FastPass – Project Results

SRIEE 2017 – Security Research, Innovation & Education Event

Discussion Club/Innovation Room EC Expo, 14th -15th November, 2017

Radisson Blu Hotel Olümpia Conference Center

Presented by

Andreas Kriechbaum-Zabini
Thematic Coordinator
Visual Surveillance and Insight
Center for Digital Safety & Security
AIT Austrian Institute of Technology

Sirra Toivonen
Senior Scientist
Risk and Asset Management
VTT Technical Research Centre of Finland Ltd

The work has been supported by the FastPass project. The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 312583.

Overview

- The project, objectives
- Video & Main achievements
- Demonstrations
- Recommendations
- Conclusion

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FastPass – The Project

Details

- **EU FP7 Security**
- **Jan 2013 – Mar 2017**
- **27 Partners, led by AIT**

Challenges

- **Security (Spoofing, Attacks) vs facilitation**
- **Acceptability**
- **Harmonisation**

Goal

- **Harmonized, modular reference system for ABC**
- **User-centric approach**

Further Info

- **Please visit: www.fastpass-project.eu**

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FastPass Objectives

Supporting Innovative Border Crossing Concepts

- **Airborder:** Comparison of classical method with kiosk biometric token
- **Landborder:** Process with registration
- **Cruise ship:** Enhance nominal list with biometric information

Architecture Based on Innovative Technologies

- Reference Architecture with open interfaces
- Advanced Technology Modules
  Passport, Biometrics, Video Surveillance, Userinterface
- Security evaluation

Integration with EES and RTP

- Extend usability to TCN
- Evaluate the value of RTP for EU citizens

Harmonized ABC Systems

- Process harmonization
- Use of kiosks
- Instaneous „Go Through“

European cooperation

- Liason with commission, EP, Frontex, eu-LISA, FRA
- Liason with other European Research Projects
- Liason with industry
- Liason with BG authorities

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Automated Border Controls in Europe

As of 2013, 288 operating ABC gates installed in over 13 EU Member States

(Frontex)

No Registration required

Pre-Registration required

Multiple systems available

(IATA, 2014)

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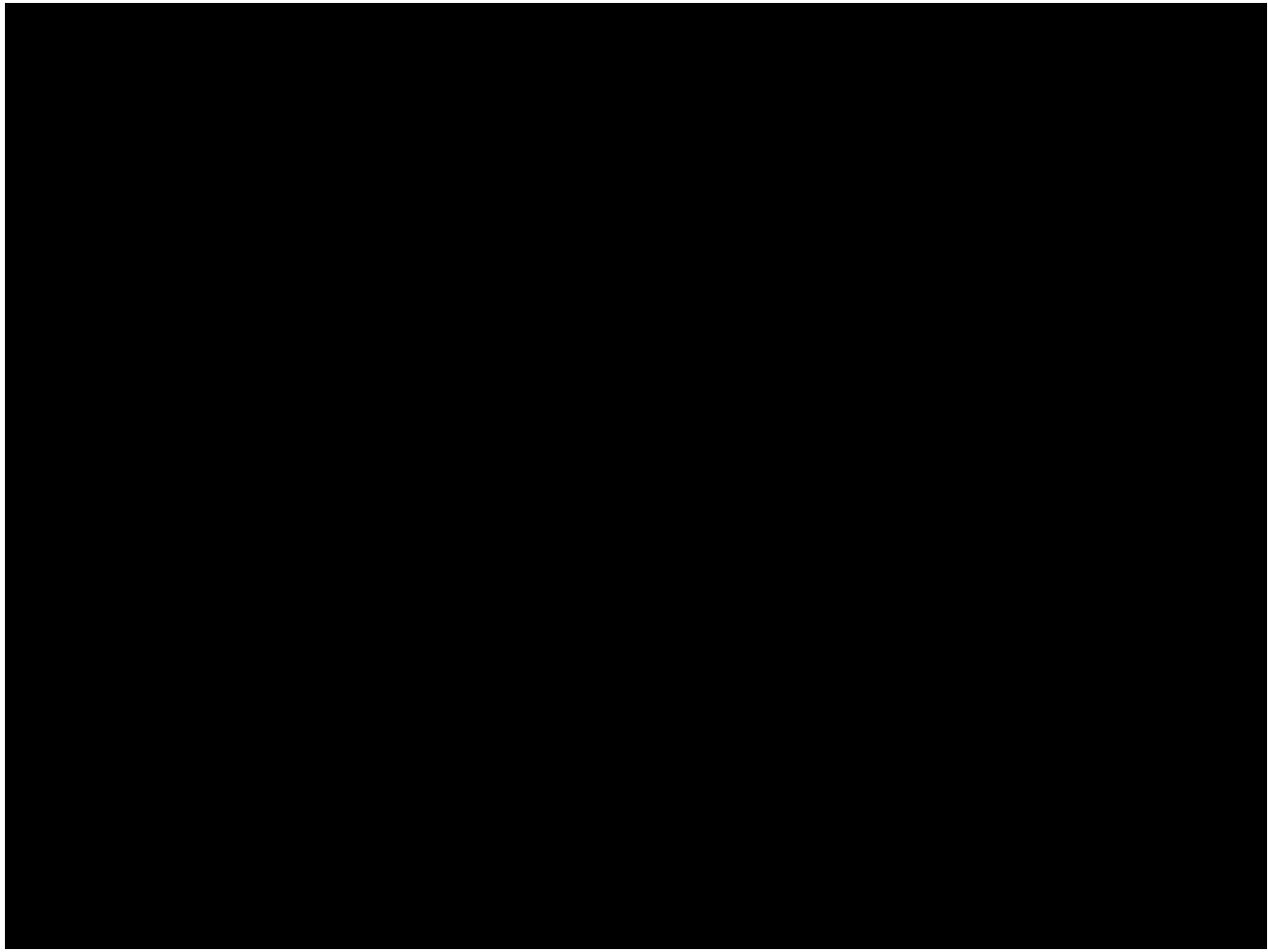
FastPass Automated Border Control



