensure that good quality samples are obtained while facing time pressures to avoid a build up of queues. In this regard, he stated that the situation for data collection at borders is not the same as in consulates for VISA applications.

He continued by explaining that there is a danger that data might be incomplete, with some necessary consequences. One such consequence observed during testing was that there must be a means to correct, modify or add to data present in the system. This, in turn, implies that there must be mechanism to assign responsibilities for such actions; he suggested that in any case, this should not be a first line officer and wondered whether it might be permitted that one Member State corrects errors made by another. One had to be careful to ensure that travellers were not to blame for someone else's error, he emphasised.

Technically, one outcome of tests in Germany was the observation of issues reading the MRZ and electronic chip for certain passports, alluded to by previous speakers. One particularly notable issue encountered was with transliterations in the MRZ.

As it stands, Mr. Rahmun suggested that the best solution for such issues would be to build a new system designed with such inconsistencies in mind.

Mr. Rahmun referred to the technical study of the proof of concept, seeking to explain how some of the lessons learned in testing had implications for ideas introduced therein. One notable consequence, he suggested, was on the individual file proposed and to be created using one individual passport with the minimum data set and biometrics. This individual file has the entry and exit stamps, and the duration of the stay is calculated on this basis, he noted. However, observations from the field included the fact that there are a lot of exceptions that need to be handled in case of such a setup. He elaborated that these exceptions included cases of there being more than one valid VISA in a passport, cases of travellers having duplicate passports or residence permits and problems with bilateral agreements between countries governing terms of stay. Thus, he emphasised his opinion once again that de-duplication needs to take place in the first line and it needs a certain level of accuracy. His experiences, he suggested, indicated that such de-duplication could take 20-40 seconds at the moment and wondered with hope whether this time could be shortened through the introduction and use of the most modern technologies. Based on feedback from the border guards, he added another point regarding the individual file, namely that records regarding refusals of entry be included. As automation increases, the border guard will spend less time looking at the passport he noted, and thus such information must be visible in the system.

A final point made related to the architecture of the future systems. Mr. Rahmun suggested that the future entry/exit system must be well integrated with the current VIS although this adds to the general complexity and cost of systems operation and maintenance. He advised all national decision makers in attendance to allow and enable eu-LISA to take on management of this complexity, shifting efforts from the national to the central side insofar as possible. In an end-to-end scenario, the limits of what is possible had become evident and complexities need to be rationalised where possible, he stated.

The fourth panellist was Ms. Anne-Charlotte Nygard, Programme Manager in the Freedoms and Justice Department at the European Union Agency for Fundamental Rights (FRA)

Ms. Nygard began by thanking the organisers for offering the possibility to speak on behalf of the Agency for Fundamental Rights and by expressing her pleasure at having been involved in the development of the eu-LISA Smart Borders pilot by carrying out a survey examining various fundamental rights aspects of the proposed systems.

In order to provide a framework for her short introductory presentation, Ms. Nygard explained that the EU institutions and Member States are bound by the EU Charter of Fundamental Rights when preparing and implementing all legislation. Thus, it is imperative, she said, that issues of data protection, privacy, personal dignity, freedom from discrimination, right to information, right to remedies and rights of the child are considered when drafting new legislative proposals. The survey that FRA had carried out examined many of these matters, in particular looking at how travellers from third countries perceived these values in the Smart Borders context in a clear and understandable manner. Regarding this latter point, she noted that asking whether a traveller's dignity was violated wasn't a viable option and, therefore, one question posed in its place was "Did you feel humiliated?" as humiliation is a concept used by courts when investigating issues related to dignity. When looking at the right to privacy, she explained that the focus

was on the intrusiveness of particular biometric identifiers. While the concept of data protection encompasses a lot of different issues, the focus of the survey was on the risk of unauthorised access to data. She indicated a feeling that examination of questions of discrimination was very worthwhile as the concept of non-discrimination by machines is often propagated and she wondered whether travellers agreed with this sentiment. As regards the right to information, the survey had been prepared with the goal of finding out whether the person knows or wants to know how their biometric information enrolled at borders is used and why it is collected. The main aspect related to the right to remedy probed related to procedures undertaken in case of errors being made. Finally, touching upon the rights of children, the survey included questions on suitable ages for enrolment of fingerprints from children.

It was described how the survey questions had been posed at 7 BCPs in 6 Member States where the pilot was being carried out, encompassing air, land and sea borders. Specifically, FRA had undertaken questioning at 3 airports (Paris Charles de Gaulle, Frankfurt and Madrid Barajas), one port (Helsinki) and 3 land borders (Narva, Sculeni and Gare du Nord). Throughout, questions were asked of those over 16 years old; approximately 50% of respondents were male with a majority being under 30 years of age. 1442 interviews were carried out between July 14th and August 27th 2015.

Introducing some initial results, Ms. Nygard explained that the majority of travellers indicated themselves to be comfortable with biometrics. Most of those questioned did not feel that enrolment of biometrics generally intruded on their privacy or was humiliating. Some were nonetheless concerned with certain aspects – some 20% were uncomfortable providing fingerprints and 30% found it humiliating, with similar figures being found with the facial image as a biometric. Up to 40% found enrolment of iris images to be intrusive, and 30% found it to be uncomfortable or humiliating. As a comparison, normal border crossings were also surveyed and in 50% of cases, travellers felt the measures in place to be uncomfortable or intrusive. 80% of respondents felt that it is important to be informed why biometrics are being used. Trust in biometrics was seen to be high – 45% of respondents expressed complete trust, whereas 20% expressed to have no trust whatsoever. Explaining that law enforcement

access to the proposed Smart Borders systems is an issue that has been much debated, Ms. Nygard noted that around 50% see no problem with such access but 20% have concerns.

Interestingly, 60% of respondents agreed with the statement that machines do not discriminate, although 10% thought that machines would discriminate more. In case of error, 50% of respondents doubted that they could cross the border, implying a mistrust of any compensation system that might be implemented, while 50% thought that information could not be easily corrected in case of problems.

The speaker provided a final warning to those considering the survey results – a lack of awareness and knowledge also came through in responses. Between 20% and 30% of respondents didn't have a clear understanding of the issues that were asked about, she noted.

Reflections

Ms. Klejnstrup sought more information on the FRA survey, wondering whether Ms. Nygard would consider that anything more should have been considered after hearing the experiences of the 3 national project managers.

