Smart Borders Pilot
German Experiences

IBPC 2016
NIST, Gaithersburg
05.05.2016

Stronger and Smarter Borders for the European Union
The Entry-Exit System
Proposal: EU ENTRY / EXIT SYSTEM (EES)

How will the system work?

**EES will collect:**
- Identity
- Fingerprint
- Travel document

**EES will record:**
- Date and place of entry and exit
- 90 days in any 180 day period

**EES will replace:**
- Entry refusals
- Passport

To whom will it apply?

to non-EU nationals, visa-required and visa-exempt travellers in the Schengen area.

Source: EU KOM, factsheet on EES, Brussels, 6.4.2016
Proposal: EU ENTRY / EXIT SYSTEM (EES)

Who is using EES data?
The competent Member State authorities

- Border guards
- Consular officers dealing with visas

Who will be able to access data in the EES?

Member States

Law enforcement authorities

will have access for criminal identification and criminal intelligence

Europol

Source: EU KOM, factsheet on EES, Brussels, 6.4.2016

Bundesverwaltungsamt
Der zentrale Dienstleister des Bundes

Border crossing facilitation
for all non-EU nationals

Traveller self-service kiosk

Checks against security databases (SIS, Interpol SLTD)

Border control lane

Border guard
### Smart Borders Pilot in a nutshell

<table>
<thead>
<tr>
<th><strong>Scope</strong></th>
<th>Air, sea and land borders crossing points (BCPs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Member States</strong></td>
<td>12 (DE, EE, EL, ES, FI, FR, HU, IT, NL, PT, RO, SE)</td>
</tr>
<tr>
<td><strong>Border crossing points</strong></td>
<td>18</td>
</tr>
<tr>
<td><strong>Test cases</strong></td>
<td>78 test variations</td>
</tr>
<tr>
<td><strong>TCN travellers</strong></td>
<td>58,000</td>
</tr>
<tr>
<td><strong>Border guards involved</strong></td>
<td>About 350</td>
</tr>
<tr>
<td><strong>Biometrics</strong></td>
<td>Fingerprint (FP), facial image (FI) and iris</td>
</tr>
<tr>
<td><strong>Process accelerators</strong></td>
<td>ABC gates, kiosks</td>
</tr>
<tr>
<td><strong>Desk research</strong></td>
<td>Spoofing, VIS and travel document number, web service</td>
</tr>
</tbody>
</table>

**Border types**
- **Air**
- **Road**
- **Sea**
- **Rail**

**Focus on**
- Technology state of play
- Which & “how many” biometrics?
- ABC & Self-Service Kiosks
- Operational & end user experiences
German Participation

EU Pilot
- Frankfurt Airport (FRA)
  - FP Enrolment (4 / 8 / 10 FP)
  - Automatic Border Control (ABC at Exit)

Extended National Pilot
- Additional Location: Seaport Warnemünde
- Additional Biometrics: Facial Image + Iris
- Additional Test Cases (many)
- Unique within EU pilot:
  - End-2-End Pilot (with backends)
  - Full national integration
  - Focus on processes
Smart Borders Pilot – National Integration

Federal Office of Administration (BVA)
National Integration Interface + Integration Civil Applications
EES Simulator incl. BMS
EU VIS
EU SIS II
Federal Criminal Police Office (BKA)
National Integration Police Applications
Federal Office for Information Security (BSI)
EasyPASS Reporting

Border Control + Integration Local Applications
Gateway
Traveler
Officer

NEW
NEW
Equipment Enrollment

Morpho: „Fingerprint on the Fly“ (FOTF)

Crossmatch: The „new“ Guardian

Iris ID - iCAM TD100
eGates at Exit

Allowing TCNs to use ABCs during Exit

Participating TCNs
ARE, ARG, AUS, AZE, CAN, CHL, CHN, ISR, JPN, KAZ, KOR, MDA, MKD, MYS, NZL, QAT, RUS, SGP, SRB, TGO, THA, TJK, TUR, TWN, USA, VEN
Video
(5 min)
Various findings on Smart Borders

