Data Quality and Interoperability: Addressing the Capability Gaps through Standardisation

eu-LISA 12th Industry Roundtable

3-5 November 2020, Tallinn

(Online event)
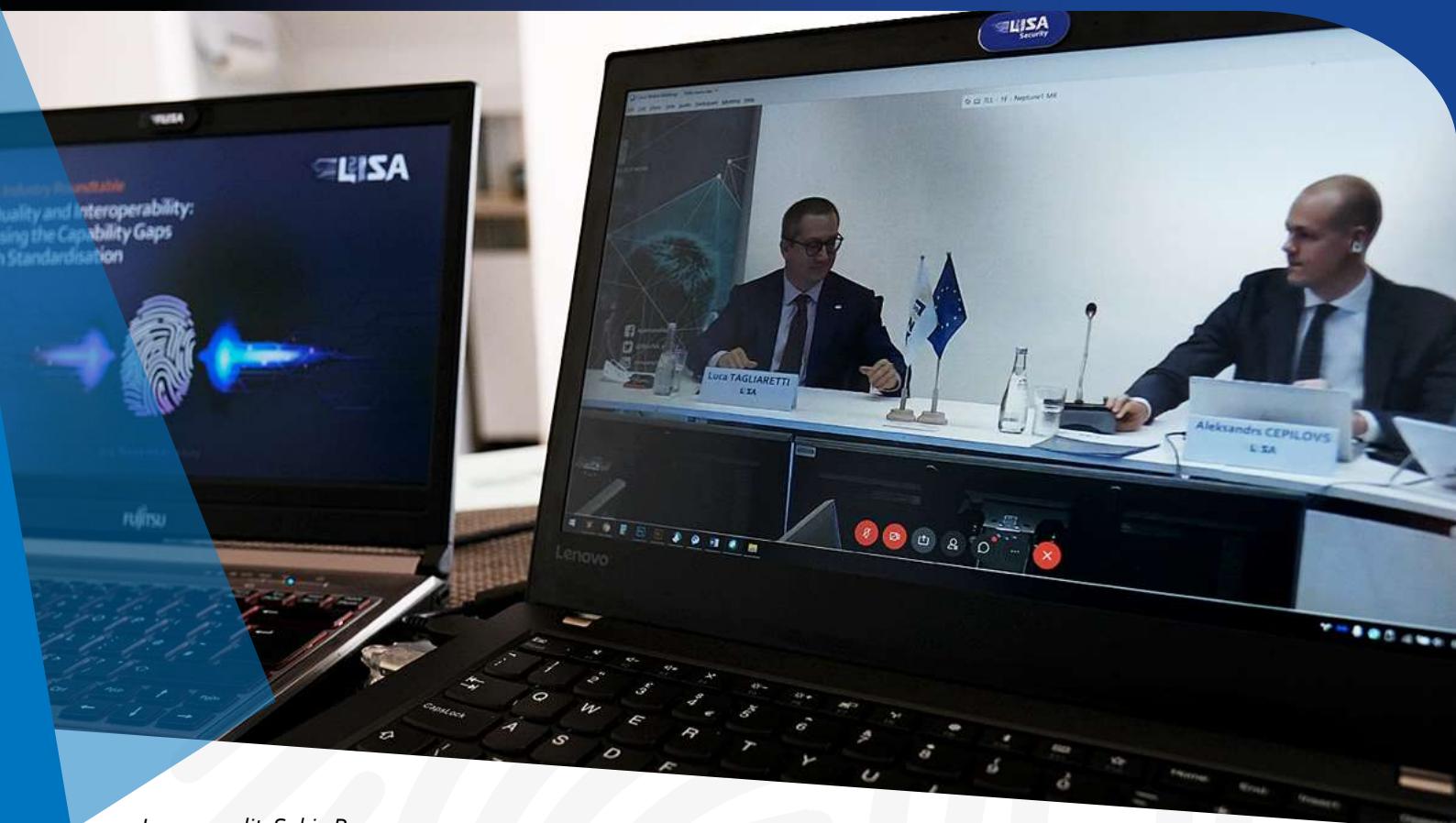
eulisa.europa.eu

Image credit: Sabin Popescu

Introduction

On 3-5 November 2020, the European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice (eu-LISA) hosted its 12th Industry Roundtable titled **"Data Quality and Interoperability: Addressing the Capability Gaps through Standardisation".** The online event brought together over 320 participants from more than 90 organisations and 35 countries, representing international border management and security industries, EU Member State authorities, EU Institutions and JHA Agencies as well as representatives of NGOs and Academia.

This year's edition of the eu-LISA Industry Roundtable focused the discussion on the challenges pertaining to data quality and access to data in context of the new information architecture

for internal security, border and migration management. To address these challenges, we invited companies to present their solutions focusing on ensuring biometric data quality at the point of capture, ensuring the quality of alphanumeric and biometric data in large scale IT systems, as well as access to data.

To set the scene for the Industry Roundtable, we also invited representatives of the research community, who focused on current issues in biometric data acquisition and biometric matching as well as relevant standards.

The purpose of this summary report is to provide highlights of the presentations and discussions that took place during the event.

More information on the event, presenters and slide decks of the presentations can be found on the website of the Industry Roundtable:

www.eulisaroundtable.eu

OPENING REMARKS: Dr Aleksandrs Cepilovs, Research Officer, and Mr Luca Tagliaretti, Deputy Executive Director at eu-LISA

Dr Aleksandrs Cepilovs and Mr Luca Tagliaretti, opened the event and welcomed the speakers and participants to the 12th edition of the Industry Roundtable.

Mr Luca Tagliaretti, in his opening remarks reminded the audience that during the past year eu-LISA started to implement several new legal instruments which aim at delivering a new information architecture for border management and internal security by 2023. The new interoperable information architecture will interconnect the large scale IT systems in the JHA domain and will enhance the exchange of information.

However, once deployed, the ability of this new information architecture to deliver the expected political objectives and operational benefits will depend mainly on the quality of the data which is fed into the systems and on how easy it is for an end-user to access the information extracted from that data. As a consequence, the ability to collect and share high quality data among the relevant users in a structured and harmonised way represents a critical success factor for the implementation of interoperability.

Thanks to the new Regulation[1], eu-LISA has now a clear mandate in terms of data quality. For this reason, the Agency, in cooperation with the Commission, the Council Presidency, Europol and Frontex has proposed a roadmap for standardisation.

The Industry Roundtable is also part of this common effort that will help us to unfold challenges related to data quality through standardisation. It is through the joint effort, in partnership with industry and academia that we will be able to tackle the challenges ahead most effectively.