Ms. Nygard suggested that she would like to see more consideration of fall-back measures that should be implemented in case IT systems for border checks are out of operation for a period of time or otherwise if something similar goes wrong, emphasising that any such solutions need to be quick and efficient. In this regard, a crucial matter yet to be delved into appropriately from her perspective was that of the burden of proof in case of query – for example, technical or personnel problems could result in exits not being recorded, she suggested. She expressed doubt that passport stamping could be completely replaced without there being more issues in some regards. She also wondered how over stayers or those who have received permits to stay after entry could be identified. In relation to the right to information, she suggested that third country nationals had to be provided with a mechanism to access any information calculated in the system about how many days they had available to stay on the territory. Regarding the rights of children, she worried whether processes for the identification of children and other victims of human trafficking could suffer with the introduction of the proposed automated systems.

Finally, on a related point, Ms. Nygard added that the Fundamental Rights Agency is carrying out a research project on biometrics and data in the eu-LISA-administered large scale IT systems, namely EURODAC, VIS and SIS II. The lessons learned from that study, she said, could and should benefit Smart Borders as well.

A representative of Deloitte expressed his joy at seeing the development of the project, having spoken at the eu-LISA industry roundtable in 2014 about critical factors that would influence the success of the pilot. One point that he had made then was that the technology will look after itself but that human factors would be critical? Thus, he wondered what, if anything, did border guards feel they were losing with the implementation of the new technologies?

Mr. Rahmun said that his experiences with border guards and technology varied. With regard to the EasyPass system of ABC gates at Frankfurt airport, feedback has been positive, he suggested, mainly because the border guards have control and have sufficient information to decide to interfere in case of problems. Their experiences in the pilot at the manual control booth in Frankfurt airport were more negative, however. In particular, the first test executed entailed the enrolment of 10 fingerprints using new technologies within a new process. Some border guards became excessively occupied with or focussed on the technology, he suggested, which took to much time out of the process leading to a neglect of other tasks. In this regard, he suggested that the border guard must still exercise his/her intuition to carry out a risk analysis that cannot be left to the machines. Thus, it is crucial to find the right balance, he said.

Mr. Goniak referenced the Smart Borders pilot conducted at Charles de Gaulle airport, where a fake manual booth had been installed. Based on his experiences, the border guards only had to focus on technical matters and this gave good results. He added that it took just 15 seconds for the picture and fingerprints to be taken and checked. Thus, he expressed an opinion that modern technical solutions leave enough time and space for actual questioning and profiling. Finally, he suggested that the border guards involved in France were keen on using the tested technologies.

Mr. Rodrigues added that despite all the possible technologies tested and indeed proposed for future use, the border guard is still needed. The systems are automated not automatic, implying that the profiling skills of the border guards are still very much needed.

A representative from HP addressed Mr. Rahmun seeking elaboration on his statement that complexities introduced by Smart Borders should be outsourced from the national systems to eu-LISA.

Mr. Rahmun explained that the number of systems to be checked or otherwise used by border control authorities – national registers, European registers, watch lists, etc. – is on the rise. National systems typically have to compare data between systems, parse and pass queries to each of the systems and merge results for use by the border guard, and hence the demand on development of these systems grows with the introduction of new systems. A lot of this burden can be put on the central system, he suggested, reducing the demands on national authorities. His vision, he suggested, was for a one-query solution to be implemented at the central level, providing an ideal solution for border guards and authorities.

An audience member queried whether the proposed Smart Borders systems could be and should be tools for fighting crime.

Ms. Nygard responded by saying that this is one issue being considered in the FRA survey introduced. She noted the possible positive use of the system to fight trafficking and identify victims of crime in order to improve fundamental rights while also acknowledging the possible impingement of rights that could be brought about by leaving the personal data of travellers open to searching by law enforcement authorities. In order to provide answers on where the best balance lies, one must account for technological limitations, consider the information included in any system and access rights to the system, she suggested. The accuracy of information contained in the systems would also have to be optimised if law enforcement access is to be considered, she said.

Mr. Rahmun noted that there are mechanisms in place to prevent law enforcement authorities from widely accessing the Visa Information System and suggested that some access should be granted in a similar way.

Mr. Goniak provided his opinion based on the statistical data related to law enforcement access to VIS gathered in France. He indicated that this traffic, although meagre at first due to a lack of data, is now growing and based on increased enrolment of data as the system rolls out worldwide, one would expect to grow further again. Thus, he suggested that similar use could be made of data in Smart Borders systems.

Ms. Nygard argued that law enforcement authorities should only have access in cases of terrorism and serious crime. Thus, there need to be limits to the access and each access must be justified. From a Fundamental Rights perspective, the risk is that law enforcement also has access to a group of people with absolutely no connection to the crime, leading to indirect discrimination, she suggested, indicating that such a situation should be avoided.

An audience member probed further on the question of law enforcement access to the Smart Borders systems, wondering whether other systems should be checked first before access to the entry/exit system would be granted.

Mr. Rodrigues agreed with the sentiment expressed by the audience member, noting that in the legal

A representative of VTT Technical Research Centre in Finland wondered whether by introducing secure technologies like ABC gates and kiosks, higher risk passengers would be pushed to manual checks, thus increasing the proportion of risky travellers presenting to border guards who may be, he suggested, the weakest link in the chain.

Mr. Goniak disagreed, suggesting that the purpose of Smart Borders is not only to put technology in place but also to alter responsibilities around the border. Easier tasks will be handled using automatic tools so that border guards that are relieved from these tasks can focus on monitoring and checking the higher risk travellers at the borders, which is entirely the job that they are trained to do, he suggested.

bases for both EURODAC and VIS, it is imperative that access requests explain what has already been done and why access has been requested and suggesting that such safeguards are useful. Mr. Rahmun added that police officers often state that seeing the travel history of suspects can be important and indicated that as no other system displays the travel routes, perhaps one should consider providing direct access to this information for law enforcement purposes.

Mr. Fulco alluded to the cascading mechanism in place for current systems, which provides for sequential querying of numerous systems in cases of serious crime or terrorism. He asked whether Smart Borders should also include search functionalities for latent fingerprints, noting that at the IT level, this requires implementation of a different kind of technology at increased cost.

Ms. Nygard suggested that any use of latent fingerprint functionalities in the Smart Borders systems must be as in EURODAC. Furthermore, the usefulness and reliability of such tools still needs to be assessed, she said, as there isn't much experience with law enforcement access at this stage.

Mr. Rahmun suggested that the question of whether latent fingerprints should be included should be rather unimportant, as the future biometric system should generally be flexible and configurable to deal with any number of use cases that might be considered now or indeed later.

Panel discussion:
Smart Borders in context: Learning from global experiences

The panel was chaired by **Mr. Tõnu Tammer, Policy Expert in Home Affairs and Smart Borders pilot project manager, eu-LISA**

Panellists:

Mr. Arun Vemury, Programme Manager, United States Department of Homeland Security Science and Technology Directorate

Mr. Kier-co Gerritsen, partner in Proodos consultancy, advisor to the Aruba government and airport on the 'Happy-Flow' pilot

Mr. Markus Clabian, Austrian Institute of Technology, Project Manager of the EU-funded FastPass project

Mr. Gerritsen was the first panellist to speak

Mr. Gerritsen began by looking at the 'what' and 'how' of Smart Borders. Dealing with the question of what the Smart Borders pilot has examined, he mentioned that the focus has largely been on the availability of technological possibilities, the provision of best in class solutions and the perspectives of end users.