https://www.youtube.com/watch?v=7FgzI3EUQ1w (2:50)
https://www.youtube.com/watch?v=8KbfozY4UNU (6:50)

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FastPass in numbers

10 Consortium meetings

~300 teleconferences

~21.000 emails to FastPassCoordinator

67 deliverables

7148 pages of results

~200 dissemination actions

64 main exploitable results

27 PARTNERS

1 website

1 film

14 newsletters

~ 60 conference presentations

Pictures: own resoucres.

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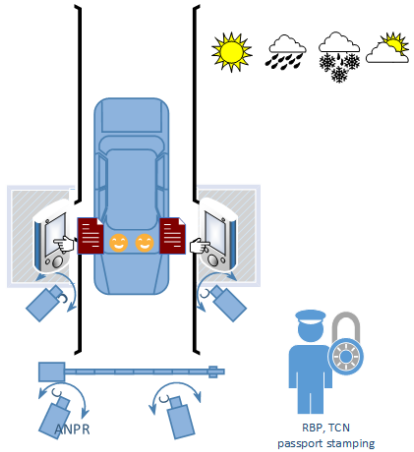
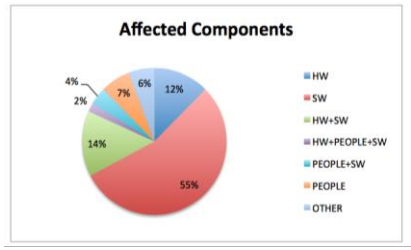
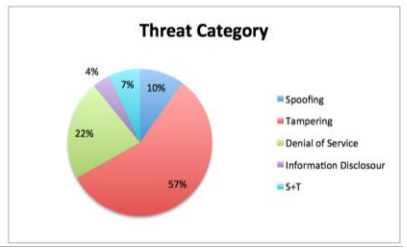
FastPass - Main achievements

- **Next-generation sensor development and novel frameworks, software and algorithms**
  - On-the-move biometric identification; improved speed, quality; reduced intrusiveness, counter spoofing
- **Innovative scenarios based on harmonized architectures**
  - Several air border scenarios, cruise-ship scenario, land border scenario with travellers remaining in the cars
- **Methodology for a holistic risk and security assessment**
  - List of threats, with type, impact, exploitability and mitigation strategy
- **Recommendations for future ABC**
  - http://www.vtt.fi/inf/pdf/technology/2017/T303.pdf







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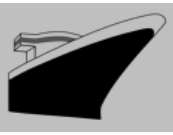
Demonstrations / Pilots

			
Demo Schedule	August – October 2016	November 2016 – January 2017	Juni 2015 – December 2016
Demo participants	~ 1000	~ 150	~ 10000
Biometrics used	Face	Face	Face + Finger
Process	Kiosk / Gate with Face as token	Kiosk / Gate with license plate / passport as token	Comparison of - Mantrap - Kiosk/Gate with passport token - Kiosk/Gate with face token

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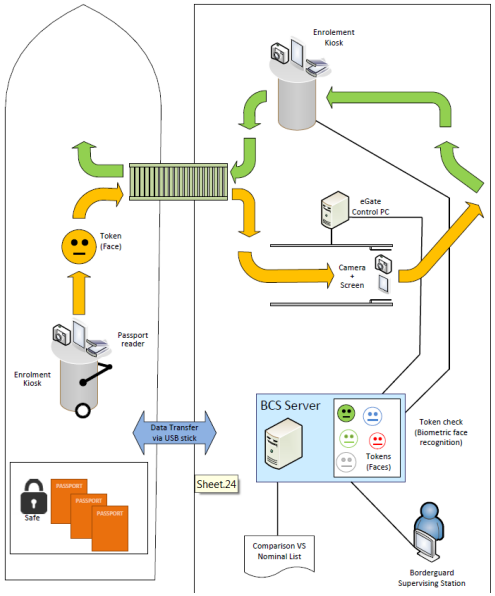
Cruise ship concept