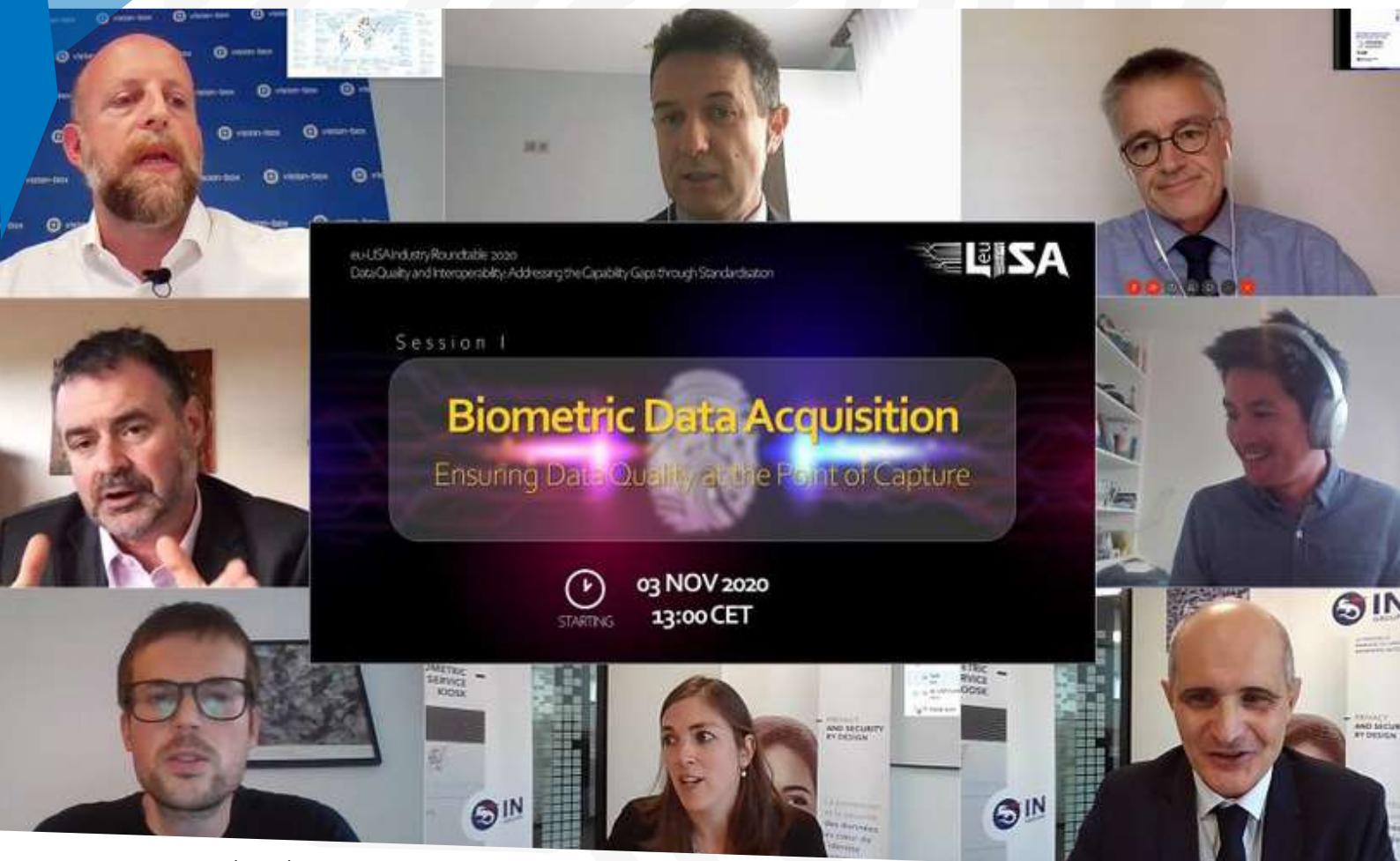[1] Regulation (EU) 2018/1726, OJ L 295, 21.11.2018, p. 99–137

Image credit: Michael Evans

SESSION 1

Biometric Data Acquisition: Ensuring Data Quality at the Point of Capture

Moderator: Mr Istvan Szilard Racz, Senior Information Technology Officer at eu-LISA

Image credit: Sabin Popescu

Keynote presentation - Standards and Challenges for Large Scale Systems

Prof. Christoph Busch, European Association for Biometrics (EAB), Hochschule Darmstadt, NTNU

Prof. Busch in his presentation focused on the challenges related to biometric data quality in the context of large-scale IT systems, and in particular on the issues of presentation attack detection (PAD), quality of facial image samples and relevant standards. He further elaborated on the three main points for a targeted attack:

- Capture device – camera, fingerprint sensor (1); can be countered by presentation attack detection
- Data transmission – network (2); can be countered by cryptographic protocols
- Data storage – database (6); can be countered by biometric template protection

He continued the presentation with a focus on presentation attacks and their detection. The attacks can be done in various ways and aimed at both fingerprints and facial presentation. Prof. Busch presented taxonomies and examples of various kinds of attacks, as well as a range of means for countering presentation attacks, including an overview of morphing attack detection algorithms.

In his presentation, he also addressed the issue of face sample quality, the factors affecting it, and the methods for face image quality assessment. Prof. Busch closed his presentation with an overview of relevant standards related to biometric sample quality, biometric data exchange formats, and testing metrics for presentation attack detection.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/Keynote_Busch.pdf

Source: ISO/IEC 30107-1:2016
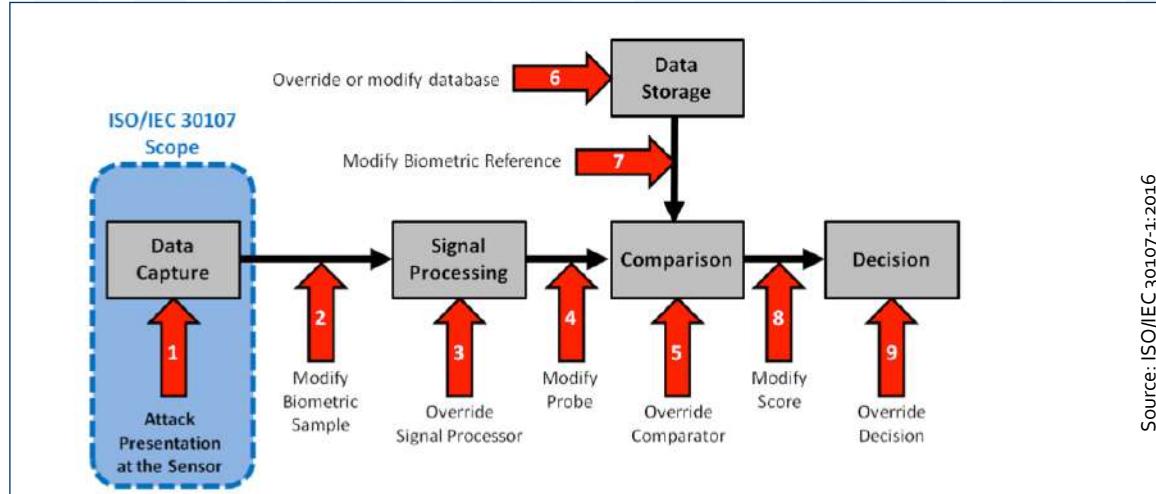
***Image 1:** Slide from the presentation of Prof. Christoph Busch, European Association for Biometrics (EAB), Hochschule Darmstadt, NTNU*

Discussion

The discussion focused on the challenges in using automated face recognition systems, as opposed to humans (e.g. border guards).

According to Prof. Busch, while new technologies (such as deep learning) may outperform humans in face recognition, both humans and machines have problems with some types of attacks (e.g. morphing attacks).

Synthetic biometrics is an additional challenge and requires a very careful approach. In order to train algorithms, we need to have all ethnic groups represented and it might be difficult with some ethnic minorities. Replication of ethnic distribution by creating synthetic data could be one remedy.