The information obtained was very useful, he suggested, but he indicated that the question now was how to translate the knowledge obtained to ensure that systems are provided that achieve the results sought – namely prevention of overstay, curbing of illegal immigration and facilitation of travellers. He envisaged some particular challenges, particularly the building of systems that are future-proof and satisfy the needs of the multiple stakeholders involved. In order to build such a system, he proposed that decision makers must remain focussed on the core of the Smart Borders proposals. In his opinion, this was the development of a system providing for IN and OUT transactions executed using standard rules. He added that Smart Borders needs to provide a service to travellers during their journey.

Based on his previous experiences, Mr. Gerritsen highlighted some key issues for Smart Borders going forward. He insisted that capabilities need to be developed to deal with a constantly changing environment. His own projects had been influenced variably by fears of terrorism, refugees and asylum seekers, or economic woes and a need for integration of new and educated people into a country's workforce. He suggested that scenarios that consider these variables should be elaborated and solutions found and suggested that standards should always be used to provide for the flexibility to deal with a changing environment.

In the context of Smart Borders, Mr. Gerritsen brought forward some particular examples of things that are changing in the airport environment in recent years. One such example was the phenomenon of travellers checking in at home, leading him to question whether border control points could evolve to include similar procedures going forward. Border control points in airports are plagued by physical constraints, he suggested, and thus probably need to change. Bringing forward the example of personal data envelopes used in the Aruba pilot and the associated questions that had been asked regarding their storage, he indicated that questions of data protection also need analysis.

Concluding, he once again emphasised the need for standardisation. It would help to set the framework for a re-use of biometrics across domains or between locations and define a basis for and conditions to ensure the feasibility and security of such processes. In order to create such standards, he expressed an eagerness that stakeholders come together to agree on preliminary matters. Standards are commercially interesting, simplify processes, help save time, and give operational flexibility when operations inevitably change, he emphasised.

Mr. Markus Clabian from the Austrian Institute of Technology spoke next. He spoke in his capacity as Project Manager of the EU-funded FastPass project

Mr. Clabian firstly indicated that the main goal of the EU-funded FastPass project was the development of a harmonised, modular reference system for all European automated border crossing points. The project is very interdisciplinary, he noted. In his presentation, he chose to focus on technological aspects of border control and especially on aspects of relevance to Smart Borders, although noting that FastPass partners have also achieved interesting results in social, legal and political research.

The FastPass project was initiated based on an identified need for more automation in border control, he suggested, indicating that automated technologies are likely the only tools available if border crossing is to become faster and more convenient as desired by all stakeholders. The consortium involved includes 27 partners and will continue to work on the project until end of 2016. Their work will include the coordination of 3 pilots, one each at air, land and sea borders, with the goals including integration of EES and RTP systems and/or functionalities thereof in deployed ABC gates, examination of how best to extend the use of ABC systems to accommodate third country nationals as planned in Smart Borders and study of whether there would be benefits in adding some functionality for EU citizens.

A second overarching goal enumerated was harmonisation of ABC systems in terms of their usability, including aspects such as document reading, interfaces for self-service kiosks, and the use of fingerprint scanners in gates. Thirdly, FastPass wishes to support innovative border crossing concepts, he indicated. Plans to address this goal entail development of a reference architecture with open interfaces that could be adapted by the authorities to their specific needs and that would utilise advanced technology modules, he noted. He added that all of the work is being organised, planned and delivered in cooperation with European Agencies and authorities, stakeholders in other related projects, industry and border guard authorities.

Mr. Clabian briefly focussed on the afore-mentioned subject of document scanning and, in particular, on how important it was in automated scenarios. He agreed with previous speakers that document scanners are problematic, but from his point of view suggested that one big problem not yet described was that such devices have only been used by trained border guards to date and thus not developed with passenger self-service in mind. The consortium is making use of a test device that displays different passports in different lighting conditions, he explained, using it to detail how and why problems occur. The test device has also been used as a tool to examine how robust it is to various different attacks, including exposure to high-powered electro magnets.

In follow up to a message conveyed by previous speakers, he also elaborated on issues at the level of the document itself. As there are around 2000 different valid travel documents that the passport readers must be able to scan, he explained that programming the device is difficult, particularly given the fact that passport designs change over

time. One outcome of research within the project thus far is that deviations in genuine passport design are significant – up to 50-60% difference in feature intensity in UV light, for example. Another important factor described was the ageing effect over the course of a passport's lifetime, a factor that also made algorithm development challenging. Notwithstanding, he even wondered whether claims regarding the capabilities of document readers made by vendors are always legitimate.

Mr. Clabian also outlined some open challenges in biometrics. One such challenge applicable to ABC gates was the fact that passports mostly only have faces and fingerprints as biometrics and the fingerprints are often not accessible. Thus, systems must rely on facial recognition unless some pre-enrolment is made, as is the case with some registered traveller programs. Yet he suggested that facial recognition is slow in some installations, both at the level of document reading and facial image comparison. Additionally, he suggested that algorithms were not necessarily as efficient as sometimes anticipated. Clarifying this statement, he explained that in pilots at Vienna airport, only 2 of 3 commercial algorithms met the Frontex recommended performance levels in terms of error rates. In these cases, older passports and those from certain countries caused problems.

The development of on the move technologies was a matter of great interest in terms of the utility of face-based biometrics, he suggested, and could improve border control significantly. Such solutions may make the use of segregated ABC systems, consisting of kiosks and gates, much more valuable, he indicated, as the facial image could act as a biometric token between the two stages of the process. At the gate, 1-to-n identification based on the facial image should be possible to complete the process, he suggested.

In seeking to briefly address the issue of spoofing and spoofing detection in ABCs, Mr. Clabian delved into the topic of multi-biometrics. He suggested that many believe that the addition of a second biometric makes any system significantly less vulnerable to presentation attacks. He proposed that this would depend on how the system is configured, with inappropriate setup implying that addition of an extra modality may open up a new avenue of attack.

Reiterating a theme emphasised by the national Smart Borders project managers in the first panel, Mr. Clabian set out to depict ABC gates as just one element of an automated, but not automatic, process. In this regard, he suggested that any security evaluation must look at the full process including the elements executed within the gates themselves. A thorough risk analysis of the full ABC-assisted process carried out in the frame of the FastPass project had led to the identification of more than 150 threats. The result does not mean that ABC systems are inherently insecure, he suggested, but it does indicate that some threats need thorough consideration.