- Demonstration Test at Port of Piraeus
- Document Authentication
- Passenger Authentication and Identification (1 :n)
- Documents: ePassports
- Travellers: EU/EEA/CH, TCNVH, TCNVE
- Biometrics:
  - Face (+ Iris as laboratory test)
- RTP will be simulated



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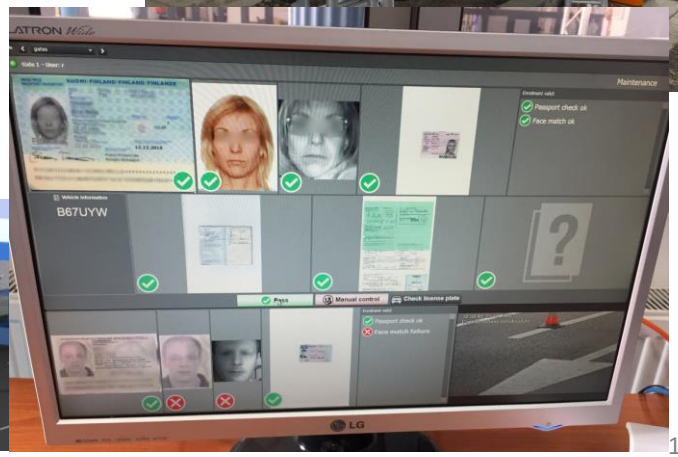
Land border concept

- Demonstration at Moravita
- Exit control for frequent traveller
- Enrolment of
  - ID documents
  - Vehicle documents
  - Driving license
- Moveable terminals
- ANPR to detect vehicle
- Automated driver and co-driver check
- Customs check, occupancy check, stamping is done manually



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Air border concept

- Classical passport reading at the eGate
- Old fashion Gate with new Biometric sensor (**Face recognition on the move**)
- Travellers: EU/EEA/CH

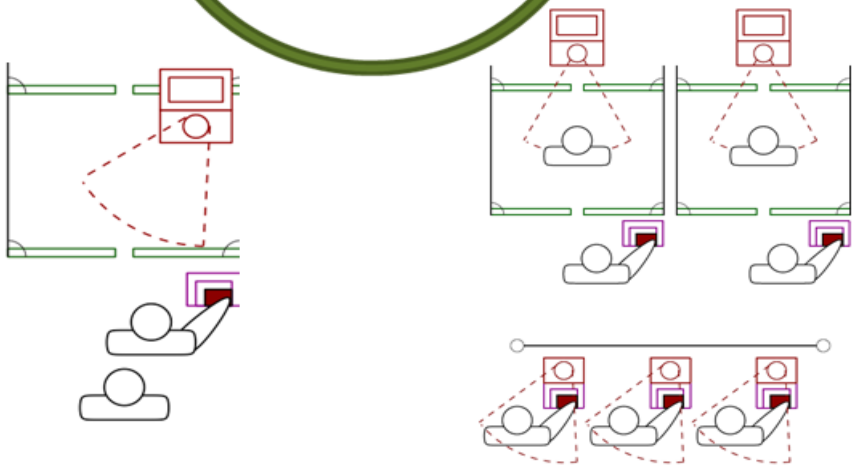
Stage 1 "Baseline Mantrap"

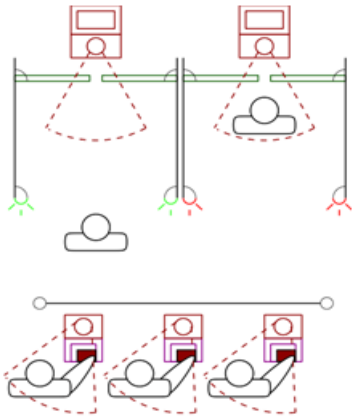
Stage 2 "Segregated 2-step System"

- Registration: Passport-, **Face**reading at the Kiosk
- **IR Face Verification** at the eGate
- Travellers: EU/EEA/CH

Stage 3 "Segregated 2-step with 1:n match"

- Registration at Kiosk, like Stage 2+ **Fingerprint**-reading
- **IR Face Identification** at the eGate
- Travellers: EU/EEA/CH + selected TCN
- RTP as simulation