Some of the technological solutions for automatic biometric identification rely on the so-called black-box models, when the system performs an identification using an algorithm relying on a large number of parameters (e.g. millions), and decisions which cannot be easily explained. While it is a challenge, it is a similar challenge faced by experienced humans (e.g. border guards), performing facial recognition; they make a decision based on their expertise and experience, but would have difficulty to always explain their decision regarding each instance of face recognition. Therefore, we should not discard automated facial identification systems based on neural networks only because the results are not clearly explainable, as this will likely have a detrimental effect on recognition performance.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/Keynote_Busch.pdf

Biometric Data Acquisition: Addressing the Challenges of Data Quality at the Point of Capture
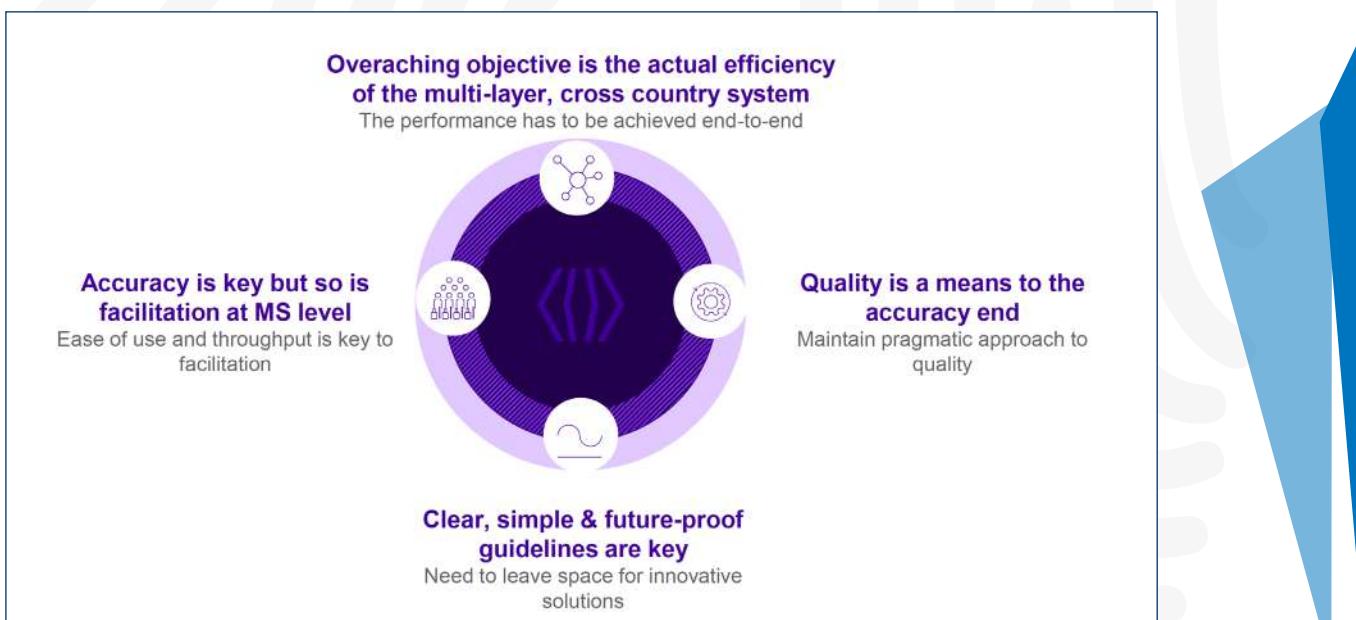
Mr Emmanuel Wang, VP Border Control & Passenger Flow Facilitation, IDEMIA

Mr Wang began his presentation by revisiting the requirements of the EES regulation for biometric identification systems. The EES regulation defines a set of requirements for facial image and fingerprints in several domains: modality, resolution, interchange format, biometric performance and quality. Some of the requirements are precise and some others need to be further specified.

The underlying objectives of those requirements are to allow the biometric data to be

- interoperable between various systems of the EU and Member States,
- applicable, so the operations at the borders will be fast and not overloaded,
- inclusive for people arriving via different transport modes,
- future proof - need to have a degree of flexibility; COVID 19 situation is a good example for how the system should be flexible, in order to be able to deal with detecting facial masks.

Image 2: *Slide from the presentation of Mr Emmanuel Wang, VP Border Control & Passenger Flow Facilitation, IDEMIA*

Mr Wang presented several specific recommendations for the acquisition of fingerprints and facial images at the point of capture, emphasising that we should ultimately strive to find a balance between quality and performance, in particular to ensure that the systems in use ensure high processing speeds, are inclusive and future proof. Mr Wang also presented some of the solutions that IDEMIA has developed.

Biometric Data Acquisition: Ensuring Data Quality at the Point of Capture

Dr Sandra Cremer, Biometrics Research & Development Team Leader and Mr Pascal Janer, VP Sales Europe & Business Development, IN Groupe

In their presentation, Dr Cremer and Mr Janer focused on attacks and attack detection (PAD) solutions developed by IN Groupe. Spoofing attacks have been an important challenge in secure biometric identification technologies.

The presentation included an overview of evaluation challenges and certification schemes for the evaluation of biometric component performance in the case of presentation attack. Dr Cremer argued that there is a clear need for an EU certification framework that is compliant with specifications defined in the EU, and compliant with European values and legal acts (e.g. GDPR). Dr Cremer further suggested that FIDO is the only biometric component certification scheme that includes certification for PAD.

The image below (3) shows some characteristics of different attack levels as defined in the FIDO certification scheme.

IN Groupe has developed its own systems for high quality biometric data acquisition, including PAD for both facial images and fingerprints, complying with the standards for mobile, stationary, manual and self-enrolment applications.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_IN-Groupe.pdf

Level	Time	Expertise	Equipment	Source of Biometric Characteristics	Face Examples
A	< 1 day	Layman	Standard	Immediate, easy Ex : Photo from social media	paper printout of face image, mobile device display of face Photo
B	< 7 days	Proficient	Standard, Specialized	Moderate Ex : video of subject, high quality photo	paper masks, video display of face (with movement and blinking)
C	> 7 days	Expert	Specialized, bespoke	Difficult Ex : high quality photo, 3D face information from Subject	silicon masks, theatrical masks

Image 3: Slide from the presentation of Dr Sandra Cremer, Biometrics Research & Development Team Leader and Mr Pascal Janer, VP Sales Europe & Business Development, IN Groupe

High Quality Image Acquisition

Dr Christian Rathgeb - Consultant for Biometric Systems, secunet

Dr Rathgeb began his presentation by outlining the requirements of the EES regulation with regard to facial images, namely compliance with ISO/IEC 19794-5:2011. The database will contain hundreds of millions of images; therefore, the acquisition of high quality biometric data during enrolment is essential for achieving the good performance of biometric recognition systems. One of the challenges is that image acquisition at land border crossings cannot always be of the same quality as at the airports; it is also true for water and rail border crossings. All that might create limitations for facial recognition. Additional limitations on facial recognition include false matches (e.g. people who are lookalikes), demographic bias, and the probability of false matches increase with database size.

One solution to these challenges is biometric fusion, combining facial images and fingerprints. Increased amounts of information prevent false matches, but this requires a method for score normalisation, which attributes scoring for recognition between facial image and fingerprints.