Finally, in an effort to cross-reference the eu-LISA pilot tests spoken about earlier against those planned within the FastPass project, Mr. Clabian introduced details of the three FastPass test scenarios. At Vienna airport, plans involved testing of 3 configurations of ABC gate, specifically a standard 2 step integrated mantrap gate with testing of a variety of workflows, a segregated 2 step gate including use of self-service kiosk where passport reading could be carried out in parallel to biometric enrolment, and a two-step process storage of multiple biometrics enrolled at a kiosk between encounters, aimed at testing a registered traveller scenario. At the land border between Romania and Serbia, meanwhile, he explained that travellers will submit to a process involving initial enrolment of biometrics which will be followed by checks at a drive through gate. The demonstration will be open to EU citizens as well as third country nationals, he noted. Finally, on cruise ships in Greece, tests will involve enrolment of biometrics at a self-service kiosk on board the vessel to be followed by swift checks on disembarkation using on the move technologies.

He summed up his presentation by presenting his expectation that FastPass systems will be shown to be resistant to attacks on document scanners and to biometric spoofing and well received by end users. This will be thanks to the fact that the interface and processes have been developed and elaborated with extensive feedback from different European border guards and traveller groups and take matters of privacy and data protection into account.

The third panellist was Mr. Arun Vemury, Programme Manager at the United States Department of Homeland Security Science and Technology Directorate

Mr. Vemury expressed his gratitude for being provided the opportunity to share some findings concerning entry/exit systems and biometrics as tested and in some cases implemented in an operational setting in the USA.

He clarified from the outset that a biometric Entry-Exit System is in place in the United States and that biometrics are collected at all US airports. When implementing the system, the focus was on airport operations, he suggested, indicating that this implied implementation of an efficient but secure end-to-end process with the biometric collection being just a single aspect. All aspects of processes and technologies used had been studied. He indicated that now that the US is facing the same issues as Europe, particularly increased travel without any corresponding growth in staffing levels foreseen, this analysis is being revisited. Mr. Vemury added that one prevalent issue for the involved US authorities right now is the fact that there is a legal requirement to collect biometric data from travellers as they leave the country, as the infrastructure is built around biometric entry only.

Mr. Vemury briefly introduced the different stakeholders in the Air Entry-Exit Re-engineering (AEER) Program framework. They include the executive branch and legislative branches of government and the air industry. The principle goal noted was to find a qualitative basis for decision-making. He explained that the focus is on airports because, unlike land and sea border crossing points, they are commercially owned, meaning that the governmental authorities have less control and influence to demand modifications and must consider aspects such as airport and airline requirements and concerns. The overriding demand in such an environment is that any new operations and processes should not hinder business and government needs and regulations must be balanced with commercial needs.

Amongst the positive outcomes of the program so far, he highlighted the mobile applications introduced to enable expedited checking and the self-service kiosks that have been repeatedly optimised to drive further efficiencies. Processes and technologies involved in the baggage inspection are also being examined and developed. In all cases, he suggested that improved metrics need to be used to assess the new processes more efficiently, especially given the pace of change – new services should be added to airports every 90 days for the next year.

Challenges in the introduction of biometric exit checks were mentioned at the outset of his presentation, and Mr. Vemury spoke further about these issues in the next section. At the root of the issue, he suggested, was the fact that US airports were not built with biometric exits in mind and, furthermore, a majority of the international airport terminals service both domestic and international passengers. Thus, international travellers – some of whom should submit to biometric collection processes – mix in the same areas of the terminals with US citizens and those flying domestically, for whom biometric data collection is often prohibited. Furthermore, international passengers can arrive from other domestic flights prior to departure. He pointed out the fact that in addition to infrastructure, staffing is an issue.

When considering the merit of introducing new processes and technologies in such an environment, Mr. Vemury indicated the importance of thorough business case analyses. The overriding question must always be whether the cost of the various upgrades exceeds the actual value received,

he suggested. By considering the balance, one can recommend solutions that best serve the BCPs, based on a combination of performance, cost and risks, he added. As an additional point, he emphasised that the cost of implementing technologies must consider costs of introduced operations and staffing requirements.

Mr. Vemury further spoke about the Maryland Test Facility (MdTF), which provides a reconfigurable controlled environment for scenario-based testing under simulated airport entry and exit conditions. A multi-disciplinary team of experts in biometrics, computer science, human factors, data and other technical subjects are involved, he noted, indicating that the full mix of experts is crucial for success. Destructive innovation was introduced as a core concept – tests are run using different parameters and fully reconfigured in case of failure or other need. The approach is possible as the tests take place outside of the airport environment and thus do not disrupt passenger flows. He added that the approximately 1300 test subjects processed since its establishment hail from 40 different countries and are aged between 18 and 81 years old. By mimicking real life conditions, one can assess how well the biometric systems work and how end users interact with the systems, he noted, even considering aspects such as how travellers carrying baggage interact with the systems. Test subjects are also surveyed subsequent to participation to assess their satisfaction.

Tests at the centre give different results to those undertaken at biometric laboratories, he said,

highlighting the value of the scenario tests and the centre generally. Another benefit introduced was the fact that tests can include different equipment configurations, different instructions or different staffing models, providing multidimensional analysis capabilities. As a rule, analyses are made using measurable criteria that often include time, success to failure ratios, and time added to processes in case of failures.

A final aspect introduced was the need for control over systems influencing the test environment. Mr. Vemury mentioned video cameras, microphones and a variety of sensors in this regard and explained that lighting can be adjusted to reproduce daylight or dimmer conditions as one example.

Mr. Vemury ended by stating that the single key finding from testing at the facility thus far is that there is no one-size-fits-all solution.

Reflections

Mr. Tammer asked about the one-size-fits-all concept. In the Schengen area, what should be regulated centrally and what should be left up to individual Member States, he asked?

Mr. Gerritsen suggested that a single solution could never conceivably exist as border crossing points differ and their needs vary. Nevertheless, he restated that standardisation is needed and should be introduced in certain areas. In particular, principle goals should be that the traveller better understands processes and possibilities between different locations and systems are developed that can be adapted to changing environments with ease.

Mr. Clabian added that processes and tools involved in traveller identification need standardization. In particular, he reiterated that travel documents need to be more harmonized. Passports differ greatly, he explained, with simple aspects such as the location and composition of the data page varying. Additionally, he expressed a view that identity documents must be linked to biometrics. Otherwise, he agreed with Mr. Gerritsen that border types, locations and weather conditions will always differ and, hence, no single solution will be possible.