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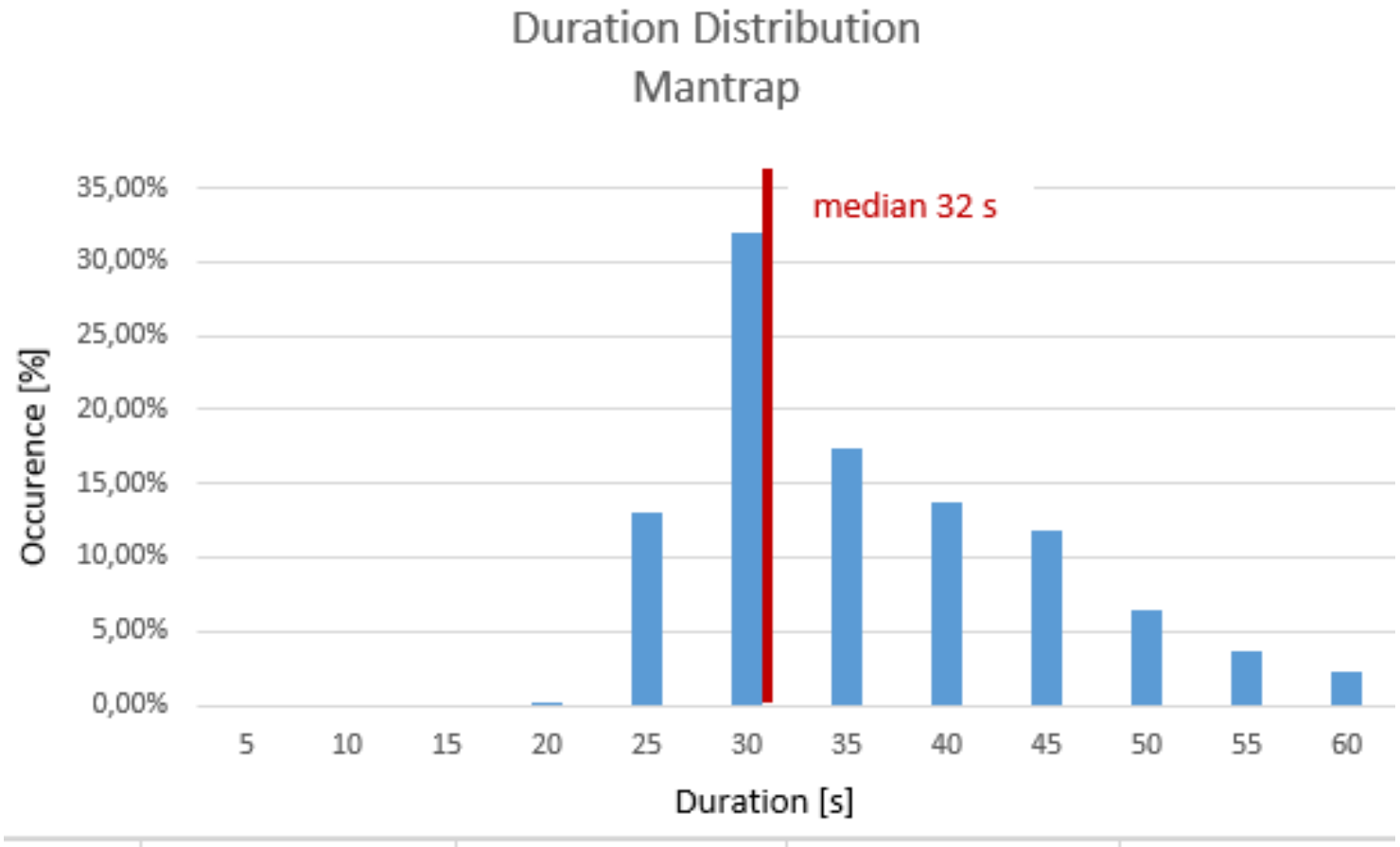
Statistical Analysis of Logged Data (Stage 1 – 5800 Pax)