Dr Rathgeb presented some technological solutions for quality biometric data acquisition developed and provided by secunet.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/3.secunet_EES_image-quality_final.pdf

Image 4: Slide from the presentation of Dr Christian Rathgeb - Consultant for Biometric Systems, secunet

Leading the Way in Intelligent Optical Inspection and Recognition Solutions to Secure Borders, Identify Threats, Accelerate Throughput and Provide Real-Time Actionable Intelligence
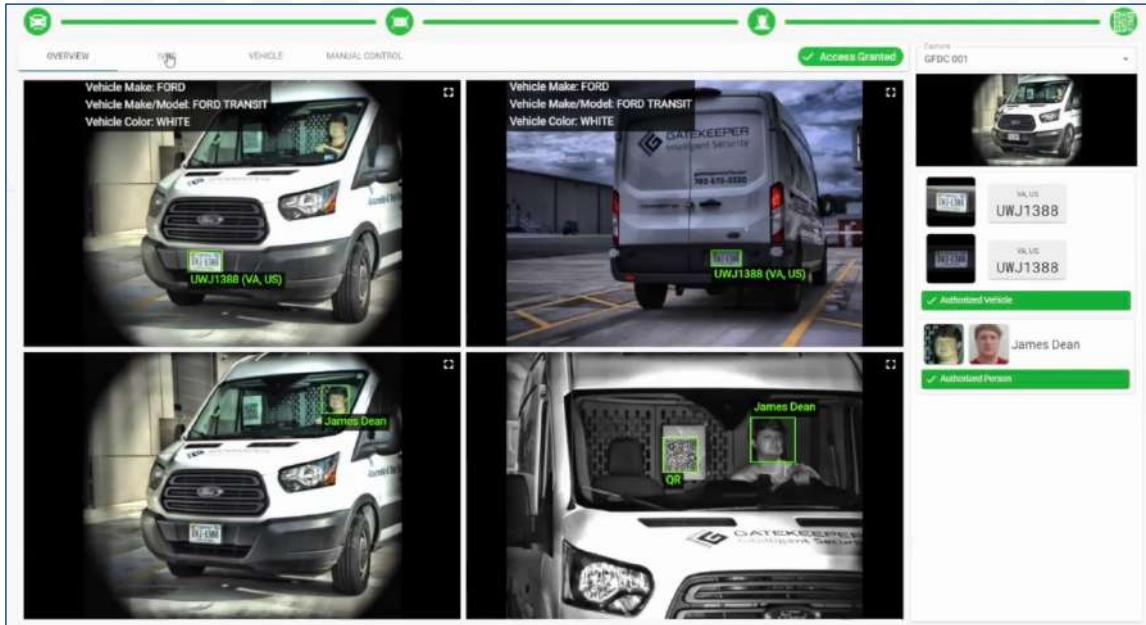
Mr Dave Harmon, Director of Business Development UK and Europe, Gatekeeper Security

The presentation focused on the presentation of optical recognition of vehicle systems. The company has developed multi-factor technology for 'vehicle biometrics', including facial recognition and 3D scanning of passenger and freight transport. The presented solutions aim to increase the human ability to rapidly and accurately perform multiple security functions simultaneously, as well as increase throughput, security, and Covid-Safe Contactless/Seamless border controls.

Mr Harmon presented a video demonstration of the system's capabilities, showing how it facilitates cross-border movement of a commercial vehicle.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_Gatekeeper.pdf

Image 5: *Slide from the presentation of Mr Dave Harmon, Director of Business Development UK and Europe, Gatekeeper Security*

Smart Borders: Making Borders Work Smarter, Not Harder

Mr Jean François (Jeff) Lennon, Vice President – Strategic Sales & Global Partnerships, Vision-Box

Mr Lennon began his presentation with an overview of the Entry/Exit System (EES) and continued with some lessons learned from the Smart Borders Pilot run in 2015. One of the questions of the Pilot project was *'is it feasible to extract the picture from the e-MRTD and verify against live image within the context of a future EES system at all types of borders with various setup?'* Here are some conclusions:

- It is difficult to set one camera position for all travellers' heights. An auto-adjustable camera could be an advantage
- Back-light and reduced lighting had been observed to impact verification success
- The cameras could be more user friendly and integrated in the environment
- Reading the e-MRTD[2] passport of some nationalities (US ,Brazil, China) seems to be a blocking issue

Mr. Lennon also presented some recommendations for policy makers:

- Pre-Deployment at BCP (border control process), Environment Study is crucial to success, to safeguard a secure, fast and efficient Border Control process
- Automated, High Quality & Compliant Face capture is a must to deliver effectiveness at the BCP and a robust EES/sBMS capability
- Each BCP type has its own challenges, thus MS requests to the Industry shall be functional and not technical, only asking for proven compliance with the EES/ISO regulations and standards

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[2] E-MRTD - electronic machine readable travel documents

You can request the slide deck at research@eulisa.europa.eu

Image 6: Slide from the presentation of Mr Jean François (Jeff) Lennon, Vice President – Strategic Sales & Global Partnerships, Vision-Box

Discussion

Following the Individual presentations from the industry, a panel discussion with a Q&A session took place. The main points discussed were:

- EU policy-making bodies and Member States should look into functional criteria and standards, whereas technical criteria should be left to the industry

- The need to carefully assess the quality threshold, in order to be able to deliver performance (e.g. ensure fast flow of travellers)

- The need to look also into fusion between facial and fingerprint recognition

- The industry has developed and is also currently working on technical solutions for quality biometrics acquisition in challenging environments (such as moving trains); transmission of data where internet is not available is still a challenge.

- Covid 19 pandemic has introduced a new challenge with facial masks, but there are some solutions and ideas how to tackle it, because *'facial recognition is here to stay'*:
    - Facial recognition algorithms can be retrained to recognise faces with masks
    - Travellers can take the masks off
    - Transparent masks are a possibility