Mr. Vemury indicated that, based on his own experiences, it is important to realise from the beginning that no one-size-fits-all solution is possible. Expectations must be set from the outset bearing in mind the variability of locations in which technologies will be implemented. He added that better understanding of how the systems work is key to appreciating where standardisation can be introduced and where variability is necessary.

An audience member wondered what biometric modalities are, or perhaps should be, considered for Smart Borders.

Mr. Clabian noted that FastPass is considering face, fingerprints and iris recognition. He noted that project consortium members are developing algorithms for the fusion of modalities and are including analyses of whether any samples provided are spoofs.

Mr. Rahmun asked about the many techniques used in the United States. Are kiosk systems already an acceptable solution or are they still under close scrutiny, he wondered?

Mr. Vemury responded with a firm statement that kiosks would not disappear in the foreseeable future. The aim is and must be that all travellers use technology at least as a first step in the border check procedure. As in Europe, he noted that resources are limited and one of the most valuable resources is the officer's time. The goal of his department is to successfully offload some of the responsibility to the traveller, in particular straightforward tasks such as the scanning of the passport, he said. Ideally, a combination of technologies including apps and kiosks would be used so that the officer's time can be used for determining the intent and purpose of the travellers.

Mr. Tammer asked about automating the process. He mentioned a saying from civil aviation about how people check in their brains together with their luggage. How much is automating the process possible, taking these restraints into account, he asked?

Mr. Vemury explained that this issue, although challenging, is being tackled in the US. As an example, he noted that human factors engineers and cognitive scientists have been recruited to examine aspects of the processes introduced

by self-service technologies. He suggested that the process must be very easy for the traveller, particularly given that people are tired after long flights, they may not speak the local language and they may not be acquainted with the technology. Mr. Vemury brought forward some anecdotal evidence of traveller misunderstandings – in one case the instruction "place passport face down" had been interpreted by a passenger as a request to place their face on the scanner.

Mr. Clabian agreed while also adding that the newest technologies may obviate some of the issues. As an example, he noted that facial recognition on the move allows passive enrolment of the biometric without the active participation of the passenger and without his/her cooperative behaviour being necessary.

Mr. Gerritsen suggested that people could accomplish any process if they're guided and that repetition is key to learning. Thus, citizens can use ATMs because they have had the opportunity to repeat the process on machines that don't change significantly, he argued. ABC system configurations vary greatly, however, he noted, inhibiting the learning process. Uniform guidance, symbols and user interfaces should be introduced, at least across Europe, he suggested.

Mr. Clabian agreed that guidance from additional personnel was seen to aid performance greatly in the tests within the FastPass project. In their work, many of the users were first time users and at least for this cohort of passengers, functional pictograms and animations were seen to help.

Mr. Vemury intervened to note that although people learn with multiple uses of any particular piece of equipment, they also unfortunately forget such practices quickly. He thus emphasised that travellers also learn from the people in front of them in the border control queues. People also benefit from recognising the systems, he argued, indicating, that this was one observed benefit in the case of the introduced mobile apps.

An audience member went on to query whether it might be possible that one day the European Union and the United States could provide harmonized border checks, at least from a passenger experience perspective.

Mr. Vemury suggested that he wasn't the right person to give an answer. While the technology could work, he expressed a view that everything else is much more complicated.

An audience member asked for more information about the pre-vetting of travellers travelling to the United States.

Mr. Vemury responded by saying that the system is in place and working well. Travellers get a pre-clearance before they even get on the plane, he noted. When arriving in the United States, they are treated like a domestic traveller.

Mr. Gerritsen expressed a desire that as soon as such systems are in place, credentials should be sent to smooth the border check process no matter the destination. The focus must be on traveller, he suggested. Mr. Clabian suggested that the key question in transferring data is trust. Technically, such transfer wouldn't be complicated, he indicated. Mr. Vemury added that such exchange would also demand harmonisation of the vetting systems.

Panel discussion:
Evolution of Border Management in Europe
- the practitioners' views

Chaired by: **Mr. Ciaran Carolan, Research and Development Officer, Smart Borders pilot project team, eu-LISA**

Panellists:

Mr. Valentin Niculescu, Head of Schengen Evaluation and Procedures Service, General Inspectorate of the Romanian Border Police, Romania

Mr. Edgar Beugels, Head of the Research and Development Unit, Frontex

Mr. Pasi Nokelainen, System Manager at the Finnish Border Guard and Technical Manager of the Finnish National Smart Borders pilot, Finland

Mr. Carolan introduced the session, explaining that the goal was to examine the practical implications of planned innovation at the external borders of the European Union. He expressed his hope to learn about practitioners' views on whether the changes being planned or discussed will make border control more secure and efficient and wondered what challenges might lie ahead.

He noted that the session built on the industry round table that eu-LISA had organised on the previous day but was intended to examine matters

from a slightly different perspective. Specifically, the assessment of how best to utilise technologies was to be examined from the operational viewpoint. Additionally, he suggested that the Smart Borders program should be just one part of the overall discussion.
To stimulate discussions, he brought forward some key ideas from the industry panel to discuss further:

- Bridging of technologies and processes – how to best consider the users and other stakeholders when considering technology deployments?

- Protecting investments made – how to ensure that the 3 large scale IT systems administered by eu-LISA and indeed others in use in Europe, administered by Europol for example, are best utilised as new systems are introduced?

- Integrated border management – how can we accomplish the goals of IBM and where can technologies help?

- Complexity – are we making things easier or more difficult for the border guards?

The panel first brought forward national perspectives on these issues.

Mr. Pasi Nokelainen, System Manager at the Finnish Border Guard and Technical Manager of the Finnish National Smart Borders pilot, spoke first.

Mr. Nokelainen, having participated in the panel discussion at the industry roundtable, touched briefly on some of the concepts outlined in the introduction. He stated that although the discussion on the previous day was interesting, most matters mentioned were not entirely surprising for him. In fact, he suggested that the Smart Borders pilot was providing evidence to support conclusions already made based on tests undertaken in Finland previously and general experiences from the country. Furthermore, he noted that results had provided little cause for

major concern. Although there are some challenges when it comes to the devices, he suggested that the one important factor looking ahead will be the choice of biometric and the extent to which its enrolment and use is demanded. However, as was the case in discussions on large-scale IT systems previously, he stated that the most crucial aspect and the greatest determinant of success would be the provision of centralised and reliable systems with accurate data collection capabilities that would enable border control officers to do what is expected and obliged by the legislation. The proposed Entry Exit System will be just one tool in the system of border controls, he suggested, and its use at national level will have to be incorporated efficiently into border check processes to facilitate faster checks and help the officers make informed decisions on passengers entering and exiting the country and the Schengen area.