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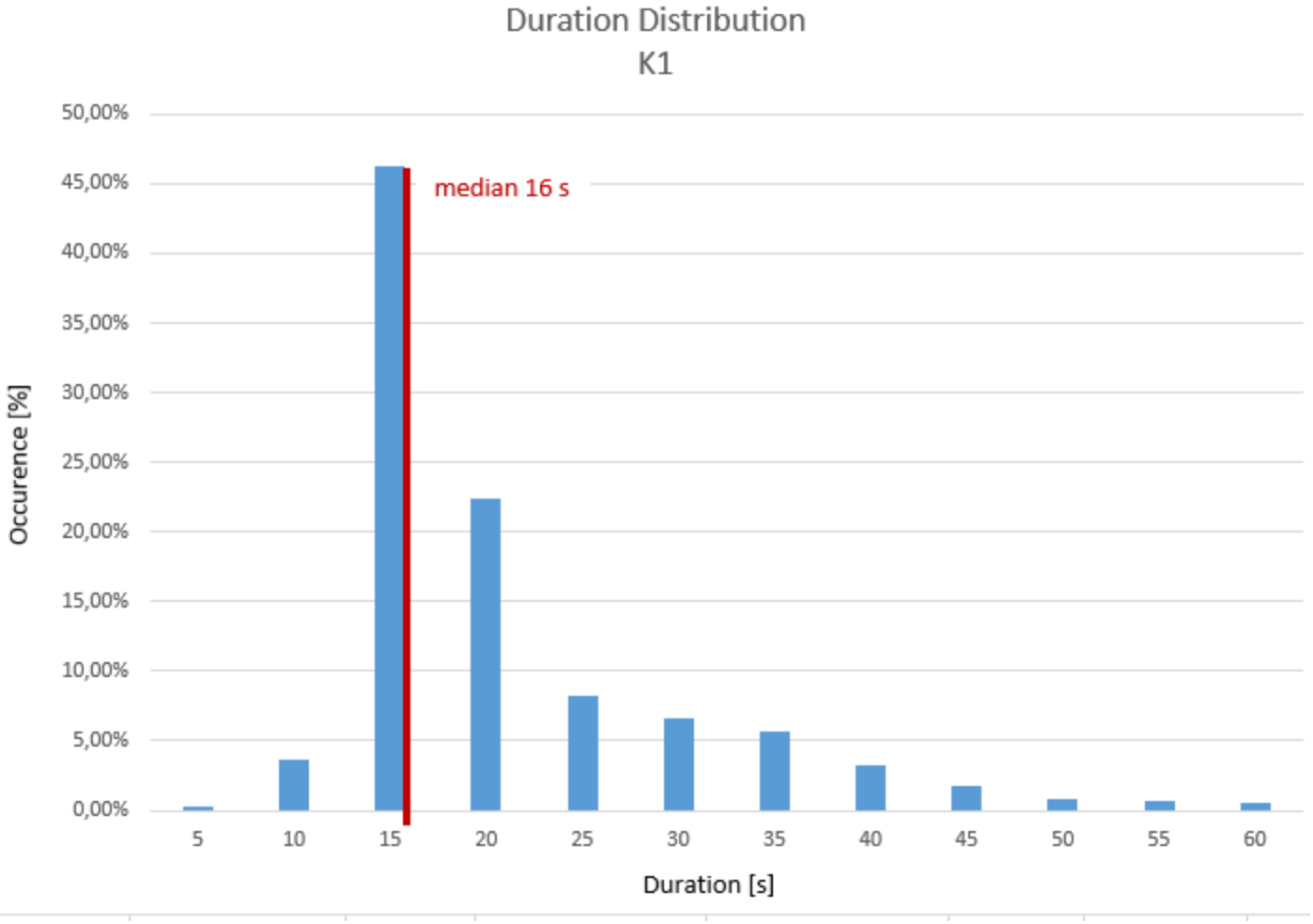
Statistical Analysis of Logged Data (Stage 2 ~ 1500 Pax)