SESSION 2

Ensuring Consistent Data Quality in Large-Scale IT Systems

Moderator: Mr Theofanis Syrigos, Head of Business Relations Management Sector at eu-LISA; Chair of the EES-ETIAS Advisory Group
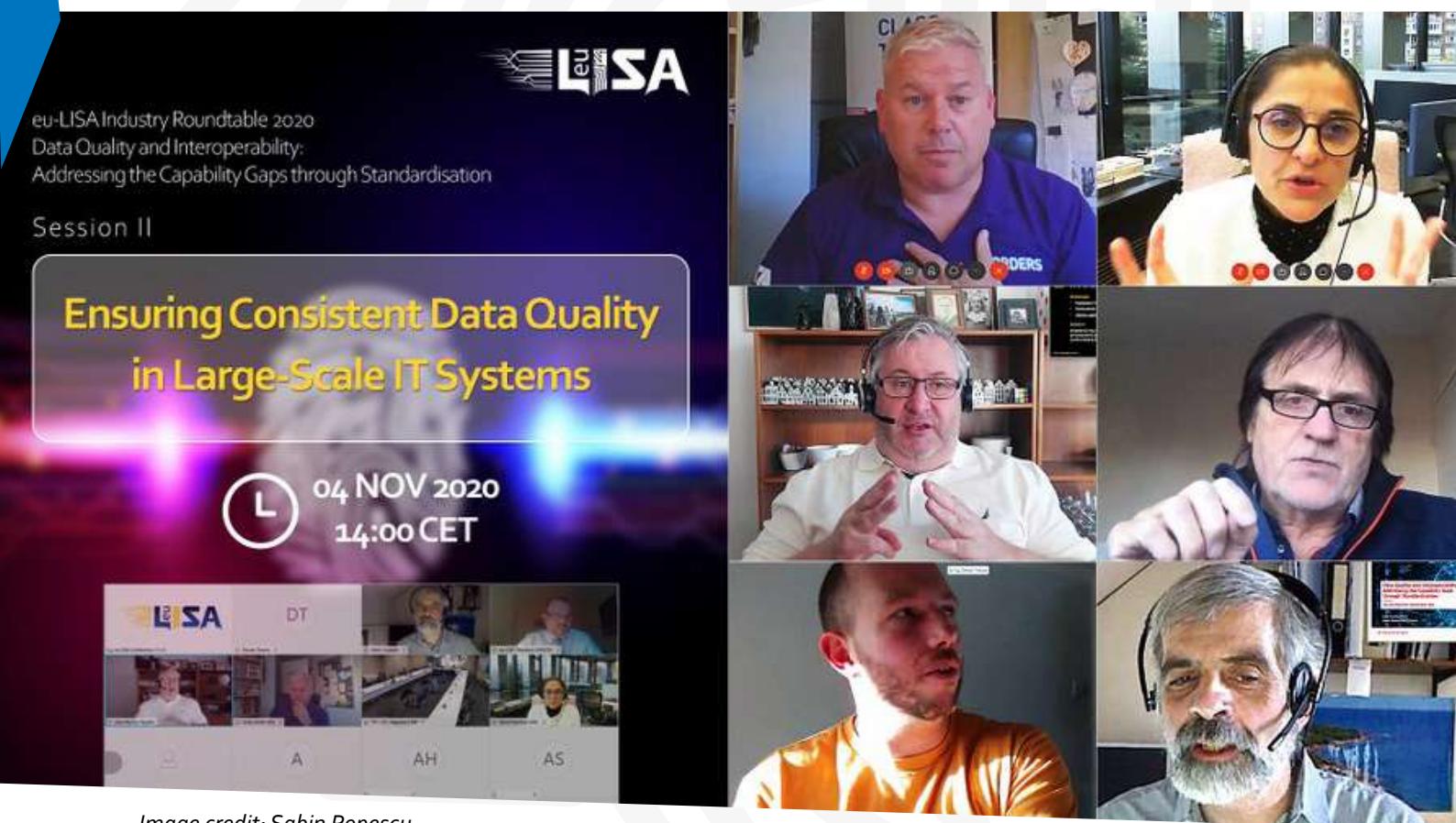

Image credit: Sabin Popescu

Keynote presentation - Face Biometric Quality Measures: Need and Use in EU IT Systems

Dr Javier Galbally, DG Joint Research Centre, European Commission

Dr Galbally started the presentation with a debate on quality – in science in general, computer science and specifically in biometrics. One expression of quality in science is *'Only nonsense conclusions can be expected from flawed premises'*. Quality in computer science may be characterised as *'The soundness of the data given as input to a computerised system plays a pivotal role on the soundness of its output'.* One of the principles describing the quality in biometrics is the GIGO principle – *'Garbage In, Garbage Out'*, meaning that bad inputs will lead to bad outputs. Following this logic, high-quality samples are naturally preferable to low-quality samples; it raises a question of what biometric quality is.

In essence, biometric quality establishes a direct link between the reliability of the input and the output of a system, where good quality samples will lead to good accuracy and bad quality sample will lead to bad accuracy. The utility definition is *'Biometric quality is a predictor of biometric accuracy'*.

Dr Galbally presented how the challenges of biometric quality and accuracy can be addressed with the example of FaceQnet[3], a quality assessment approach for facial recognition based on deep learning, developed by DG JRC in collaboration with the Universidad Autónoma de Madrid.

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[3] More information on FaceQnet can be found at J. Hernandez-Ortega, J. Galbally, J. Fierrez and L. Beslay, *'Biometric Quality: Review and Application to Face Recognition with FaceQnet'*, arXiv:2006.03298, 2020 arxiv.org/abs/2006.03298

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/Keynote_Galbally.pdf
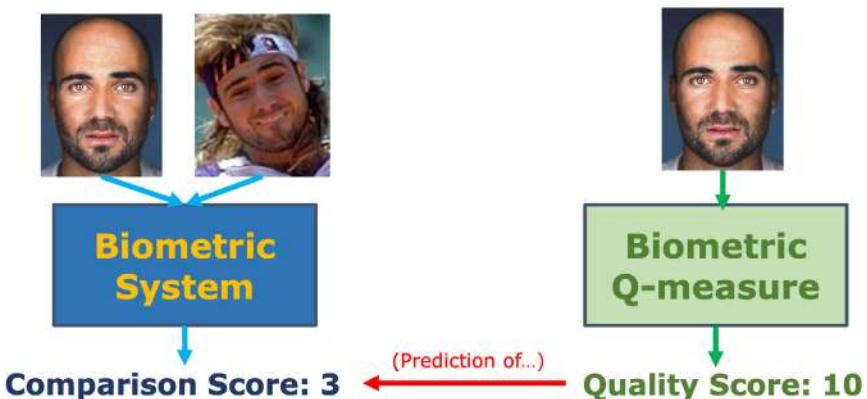
Image 7: *Slide from the presentation of Dr Javier Galbally, DG Joint Research Centre, European Commission*

Discussion

The audience raised a number of questions during the discussion. First, whether human inputs were used for determining the perfect images used for comparison purposes in the research performed by the JRC. Dr Galbally responded that the approach to establish 'ground truth' in the study was to use mated scores generated by three different biometric systems, which allows the process to be automatized and make it more objective. However, there is still a human dimension as the requirements for portrait images are defined by humans.

Another important aspect addressed during the discussion was how technologies can be applied at end user level, for example, a border guard taking photos of people entering the EU in a moving train, bad weather conditions, etc. According to Dr Galbally, there is only one way for quality input – only at the acquisition stage (i.e. when the photo is taken). Therefore, the more restrictions you impose in the acquisition context, the more you limit the variability of conditions, the better quality you obtain in the end. Perfect quality is defined by ICAO/ISO requirements and the less these requirements are followed, the worse the results are. In a case when it is not possible to follow those standards, we need to recognise that the quality will not be optimal.

Data Quality & Interoperability – Curing the 'Rubbish- In Rubbish Out' Paradigm

Mr Andy Smith - Director, Government & Industry Relations, SITA

Mr Smith began his presentation with an emphasis on the growing demand for traveller data expressed by governments and international organisations alike, as a response to security threats, as well as the current pandemic, for example. These data could be better used in all the border management layers, as shown in the image below.

Better data management can help the authorities determine if a person can arrive in the country even before that person arrives. It is especially relevant in the times of today's COVID-19 pandemic.

In addition, the amount of information that includes medical details that is required from the travellers these days, in the light of the pandemic, starts being 'painful' – both for the passengers and the authorities. At the same time, it is not always efficient in conducting epidemiological research when a passenger is found infected with COVID-19.

A solution presented by Mr Smith, and offered by SITA, envisages integrating existing systems more than in the past. In particular, he advocated some opportunities in combining API (advance passenger information) and PNR (passenger name record) data, allowing for more seamless travel for passengers and a better track and trace system for the authorities.