Reflecting on the history of the Smart Borders package, Mr. Nokelainen expressed a feeling that the process has already taken quite some time. The technical study of 2014 was not the first such document, he noted, yet legal proposals are still being drafted with the pilot being one particular phase in the long process aimed at testing various technical concepts. Now is surely the time to move forward, he suggested. Noting that Finnair had just acquired 19 new large aircraft to double capacity on Asian routes by 2020, he anticipated a requirement for significantly more facilitation of travel at his country's borders in the near future, particularly for third country nationals. Use of ABC gates alone will not be sufficient, he said. Europe will need to ensure implementation of more automation, make more accurate information available more quickly and where possible, preprocess information, he suggested.

Mr. Valentin Niculescu, Head of Schengen Evaluation and Procedures Service at the General Inspectorate of the Romanian Border Police followed up with his introductory words

Mr. Niculescu briefly introduced the testing undertaken in Romania within the Smart Borders pilot in order to provide background for further discussion. Testing, he noted, had been undertaken at two border crossing points, one land border crossing with vehicular traffic and one railway crossing.

A significant general finding was that data collection at the railway crossing was difficult, particularly when the train was moving. Perhaps this was due to the fact that the technical equipment for taking fingerprints allowed enrolment of just 2 prints at once, meaning that capture of 4 prints was reasonably feasible but 8 much more time-consuming and inconvenient, he suggested. Passengers unanimously indicated a preference for enrolment of fewer prints. As a guide, he noted that the enrolment of 4 prints required 1 to 2 minutes. Another noted set of issues related to reading of data from passports, particularly electronic Moldovan passports. Iris enrolment was also undertaken in the train, and he noted that some passengers refused to let officers enrol iris images for cultural and religious reasons. On the positive side, officers had indicated that risk profiling was easier thanks to automated processes, he noted. Furthermore, at the road border crossing point, feedback had been positive throughout. As alluded to by a previous speaker, he noted that provision of a special lane that allowed for expedited border crossing was attractive for passengers who generally wished to cross the border as quickly as possible.

Mr. Niculescu highlighted that the pilot was run during the summer when temperatures were convenient for testing. He suggested that technical and operational realities in winter weather should also be discussed.

Mr. Edgar Beugels, Head of the Research and Development Unit at Frontex, provided his opening statements subsequently

Mr. Beugels recalled Mr. Garkov's words from the morning session regarding border management of the future, particularly his point that Smart Borders would be just one element of future border management. One should not forget the general goal of developing further capacities in the field of integrated border management (IBM), he said, before going on to provide his own perspective on what IBM means and how it could be developed going forward, making use of Smart Borders systems alongside other tools.

An important component of IBM is the use of IT systems to support the work of border guards and those controlling the border generally, he noted.

Systems in place have been created as separate entities, but we must foresee some kind of integration at the IT level, he argued. He suggested that one mechanism by which this can be achieved is the establishment of a horizontal layer that allows communication between the different systems that are in place for border control.

Hindrances to such integration are prevalent, however, and Mr. Beugels brought forward some issues:

- A lack of common data elements that makes it more difficult for the systems to talk to each other.
- A lack of technical integration.
- A lack of analysis, individual as well as strategic, that utilises the wealth of information available.

With the above in mind, he wondered how Smart Borders can contribute to the advancement of IBM. One potential area mentioned was in the identification of victims of human trafficking, but this could not be achieved solely by providing law enforcement access to the system, he suggested, but rather more importantly by using analytics to identify patterns and uncover unknowns. He also touched on how the systems could contribute to the fight against irregular migration, noting that they would enable conversation on the problem of overstayers with a full knowledge about when these people entered that is unavailable currently.

Mr. Beugels went on to state that at least some integration of the EES with the VIS makes sense, indicating that this is indeed an appropriate step towards allowing systems to speak with each other. He suggested that a logical next step to encourage more harmonised border control would be the creation of a uniform national interface. In the case of the EES, it could be accessible as a generic interface for carriers to check the passengers permission to travel, for example.

Looking to the future, he proposed operations in which IT-based processes will run in the background in a largely invisible manner utilising more on-the-fly and walk-through technologies. Face-to-face interactions would be brought to the forefront of the processes, he suggested. Given the increasing movement across borders alluded to by previous speakers, he stated that there really is no other option. The border check process of the future will be automated, overseen by individuals who can intervene.

Mr. Carolan sought further perspectives on IBM, emphasising that accurate information needs to be provided promptly if security is to be maintained or improved. How can we ensure that the most relevant information is made available to the border guard quickly and easily, he asked?

Mr. Nokelainen emphasised that prompt provision of information and data was necessary for security but also for facilitation. Indeed, by providing data efficiently, border guards have more time to reflect on the information. Thus, facilitation itself implies improved security, he noted. He suggested that more developments are needed on the central side of the systems instead of at the national level. Right now, he described how border checks in Finland involve use of one single application that integrates the national EES with other systems and is accessible to several authorities including the police, customs, Ministry of Foreign Affairs, visa authorities, immigration services and others. There is a centralized search engine that allows all systems to be queried simultaenously and he suggested that a similar model could be followed centrally.

Coming back to the the topic of integrating the VIS system with the EES introduced by Mr. Beugels, Mr. Nokelainen indicated that such integration

presumes that fingerprints will be collected in the Smart Borders systems, which is not necessarily confirmed at this stage. In any case, he suggested that it would be preferable that the same processes are followed by both visa holders and visa exempt travellers. It would also be preferable that enrolled prints are passed at once in different queries to as many systems as require them, he noted.

Mr. Carolan sought clarifications from the panellists on what IBM involves beyond IT system integration.

Mr. Beugels said that IBM can be described according to a 4-tiered control model, comprising steps involving cooperation with the country of origin, then with neighbouring countries, checks at the border and finally contols or checks on the territory. Within the end-to-end process, he noted that information is received from different sources that can be used to build up a comprehensive picture on any given traveller. In this context, he indicated that feedback loops are crucial – thus, information on refusals at the border should be fed back to those at consulates issuing visas to allow them to rectify any faults in their procedures. However, such feedback often seems to be missing and, thus, there is a lack of appropriate analysis based on all information available. He also suggested that there should be an information envelope related to each person that the relevant authorities can make use of on a need to know basis.

Ms. Helen Neider-Veerme from the Estonian Police and Border Guard Board briefly provided comment on Mr. Beugels' assertion that better feedback loops are needed to improve checks, noting that the Estonian authorities use and analyse data in the Visa Information System daily and with signficant investment of effort, using the information obtained to return travellers who give false information at embassies. Feedback is given to the Ministry of Foreign Affairs in every single case, she said.