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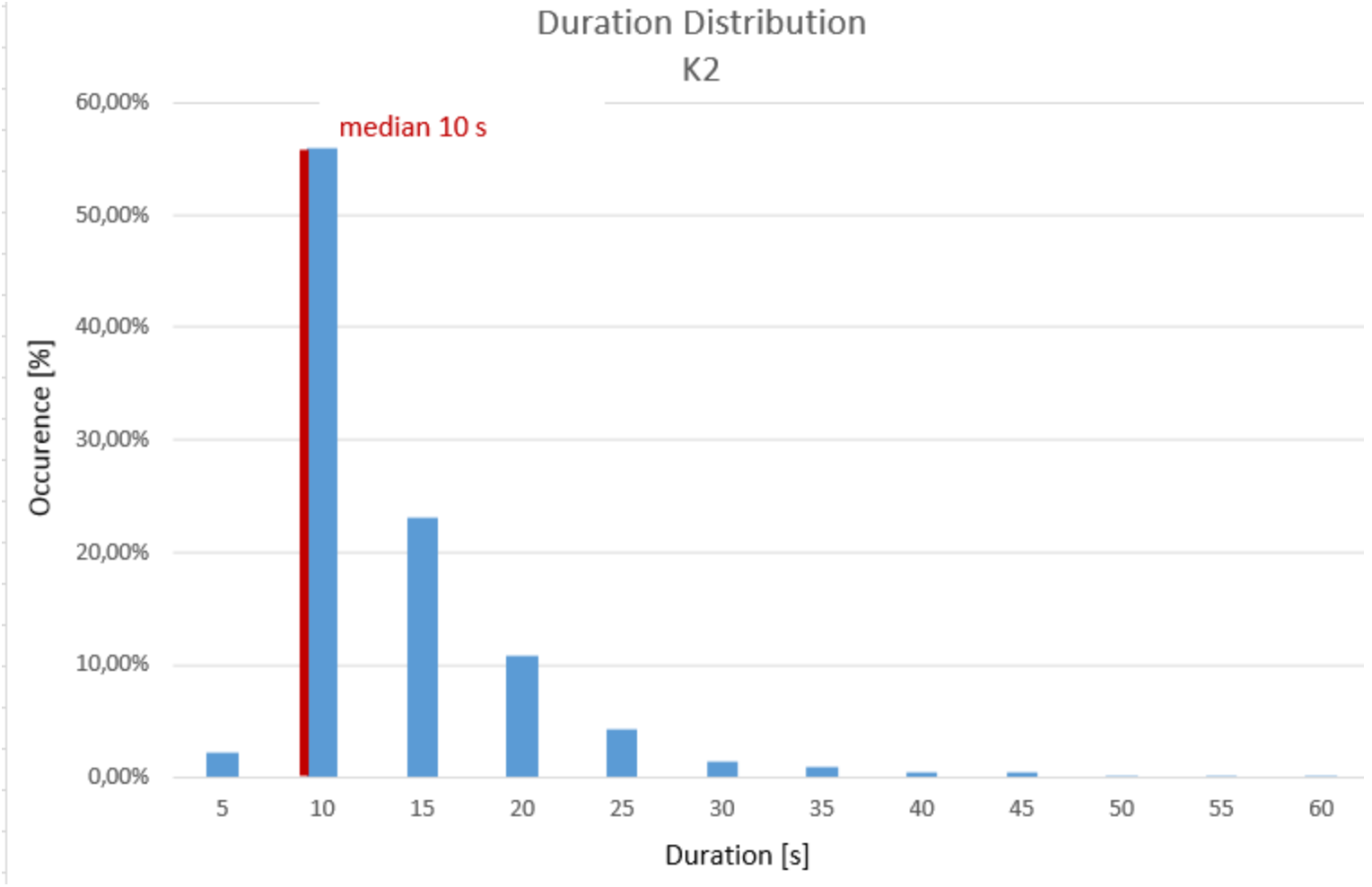
Statistical Analysis of Logged Data (Stage 3 ~ 500 PAX)



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Demo Conclusions

- Harmonized IT framework allows common interfaces and exchange of modules
- The customization of the harmonized FastPass solution to different scenarios is feasible. However, these changes must be carefully considered.
- Air border scenarios demonstrates performance of specific processes
  - Passport as token – increasing throughput per gate
  - Face as token – further increase of throughput
- Cruise ship scenario demonstrates several advantages
  - Fast transit
  - Moveable gate
  - Will be necessary to implement EES for cruise ships
- Land border scenario
  - Timesaving process for border crossings in cars (frequent travellers)

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Public Recommendations for future ABC installations

180 recommendations

- From political, impact, legal analysis (24)
- For harmonization, requirement management and user experience (51)
- For system design and secure solutions (13)
- For technical components – i.e. eGate, document observation, biometrics, video surveillance, data fusion and alarming (68)
- For operation, training and testing (24)

..summarized in

Best practices –
Recommendations for future ABC installations
@
http://www.vtt.fi/inf/pdf/technology/2017/T303.pdf

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Best practices for the course of the Development life cycle

PLANNING, INITIATION	•Success factors of ABC solutions •Engaging policy makers •Technology impact Assessment •Legal requirements •Data protection impact assessment	•Stakeholder needs	24
DESIGN	•Towards operational harmonisation •Future border control process design •Cost – benefit analysis	•Requirements engineering •User Experience	64
EXECUTION	•Technical aspects when implementing ABC •Modular architecture •High security solution	•ABC gate and housing hardware •Document authentication •Biometrics (Fingerprint, Face, Iris) •Video surveillance •Data fusion and alarming	68
IMPLE-MENTATION	•ABC implementation recommendation •Training as a part of the implementation project •End user acceptance testing		24

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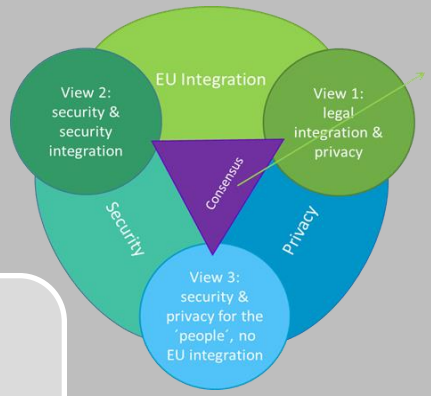
Planning, Initiation