Finally, Mr Smith emphasised that in the current situation, when sensitive medical information is required from travellers, in addition to legislative and technological debates, we should also engage in an ethical debate about passengers' medical data.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_SITA.pdf
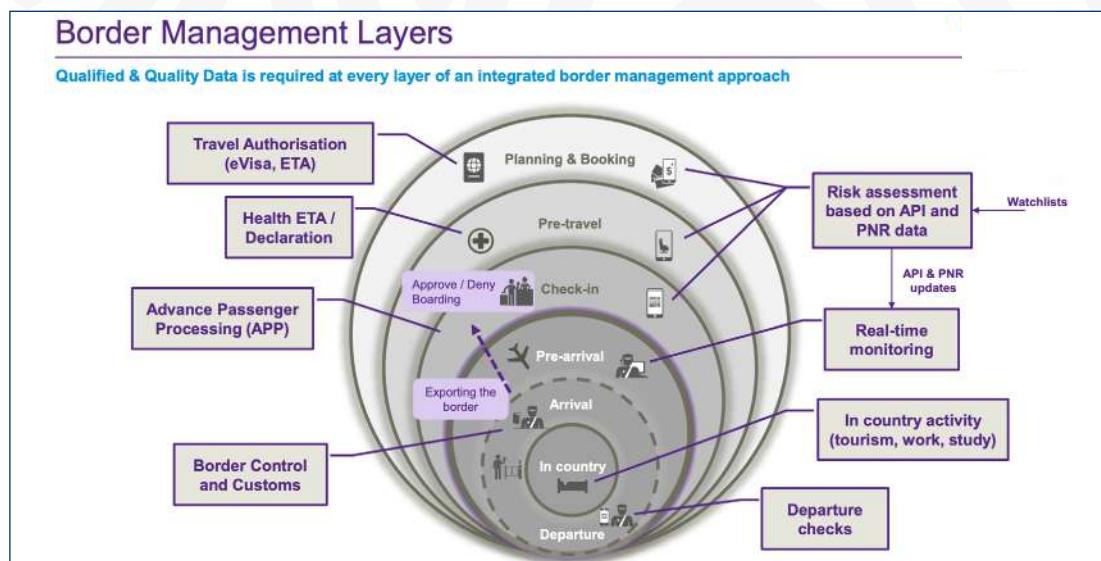
Image 8: *Slide from the presentation of Mr Andy Smith - Director, Government & Industry Relations, SITA*

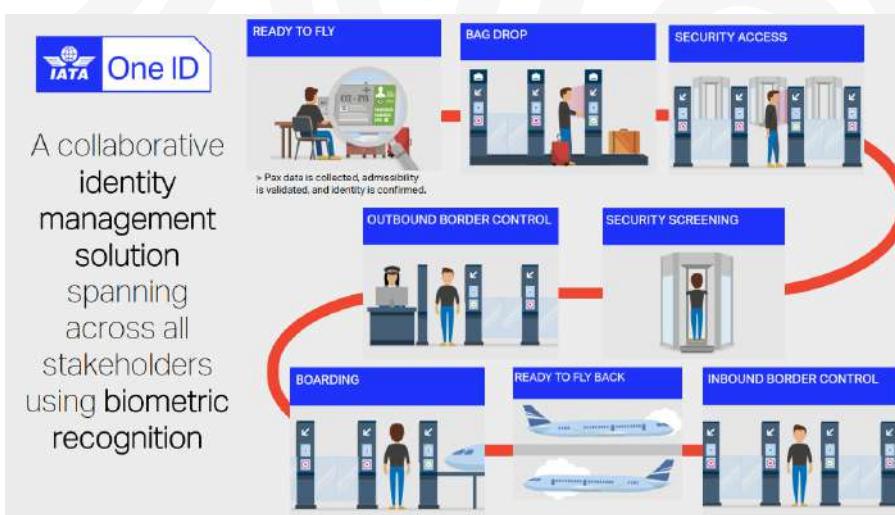# A Vision for an end-to-end Biometric Passenger Journey

Ms Nuria Fermoso, Regional Manager, Passenger Experience and Facilitation, Europe and Mr Alan Murray Hayden, Head of Airport, Passenger and Security Products, IATA

Ms Fermoso presented IATA's vision for an end-to-end biometric passenger journey – the One ID Vision. Besides being more efficient for travellers, airlines and authorities, such a journey could be touchless, which is especially relevant in the current and post COVID-19 situation. According to a survey of passengers, 92% of passengers prefer a touchless screen. The image below shows an illustration of the One ID vision of IATA. Ms Fermoso outlined the key functions of the One ID ecosystem, which include creating an off-airport and advance sharing of a trusted digital identity coupled with the enrolment of an authenticated biometric to allow for biometric recognition; secure and consented transmission of passenger data to authorised stakeholders;

facilitation of biometric processing within airports using local or collaborative identity management systems. One of the most important principles of the vision is privacy by design, where passengers own the information they provide.

Mr Murray Hayden said that in order to get the airline industry 'back in business', it needs first and foremost travellers, and it is possible to make travelling safer in the current and post COVID-19 reality. Mr Murray Hayden presented a mobile app, developed by IATA to enable contactless travel, by allowing the sharing of identity data, including passport and biometric data, with relevant authorities and service providers, using a mobile device. By leveraging biometrics, everyone would benefit – passengers, airlines, airports and border control authorities.

Link to the slide deck: eulisaroundtable. eu/eulisa_content/ uploads/2020/11/For-web_IATA.pdf

Image 9: Slide from the presentation of Ms Nuria Fermoso, Regional Manager, Passenger Experience and Facilitation, Europe and Mr Alan Murray Hayden, Head of Airport, Passenger and Security Products, IATA

How NLP Saves the World! From Stopping Terrorist Attacks to Spotting Fake News
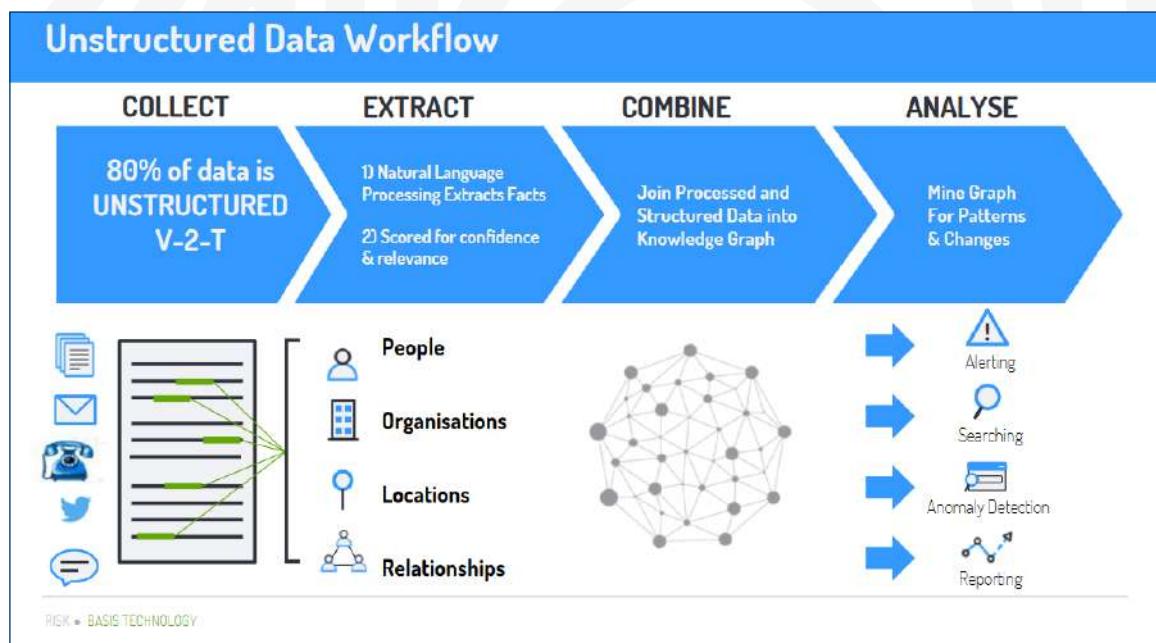
Mr Chris Brown, VP International and Mr Declan Trezise, Director, Pre-sales Engineering, Basis Technology

Mr Brown started the presentation with an explanation of Natural Language Processing (NLP). One of the challenges for the authorities is that 80% of collected data is unstructured – names are written in various alphabets (e.g. Cyrillic, Latin, Arabic, etc.) and can be transcribed into another alphabet in different ways, and at times criminals make use of this, in order to enter other countries. A sad example of that was at the Boston marathon bombing, when the attacker was on the watch list of the authorities, but a different version of his name transcription into English from Cyrillic prevented them from identifying him in advance.