When asked about what obstructs information from being analysed (data protection issues, the legal framework and cultural issues were all brought forward as possibilities), Mr. Beugels indicated that the legal framework is a signficant constraint. Yet he also highlighted the fact that technical capabilities are sometimes lacking, explaining that

the various systems were developed independently and at different times without any consideration on later needs or possibilities in the area of analytics. He reflected how similar conversations proceeded in the USA post-9/11, when it was realised that large amounts of information were available but not shared, noting that changes were made to enable improved analytics immediately thereafter. He expressed a personal belief that with proper implementation of analytics, border security would doubtless improve.

Mr. Nokelainen partially concurred but nevertheless noted that the EU is not as advanced as might be desirable ahead of systems integration. SIS II is relatively new, he said, and the VIS even newer without even considering Smart Borders. Preprocessing data and analysis is a relatively new topic, he suggested, and might be better realised in another 10 years.

Mr. Niculescu provided further information on a project on IBM being jointly coordinated by several European countries. The main objectives of IBM, Mr. Niculescu reiterated, must be to maintain border security and ensure legitimate crossing of borders while preventing illegal migration, cross-border crime and terrorism. In summary, he stated that IBM has to maintain and enhance internal security. The project of which he spoke encompasses six main elements and he enumerated each in turn. The first concerns efforts to ensure that Member States take responsibility for their own external borders, organise and administer all matters according to Schengen standards and implement

controls taking into account both national and union interests. The second emphasises border control activities based on risk analysis and state of the art technologies to detect cross-border crime, he noted. The third pillar of work focuses on EU inter-agency and Member State inter-service cooperation. Finally, he described that the fourth strand of work seeks to ensure FRONTEX coordination of activities, the fifth to improve international cooperation (with third countries and international organisations) and the sixth ensures continuous consideration of fundamental rights and data protection.

Mr. Niculescu also took a moment to reflect on a particular concern for the proposed EU-wide Entry Exit System, specifically the fact that matching entry with exit will be difficult given the fact that human errors will doubtless be made and stamping may be abolished. He also expressed a desire that the system be somehow linked to national immigration services to allow better checks on the status of immigrants on the Schegen territory.

Mr. Carolan posed a question regarding the role of technology in harmonising border checks and border management across Member States, wondering whether the panellists saw this as one means to ensure mutual trust between Member States in the common travel area.

Mr. Nokelainen suggested that border checks are in fact already harmonised in terms of the content of the checks because all countries follow the Schengen Borders Code, agreeing nevertheless that methods for implementation can be chosen individually by Member States. Regarding processes, he stated that there is an evaluation mechanism in place to see whether Member States are compliant with legislation and suggested that this should increase trust. He did agree that harmonisation can be furter improved through use of technology, providing as an example a suggestion that requirements be set at the central level regarding aspects such as data quality and accuracy. Thus, he indicated a preference that Member States be provided only a small range of choices regarding what they implement in terms of technology.

Mr. Niculescu agreed on the whole, suggesting that although there are different methods used in checks, border control is, in principle, the same all over Europe.

Mr. Beugels expressed a strong belief that harmonisation and standardisation is key and can be improved by deploying appropriate technologies that are unfortunately lacking at the European level at the moment. He assured that Member States want their neighbours to comply with standards. He suggested that the Schengen Borders Code ensures harmonisation only on paper, as it is sometimes ambiguous and permits the use of divergent practices. Furthermore, as highlighted by the migrant crisis, he noted that rules are not necessarily adhered to.

He also suggested that harmonisation of technologies can improve the passenger experience. Building on experiences with ABC gates, he indicated that interfaces and configurations need to be similar between Member States to allow a person with no prior experience to interact with a deployed system. Such harmonisation would be an important contributing factor in making the roll out of future systems successful.

Mr. Nokelainen responded by noting that any harmonisation at the technical level in Europe would have to be defined. He suggested that one issue was the fact that it is unclear what it means to comply with the Schengen Borders Code in terms of technology. He implied that this question required further consideration.

The next question focussed on the matter of carriers having access to information in the future European Entry Exit System, particularly how this could be achieved at the technical level.

Mr. Nokelainen noted that a proper response could only be provided once the contents of the legal proposal are known. In any case, he stated that any carrier checks would imply execution of an additional process and, therefore, additional costs for the carriers and thus should be carefully considered.

Mr. Beugels felt that such checks did not, in fact, introduce anything different or additional. The checks under discussion would be intended to

ensure that those who shouldn't reach borders do not travel. Carrier liability would come into play subsequent to travel as is the case today, he said.

Mr. Niculescu added that airports are making increasing use of API and PNR information, with the latter being discussed and expanded in Europe. He suggested that systems and networks for sharing this information could also be used for carrier checks and for communication of any relevant information to carriers.

A representative from the European Parliament commented, stating his belief that enabling carrier access would not add a new purpose to the EES. He continued by noting that discussions on Smart Borders should remain separate to those focussed on the migration issue, emphasising that Smart Borders will not provide a new tool to help in the humanitarian crisis. Knitting the two themes together for the purposes of questioning, he wondered whether eu-LISA could become involed in the hotspot project being coordinated by FRONTEX while also enquiring about panellists' views on law enforcement access to the Smart Borders systems.

Mr. Beugels picked up on the topic of hot spots and commented that FRONTEX and eu-LISA are strongly involved with a pilot program that deals with recording the migrants on Lesbos island in Greece. Otherwise, panellists expressed no strong views on the question of law enforcement access.

The moderator shifted conversation briefly towards the topic of border guard roles, specifically wondering whether the panellists felt that the role of the border guard would change in the future, requiring increased knowledge of IT and interpretation of technical information. He also wondered whether their training might have to change as a result. Referring to a question at a previous session, he also wondered whether the border guard could ever be seen as a weak point in the system.

Mr. Nokelainen indicated that he didn't envisage signficant change compared to the current situation. Increasing use will be made of self-service technologies, he noted, but in manual control, technology will simply provide information to make it easier for them to evaluate passengers. Thus, he expressed an opinion that future IT will make checks more reliable and more fluent. He

disagreed with the sentiment that the border guard can be seen as a weak link in the process, suggesting that they are present and needed to deal with the problem cases that are not amenable to processing using full automation and that require the judgement of a trained guard to ensure security. Finally, he did agree with the need for altered training to deal with new IT.

Mr. Niculescu generally agreed, adding that problems at the border are created by humans and also must be solved by humans. Technical solutions cannot solve human problems, he stated.

Mr. Beugels also concurred, indicating a view that IT will help the border guard. Furthermore, he did not agree that border guards are the weak points in the system but rather felt that they were needed to ensure security and efficiency. IT will be used to accomplish the mundane and straightforward tasks, he said, while the guards will handle the problem cases that often require more in-depth and intuitive analysis of information. Nevertheless, their work will change as the focus of their tasks shifts, he suggested, as has already happened in the case of ABC systems where border guards act as observers for the most part. When it comes to training, the guards need to be made aware of what the IT can and cannot do, he suggested. Given increased use of IT, he indicated that border guard tasks will change and involve more data analysis. As an example, he suggested that traveller nationalities will become less relevant as tools offer new possibilities to examine the traveller him-/herself.