Success of ABC solutions

Stakeholder needs

Engaging policy makers



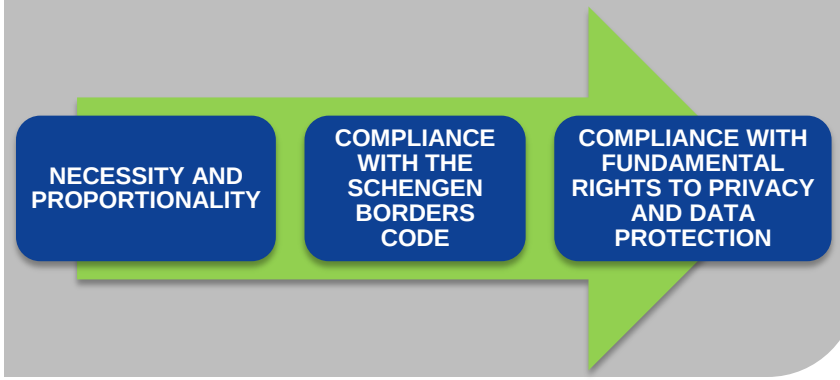
1. Accessibility for disabled passengers
2. Data minimisation
3. Transparency in biometrics use
4. Legal instruments & monitoring mechanisms for EU-wide IT-systems in border control
5. Democratic (and civil society) legitimacy of ABC prior to proceeding

PLANNING, INITIATION

Impact Assessments

- Data protection impact assessment
- Impact of a technology implementation

Legal requirements



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Recommendations for Planning, Initiation

- Be a comprehensive reflection about the fundamental rights implication of using an ABC system
- Use a method of **structured dialogue with the stakeholders** involved
- Use a structured, systematic method that is well **documented**.

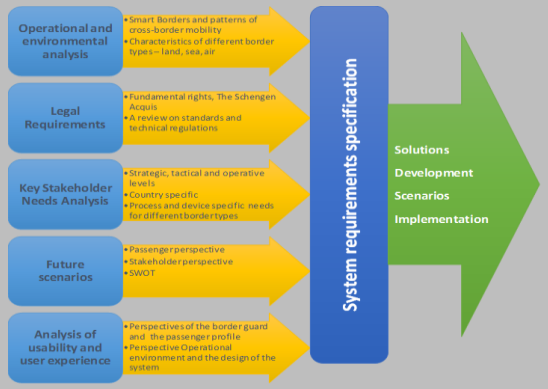
- By developing technology in a **responsible manner**, there is a greater likelihood that it will meet the needs and expectations of stakeholders.
- Operate ABC under **a clear legal basis**.
- Clearly specify the legitimate purposes of ABC, i.e. the real needs it has to meet.
- Assess the **necessity** of having ABC solutions in general and individual BCPs.
- Assess the **proportionality** of the chosen solution.
- Detail clearly the process and data flow.
- Carry out **the Data Protection Impact Assessment** and update it regularly.

Design

Towards operational harmonization

Future border control process design

Requirements engineering



DESIGN

Cost – benefit analysis

Usability as a key success factor

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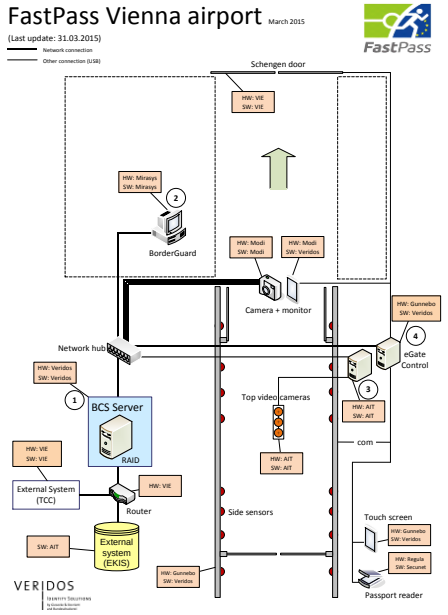
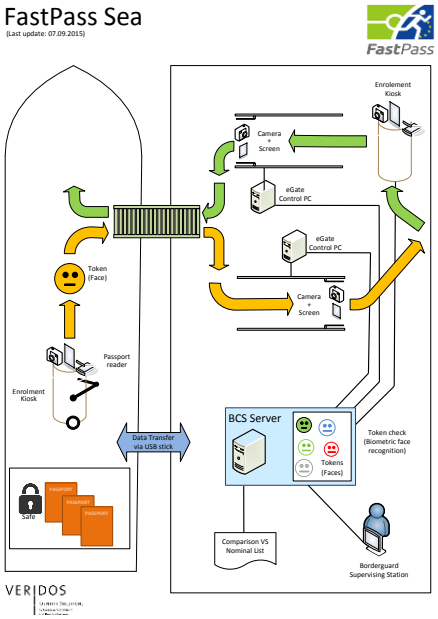
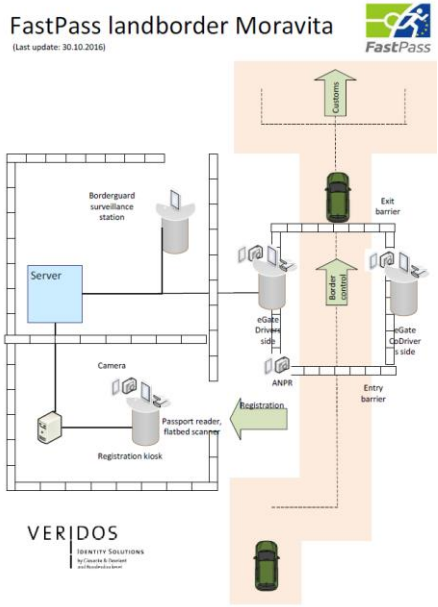
Recommendations for harmonization

