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Short Summary – Public Release

THE DOCUMENT CHALLENGE II

Testing human and machine performance in detecting and classifying genuine and false travel documents

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DISCLAIMERS

ACKNOWLEDGEMENTS

Introduction

Travel document fraud is widely perceived as a serious problem affecting border control and the internal security of the European Union. The verification of the authenticity of travel documents is a key element of border checks and a pre-requisite for efficient border control. The continuous development and sophistication of the physical, optical, and electronic security features of travel documents currently in circulation brings significant challenges for border control officers, who need to increasingly rely on the support of document inspection systems (DIS) using advanced functionalities and automated components.

The performance of document inspection solutions, although of importance for the effectiveness of border checks, is rarely taken into consideration when assessing the risk of document fraud. Analyses tend to focus on the **threat** of document fraud as detected at the border, rather than also encompassing an evaluation of the **vulnerabilities** related to the capacities (means) deployed (human and technological). However, although some vulnerabilities are technical in nature, others are more related to the integration and up-take of new technologies in the border management process.

In line with its mandate, Frontex works in close cooperation with the Member States on the development of a portfolio of border check capacities and on the increasing of the capacity to assess and overcome existing and future challenges related to identity verification, travel document authentication, risk management and travel facilitation at the EU's external borders.

The current technical report is part of a wider range of activities developed by the Agency in order to provide facilitation assistance to Member States with regard to the roll-out of new technology for border checks, and to disseminate among all relevant stakeholders information about current practices, the benefits and challenges, and the end-user needs.

What is the Document Challenge II

The **Document Challenge II** was developed as a practical exercise simulating document inspection in the first line of border control, organised by the Frontex Research and Development Unit (RDU) in cooperation with the UK National Document Fraud Unit, the Forensic Science Institute of the German Bundeskriminalamt (BKA), the Royal Netherlands Marechaussee, and the Portuguese Immigration and Borders Service (SEF) and with the support of the German Federal Office for Information Security (BSI). Two hundred and thirteen documents, seven document inspection systems and thirty-nine border control officers deployed in the context of Frontex coordinated Joint Action Lusitania participated in the exercise.

The main objective was to examine document inspection performance (by both humans and machines) in the first line of border control, aiming to better understand the complexity of the task of detecting false/falsified travel documents.

Results and Observations

The results and observations collected during the exercise highlighted a series of vulnerabilities in the travel document inspection process. Participating experts put forward a set of recommendations contributing to the effective implementation of the Schengen Borders Code (Articles 5, 7 and 13).[1] In particular, the following weaknesses should be considered:

- The performance of technical equipment shows a **degree of variability, indecision, and inconsistency**, with errors happening when optical authentication is performed, as well as problems with electronic authentication resulting in a number of **false documents being incorrectly accepted as genuine** (and *ceteris paribus*, genuine documents being rejected as false). **No automated document inspection system is capable of performing authentication of all possible physical security features and printing techniques**.

- The performance of border control officers is also **highly variable and subjective**. Although document 'wizards' with very high accuracy levels exist, **time limitation** in the first line of control negatively affects the detection of false documents. **Qualitative experience** –personal exposure to the practical detection of falsifications – rather than level of training or length of service is positively correlated with performance.

- When trained/experienced officers use automated document inspection systems, effectiveness of document inspection tends to increase (in the cases when the operator rejects machine results, thus somewhat compensating for machine errors). However, both **overreliance and unfounded mistrust** in machine outputs cause false documents to be erroneously accepted as genuine. **Human factors,** or the interaction between the human operator and the machine, play an important role in the effective use of machine authentication and should be studied in more detail.

- Performance depends on the intrinsic characteristics of the document to inspect. **Lack of reference knowledge, as well as non-standard or unsuitable design and production** of travel documents in circulation (passports and also ID cards), significantly affect the effectiveness of both technical and human capacities.

Based on the results of the analysis, the following general recommendations have been proposed in order to mitigate the identified vulnerabilities.

In relation to the **use of automated document inspection systems**:

R-M.1. Develop and routinely update a set of **EU-level minimum functionalities and operational performance requirements** (for instance in terms of False Acceptance Rate/False Rejection Rate, Positive/Negative Effectiveness, etc) related to the use of automated document inspection systems at the EU's external borders (and also for other law enforcement uses).

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[1] (Article 5 (entry conditions), Article7 (border checks on persons) and Article 13 (refusal of entry) of Regulation (EC) No 562/2006 of the European Parliament and of the Council of 15 March 2006 establishing a Community Code on the rules governing the movement of persons across borders (the Schengen Borders Code), with subsequent amendments)

R-M.2. Develop and routinely update an **EU-level performance testing methodology** (and potentially a **certification scheme**).

R-M.3. Develop and routinely update a common vendor-independent **European reference document and template database**.

R-M.4. **Monitor transactions and routinely test deployed operational systems** against the minimum performance requirements (at the national level).

R-M.5. Develop and implement procedures in order to **provide, continuously maintain and update a set of trusted electronic certificates for Passive Authentication at the EU-level**.

R-M.6. Establish a **quality assurance process** (a feedback loop) at the national level.

In relation to **human capabilities**:

R-H.1. Introduce the subject of operations, strengths and weaknesses of document inspection systems at the **basic document training level**.

R-H.2. Develop and/or **encourage intra-European mobility programs for the exchange** of first line border control officers in order to facilitate the exposure of staff to different operational realities (especially traffic and origin of documents).

R-H.3. **Routinely challenge first line border control officers** and set up an incentive mechanism.

In relation to **document design and document inspection systems manufacturers**:

R-D.1. Encourage the inclusion of inspection-related needs (and challenges) in the conceptualisation and **design of travel documents**.

R-D.2. Encourage the development of **EU-wide mandatory minimum security standards for ID cards similar to the ones already existing for passports and residency permits**.

R-D.3. Support the development of **certification for documents compliant with ICAO standards**.

R-D.4. Foster the creation, maintenance, and dissemination of a **travel document exception/defect list at the EU level**.

R-D.5. Encourage document inspection systems manufacturers to develop and integrate technology capable of **authenticating printing techniques**.

R-D.6. Encourage **harmonisation** and the development of recommended minimum **industry standards** (or best practice guidelines addressing all components involved in machine-assisted document inspection) for document inspection systems at the EU and/or ICAO level.

In relation to **further research**:

R-R.1. Comparative analysis of all **document inspection use-cases** in order to better understand the effect of the use of automated systems, strengths and weaknesses (with comparable data-sets, with focus on origin of documents, with time measurement, etc).

R-R.2. **Comparative usability analysis** (including cognitive) of the use and perception of current automated document inspection systems in order to understand the effect of the **human factor** on the performance of the systems.

R-R.3. Analysis of current operational effectiveness of **electronic checks** (and identification of vulnerabilities, for example: how often electronic checks are performed at the border; how many and what type of errors are detected; etc).

R-R.4. Study of the operational effectiveness of other variables important for entry decisions in general – such as **passenger profiling** (individual risk assessment) – and in particular the effect of these variables on document inspection (positive and negative

biases/expectations). For example: does passenger profiling create assumptions regarding document authenticity and thus influence the effectiveness of document inspection?

It is expected that the outcomes of this analysis will expand existing knowledge and contribute to the ongoing actions and initiatives undertaken at the European level by both Member States and the European Union for strengthening capacities and mitigating the associated risks of travel document fraud.