An audience member who introduced himself as a former border guard of 16 years followed up by asking what kinds of people would be needed at borders and what skills and capabilities might be demanded a decade from now.

Mr. Beugels said that delineation of any concrete demands would be beyond the scope of discussions on the day but noted that the border control community will drive the change themselves. Rules made centrally will doubtless have implications at the working level and border guards should drive developments thereafter.

In a final round of questions, quick responses were sought on some brief relevant points.

Mr. Niculescu spoke about Smart Borders tests in Romania and particularly about whether he viewed the deployment of the tested technologies as a help or a hindrance to border control.

He indicated that the pilot was a good experience overall. He also expressed his views that the findings were practically useful and provided lessons for future planning. Overall, his feeling was that the technologies tested would be more of a help than hindrance.

Mr. Nokelainen spoke about national plans in Finland following the Smart Borders pilot, particularly in the domain of operational tests.

He noted that the tools deployed in the pilot had been installed in a short space of time and, therefore, didn't necessarily provide final results; thus, some testing could be continued to provide more reliable data over time. At this stage, he felt that the main output of the pilot was information on aspects that were less desirable. He reflected briefly on tests already undertaken in Finland outside of the eu-LISA pilot, listing tests on processing of visa holders through ABC gates, deployment of an entry-exit and RTP simulator and testing of fingerprint scanning at ABC gates. All, he noted, had provided valuable information on whether data collection can be accomplished in one entry using a single fingerprint scanner. Interesting results were obtained regarding fingerprinting generally and about related topics such as animations and traveller instruction. Looking to the future, he suggested further tests to examine how biometrics affect the entire border control workflow, the use of mobile applications to submit information for pre-processing and trialing of automatic licence plate recognition at land borders.

Mr. Beugels briefly touched on the National Uniform Interface (NUI) concept introduced in the Smart Borders technical study, specifically answering a question about whether it could be a paradigm for further harmonisation and standardisation of technologies at the national level and whether Frontex could play a role in further bringing standardised technologies to European border control.

He noted that certain technical prototypes have been tested in the context of joint operations and in joint projects. However, he felt that standardised interfaces and technologies could be tested in other ways, for example, through projects at Member State level. Regarding the NUI, he noted that opinions seem to be divided, with some Member States expressing not to need it while others indicate that they would be happy to have matters taken care of at the central level.

Mr. Nokelainen emphasised that the NUI and similar specific applications are indeed developed at the central level but together with the Member States.

Closing remarks
Beyond Smart Borders: Towards innovation in future European border management

Mr. Krum Garkov
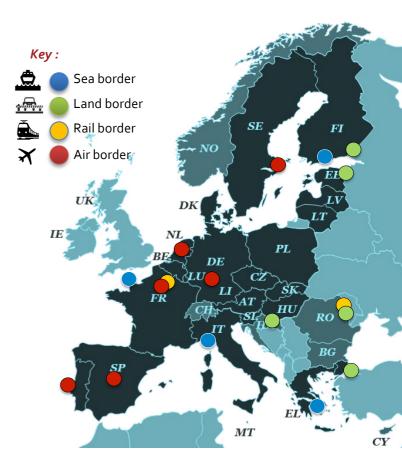**Executive Director of eu-LISA**

Mr. Garkov noted from the outset that given the volumes of information and thoughts exchanged, he would prefer to give the closing speech on the following day in order to have more time to reflect and digest. This highlighted the fact that the event was very interesting and successful, he said. Throughout panel discussions, valuable experiences had been shared, he said, and he expressed both hope and expectation that this will help to facilitate work of everyone involved in shaping Smart Borders in the months ahead, especially at the practical level. Mr. Garkov expressed his excitement and anticipation regarding the work that lies ahead following the pilot, looking forward to reading the new revised proposal of the European Commission and hearing the opinions of the Parliament and the Council. He hoped that the proposal will reach a positive conclusion so that the Agency would be able to begin system developments and implementation in 2017. He justified his position by expressing his belief that Smart Borders is an important initiative. If the opportunity to deploy it now is missed, he suggested that the task would be more difficult and costly 5 years from now while any later deployment would be too late to address present and future challenges.

Speaking more generally, Mr. Garkov spoke of the value of the conference and similar events in permitting various authorities to not only examine the particularities of Smart Borders, but also to look beyond and thus better shape the future of border management in Europe from the earliest stages possible. Now is the time, he suggested, to ask how to manage European borders in the future. In this regard, he promoted the development of a strategy to guide how technology should evolve and be utilised.

Undoubtedly, the future of border management and its strategic direction will require more powerful, flexible and also smarter systems that can adapt to shifting demand or changing political priorities, he stated. One key question introduced was how to find the right balance between what Europe already put in place for border management and new capabilities and trends in the industry. Mr. Garkov went on to outline four important development principles: 1) technological developments need to be aligned with the processes that they support, implying clear definition of objectives from the outset; 2) data should be turned into information, i.e. border management must utilise predictions, analysis and forecasting, without which, he suggested, developments will always lag and management will lurch from one crisis to the next; 3) stakeholder integration is vital, and in terms of Smart Borders, all concerned parties should interact if the systems are to have added value; 4) standards and best practices need to be developed and implemented to ensure harmonisation and interoperability between systems at national and central levels.

A significant lesson from the Smart Borders pilot brought forward was the need to consistently and strategically look to the future in order to shape it while diverse possibilities are still open. It is not wise to jump from one initiative to another, Mr. Garkov suggested, meaning that one is later faced with the task of drawing everything together. The strategy that he mentioned should cover both operational border management and technical innovation, he indicated, and would provide a template towards

which everyone can work with full focus and energy. Another crucial point would be interaction with partners and EU institutions, he said, and thus he once more expressed his view that events like the eu-LISA conference will always be one of the main vehicles to shape and deliver the future. Finally, Mr. Garkov thanked everyone for attending and for working hand-in-hand with the Agency during the pilot. He noted an expectation that once the pilot report is available, it will be a very useful tool to facilitate the successful conclusion of work on the Smart Borders proposals. Finally, he thanked the eu-LISA team for ensuring that the event was so well coordinated and passed off successfully and welcomed everyone to the evening reception at the future permanent location of the Agency.

Key :
🚢 Sea border
🚃 Land border
🚆 Rail border
✈ Air border

The test cases of the Smart Borders Pilot project were executed in 12 Member States.
The locations for the tests are highlighted in the picture above.

Conference Organiser:

eu-LISA,
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management of large-scale IT
systems in the area of freedom,
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