NLP helps complete the incomplete identities and find connections between different individuals and organisations and it is being used by various law enforcement authorities around the world.

Mr Trezise presented the NLP tool developed by Basis Technology and demonstrated how it works in practice. The illustration below shows the process of the NLP analysis.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_Basis-Tech.pdf

Image 10: Slide from the presentation of Mr Chris Brown, VP International and Mr Declan Trezise, Director, Pre-sales Engineering, Basis Technology

Data Quality and Interoperability: Addressing the Capability Gaps through Standardisation

Mr Alain Couniot, Senior Enterprise Architect, Sopra Steria

Mr Couniot began his presentation by stating that data quality and interoperability are intrinsically hard challenges; however, a wide range of tools are available today to address both challenges. He then provided an overview of the information lifecycle with the associated pitfalls affecting both quality and interoperability of data (see image below).

Mr Couniot outlined a set of key principles for success with regard to ensuring high data quality including, but not limited to: rigorous end-to-end data handling; accurate and extensive description of data acquisition context; traceability of data processing, etc. Here AI is a powerful tool, which can be effective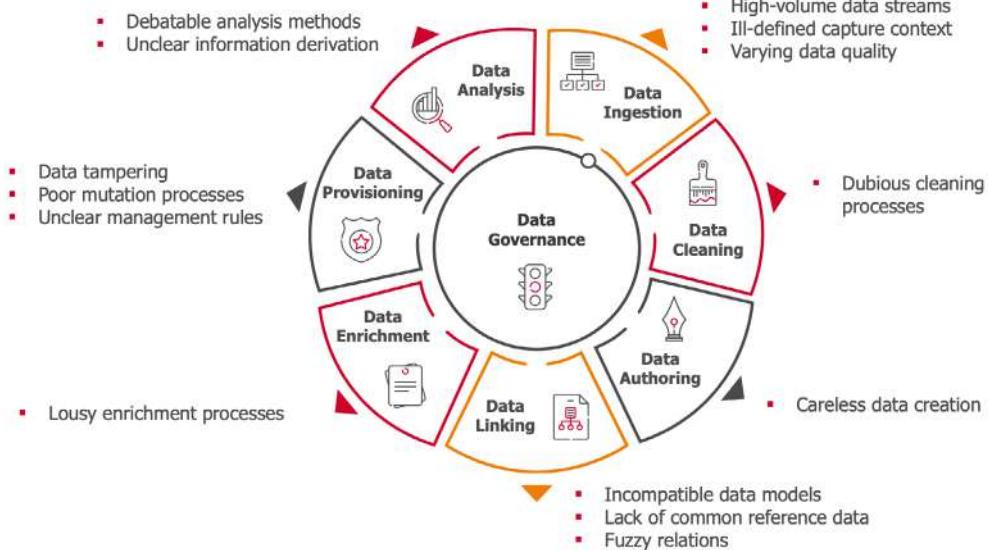ly used to augment the capabilities of human agents to deal with data; however, we should not use AI to generate data or use AI as a source of truth. In this context, the topic of Artificial Intelligence raises crucial questions about technology and ethics: *'Prerequisites for ethical use of data enabling trustworthy and explainable AI'*.

Finally, Mr Couniot presented Sopra Steria's expertise in information quality and interoperability and its vision for the future of border control.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/4.Sopra-Steria_SSG-2020-Final.pdf

Image 11: *Slide from the presentation of Mr Alain Couniot, Senior Enterprise Architect, Sopra Steria*

Discussion

Discussion focused on a range of issues pertaining to data quality in large scale IT systems, in particular in the age of artificial intelligence. In response to the question on how data quality relates to the performance of AI-based systems, Mr Couniot (Sopra Steria) responded that essentially the performance of AI systems is fundamentally dependent on the quality of data used for their training. He further stressed that today's AI is about prediction and correlation, but cannot establish causality. Therefore, the future, Mr Couniot argued, is in combining deterministic (rules-based) approaches with artificial intelligence.

On the question focusing on the benefits of NLP in context of border management and internal security, Mr Brown and Mr Trezise responded that essentially NLP technologies complement biometrics in ensuring fast and precise identification. NLP technologies, they suggested, are especially useful in circumstances where biometrics of an individual are not available, or the use of biometric identification is not feasible, to ensure rapid and precise identification of persons on watch lists, for example.

Another important question raised during the discussion focused on data protection in the context of the IATA ONE ID. In response to this question, Mr Murray Hayden suggested that personal identification data are at all times stored on the passenger's electronic device (smartphone). IATA facilitates the flow of passenger data to authorised parties, but it does not go through any IATA systems and therefore are not stored anywhere else. Data exchange with authorised parties takes place in full compliance with the GDPR requirements, including purpose limitation, data minimisation, etc.

Last, but not least, Mr Smith expressed his opinion on the best way to approach regulation with the focus on data quality. Mr Smith suggested that government regulations should focus on outcomes and not the means through which those can be achieved, as technology moves at a very fast pace compared to the regulatory framework.

SESSION 3

Access to Data: Interoperability Architecture and Access to Information on the Ground

Moderator: Ms Ana Maria Ruginis Andrei, Head of Architecture Sector at eu-LISA

Image credit: Sabin Popescu

Privileged Access Management - Controlling Access and Authorisation Enabling Interoperability

Mr Joseph Carson, Chief Security Scientist, Thycotic

Mr Carson began his presentation by a brief overview of privileged access. He said that there are common causes of breaches, such as poor access management, shared credentials, shadow IT and others. One solution to protect against the breaches is to have a '*zero trust*'[4] policy with a principle of strict access controls; however, a zero trust policy affects system usability. Other, more flexible solutions are therefore preferable.

Mr Carson argued that we should aim at privileged access management (PAM), where we do not focus on managing a privileged account but enable secure usage of privileged access. PAM provides tools to mitigate the risks, as illustrated below.

Mr Carson presented the Thycotic experience in Privileged Access Management for IT systems, including a PAM approach to enable secure interoperability between different IT systems.

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[4] Zero trust assumes any user or system that accesses the network, services, applications, data, or systems must be verified. To gain authorised access, trust must be earned by the prospective user through verification (Joseph Carson)

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_Thycotic.pdf

Image 12: Slide from the presentation of Mr Joseph Carson, Chief Security Scientist, Thycotic

# Biographic Matching & UMF Standards for High Quality Interoperability

Mr Amr el Rahwan, Senior Solution Architect, WCC

The presentation from WCC focused on biographical data in the context of interoperability architecture and the solutions provided by WCC to address some of the challenges related to ensuring cross-system interoperability for biographical data. Biographical data presents a number of challenges. The names of individuals, names of cities and countries are pronounced differently in different languages (e.g. The Hague (English) vs Den Haag (Dutch)); geographical changes can also be recorded differently, for instance if the person was born in today's Ukraine vs the former USSR. Transcription to other languages makes it even more complex. A high quality interoperability approach mitigates these challenges. The use of biographical data, for instance, allows for matching multi-cultural names.