- Lessons Learned on
  - Duration & Quality of data
  - Architecture & Organization
  - New Technologies & Biometrics

- Eu-LISA Pilot Report

- German Pilot Report
  - In addition to eu-LISA report
  - in english
Duration
Duration First Entry for Visa Exempt

Duration of border control process for TCNVE, entry, different biometrics, different devices, different quality thresholds.
Diagram 7: Duration of the single steps of the border control process for TCNVE, entry, capture of 8 fingerprints, eu-LISA final threshold
Duration: Example Subsequent Entry

Comparison of first and subsequent entries for visa-exempt travellers (TCNVE)
Duration: Distribution per Scanner

Duration of fingerprint capture process depending on scanner technology (TCNVE, entry, 8 fingers, eu-LISA final threshold)
Fingerprints
Diagram 39: TC 3 - Distribution of NFIQ scores for fingers of right slap for each used scanner
Quality Assessment NFIQ2 (beta)

Diagram 44: NFIQ 2 beta evaluation for captured fingers using the new contact scanner and different threshold configurations
Quality: Time vs. Threshold

- Start with high quality threshold “Initial”. BUT number of retries were too high
- ONLY used auto-capture by device for interim period. THAT was quick, but not comparable with rest of EU
- Compromise: “eu-LISA final” Reduced threshold Number of retries “feasible”

Distribution of the capture count depending on scanner type & quality threshold

“Initial”: Retry policy on NFIQ 2/2/2/2/3/2/2/2/2/3
Quality loss by reducing threshold is measurable BUT adequate.

Recommendation: accept lower quality and optimize time wise.

"Initial": Retry policy on NFIQ 2/2/2/2/3/2/2/2/2/3
Face & Iris
Live Capturing of Facial Image

- In general quality positive
- Sometimes not sharp, too close etc.

- Changes to infrastructure
- Handling of camera
Quality: „chip“ versus „live“

**Percentage in Range: Quality Attributes of Chip and Live Images**

- 7.6: Greyscale density and colour saturation
- 7.5: Colour space
- 7.1: Proper exposure
- 5.7: Eye distance
- 5.6: Horizontally centred face
- 5.5: Vertical position of the face
- 5.4: Ratio: Head height / image height
- 5.3: Ratio: Head width / image width
- 2.2: Mouth closed
- 1.3: Roll, nose axis

Legend:
- LIVE
- CHIP
- Positive
- Very robust to environment conditions
<table>
<thead>
<tr>
<th>Quality Feature</th>
<th>Adequate quality (score &gt;= 50)</th>
<th>Excellent quality (score &gt;= 75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usable iris area</td>
<td>95.29%</td>
<td>47.13%</td>
</tr>
<tr>
<td>Pupil contrast</td>
<td>99.36%</td>
<td>41.30%</td>
</tr>
<tr>
<td>Pupil shape</td>
<td>99.87%</td>
<td>99.87%</td>
</tr>
<tr>
<td>Image sharpness</td>
<td>96.96%</td>
<td>82.61%</td>
</tr>
<tr>
<td>Iris dilation</td>
<td>7.97%</td>
<td>0.13%</td>
</tr>
<tr>
<td>Gaze angle</td>
<td>97.09%</td>
<td>84.96%</td>
</tr>
</tbody>
</table>

*Table 22: Distribution of quality scores for assessed iris images*
German Report: Findings & Requirements

- Maximum of available biometrics ("10fp or 8fp in combination with other")
- Biometric-driven – not passport-driven
- "Crossover" – architecture (EES, VIS ...)
- Long retention period (5 yeas like VIS)
- ...
- De-Duplication for 1st line
- Biometric Enrolment: Reduce threshold, but take “as much as possible”

....many more (in the report)
National Plans for 2016

German Smart Borders Pilot – Part Two
Integration of Self-Service-Systems
Adapting to new EU COM Proposal

EU level:
Negotiation / Design

... and move towards a better integration
Thank you for your attention!

Fares Rahmun
Fares.Rahmun@bva.bund.de
+49 228 99 358 1548
Federal Office of Administration (Bundesverwaltungsamt)
www.bunderverwaltungsamt.de/en