Mr El Rahwan presented the ELISE ID Platform, which provides high quality interoperability and is incompliance with the EU legislative framework on interoperability. The scheme below provides an overview of how ELISE can be integrated into current and future EU large scale IT systems.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_WCC.pdf
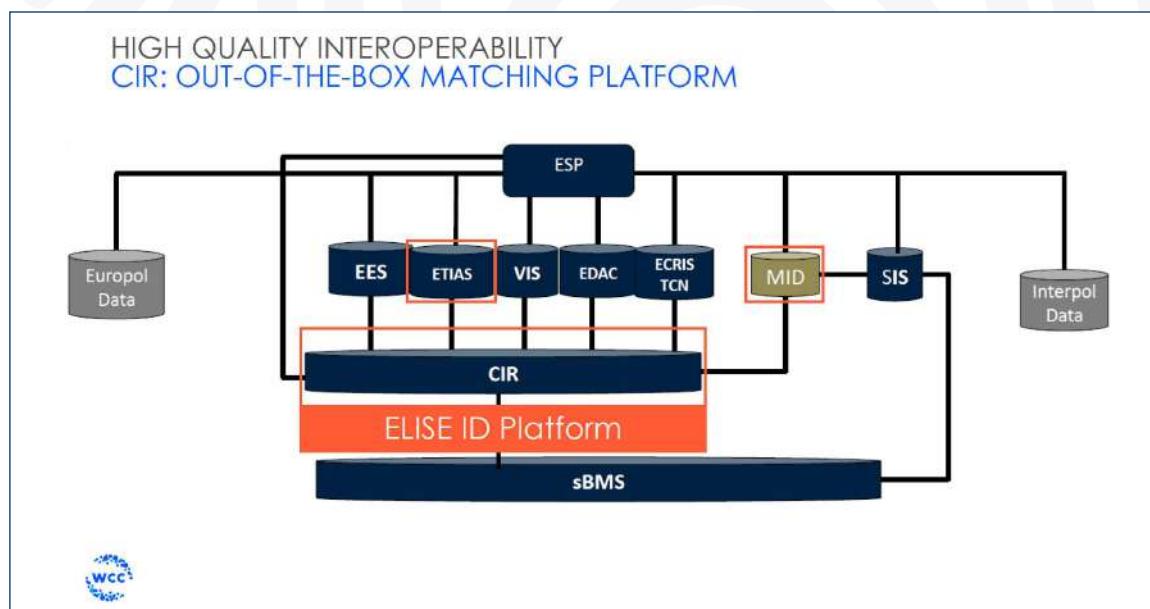
Image 13: Slide from the presentation of Mr Amr El Rahwan, Senior Solution Architect, WCC

Next Generation Architectures Unlock the Power of Your Data

Dr Mohammed Haji, EMEA North Solutions Engineering Manager, Couchbase

Agencies, personnel on border control duty and private players face a number of challenges, such as legal, security and interoperability challenges. Dr Haji presented the Couchbase Unified Architecture Platform that helps dealing with those challenges.

In the security domain, the platform addresses several components: password management, end-to-end encryption, role-based access control and auditing, and the ability to parametrise queries. Another important challenge Dr Haji discussed in the presentation is the ability to scale-up systems, in particular when this needs to be done in real time and with large volumes of data. The Couchbase solution allows the redistribution of data across a server cluster in case there is a sudden un-forecasted spike in activity, thus reducing the possible system downtime. Another important feature of the solutions provided by Couchbase is the automatic

failover with data re-distribution – self-healing – within a server cluster, which supports high system availability and reduces possible downtime.

Dr Haji also addressed the capability of cross data centre replication, which is especially relevant in the context of the systems operated by eu-LISA, where replication is done across two locations in active-active mode. Couchbase enables automatic switch over of traffic without downtime. Last, but not least, the Couchbase solution can integrate different service providers, including on-premises servers, in order to allow for additional flexibility and avoid lock-in.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-web_Couchbase.pdf

Image 14: Slide from the presentation of Dr Mohammed Haji, EMEA North Solutions Engineering Manager, Couchbase

Access to Data: Interoperability Architecture and Access to Information on the Ground

Ms Ines Ramos, Manager – Business International Organisations Benelux and Mr Juanjo López, Executive Director, Head of Data & Analytics Benelux & Switzerland, everis

Mr López began his presentation by outlining the reasons why interoperability between information systems in the area of justice and home affairs matters, and why we need to focus on data quality in this context. Mr López emphasised the necessity for alignment between different data sources from different domains and the need to ensure data consistency.

Following an overview of core business systems within the interoperability landscape provided by Ms Ramos, Mr López offered the everis perspective on data quality management and the overall data quality framework. In particular, Mr López focused on different techniques and approaches to address data quality governance, data quality

automation, data integration and cleansing, data standardisation, metadata acquisition and data mastering.

Mr López concluded by emphasising that, in addressing data quality, it is important to consider three main aspects: organisation (e.g. data governance framework), data flows, and data quality management architecture supporting data quality processes.

Link to the slide deck: eulisaroundtable.eu/eulisa_content/uploads/2020/11/For-website_everis-1.pdf

***Image 15:** Slide from the presentation of Ms Ines Ramos, Manager – Business International Organisations Benelux and Mr Juanjo López, Executive Director, Head of Data & Analytics Benelux & Switzerland, everis*

Discussion

The first question addressed in the discussion focused on the integration of privileged access in user management processes. Mr Carson responded that privileged access can be integrated in the whole spectrum by authentication means or identity service providers, such as Microsoft Active Directory, Azure, Sailpoint, etc.

The discussion continued with a question addressed to WCC and focusing on the capabilities of the ELISE ID system to deal with diverse search requests, including both biometric and biographical data. Mr El Rahwan responded that biometric matching is not performed by ELISE, but by a biometric matching system. When biographical data are identified following a biometric match, ELISE will do a biographic search on the basis of the configured rules (e.g. fuzzy or exact matching). As for integration, then it can be done through direct integration with the database or by using an API to connect to a web-service, as is the case with Interpol, in which case data are exchanged through a connector in a web-interface.

The discussion also touched on the implementation of AI in the context of solutions provided by companies. Dr Haji explained that Couchbase provides analytics as part of a data services package, which in combination with the capabilities of Couchbase database solutions ensures real-time analytics. In response to the question regarding the approach to AI within ELISE ID platform, Mr El Rahwan explained that ELISE ID is a rules-based knowledge-driven AI with domain-specific modules. ELISE is built around the POLE – People, Objects, Locations, Events – model, and therefore is suitable for structured data formats, such as UMF. It is therefore important in each instance of implementation to configure the domain-specific module correctly. In order to deal with unstructured data, ELISE can be integrated with other algorithms, which help transform unstructured data into structured data, which can in turn be processed by rules-based systems embedded in ELISE.

The discussion closed with an intervention by Ms Ruginis Andrei addressing a question from the audience regarding the UMF standard. Work on the UMF takes place mostly within the framework of the UMF3Plus project, where Member State authorities, as well as the European Commission, Europol, Interpol and eu-LISA are involved. Part of this work is dedicated to extending UMF beyond law enforcement.