- Harmonisation for efficiency and effectivity
  - Stakeholder engagement
  - Architectural solutions
  - Various border types inclusion
  - Border Check Process planning
  - Traveller Flow optimation
  - Reliability management







The self-service must ensure quick and easy pass

- **Guidance to passengers** should be so clear and unambiguous
  - Clear, minimized, harmonized and synchronized process
  - Adjusted according to the context and specific needs.
  - The system **must provide feedback**
  - Progress of the check process must be clearly indicated.
  - Additional guidance in the case of abnormal or incomplete activity
- The timing of different steps logically synchronised.
- Forward going process is recommended regardless of the results
- The physical dimension of the gate should allow smooth passage with trolleys or other luggage.

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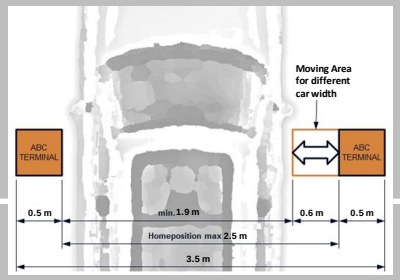
Recommendations to enhance BG user experience

- Notice on critical messages
- Clear visual outlook to support checking work
- Possibly modular interface that enables personalized or border type specific modifications.
- Location of the controlling booths and UIs designs must support profiling and observing the passenger flows.
- Environmental factors affecting the ability to work regarded

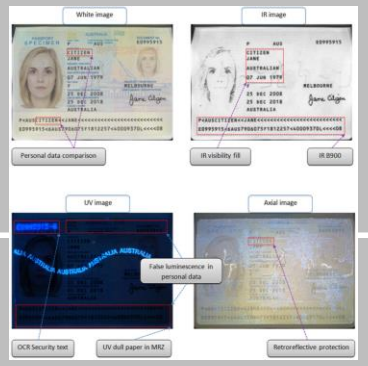
Technical considerations for ABC gate and housing hardware at different border types

ABC gate and housing hardware at different border types



EXECUTION

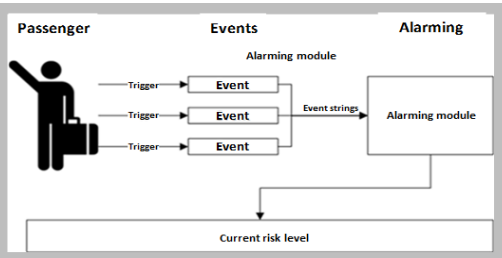
Document authentication



High secure solution

Innovations in the biometric area (Fingerprint , Face , Iris)

Innovations in the video surveillance area



Data fusion and alarming

The wor… …ement n° 312583.

Implementation

ABC implementation project

Training as a part of the implementation project

IMPLEMENTA-TION

End user acceptance testing

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Recommendations for implementation project

- Ensure commitment of different stakeholders
- Ensure the development and implementation conditions and cooperation
- Make a deployment and a risk management plan and follow it throughout the project
- Local administration acceptance of the technical concept and the location
- Perform system prototype tests with end-user, system SW-integrator and other relevant partners at the site to configure the system
- Perform Acceptance tests to obtain confirmation to operation start
- Conduct Training on the required end-users
- Provide technical support for the ramp-up time to handle possible problems.

Magnetic Autocontrol GmbH

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Conclusions

- The challenge to design and harmonise automated border control systems at different border types can be resolved.
- Building of systems for borders must always be tailored and adapted to the needs of individual borders.
- Harmonised usability and user experience (UX) considerations need to reflect the perspectives of both the passengers and the border guards. The potential to gain efficiency and fluency of traveller flows at border check points with usability considerations is definite.
- The use of novel document readers, biometrics and advanced information processing for ABCs can enable more efficient, secure, cost effective and fast border control processes for travellers, while increasing the passenger flow and reducing the burden on border guards.
- It will, however, require the analysis of a wide spectrum of information, cooperation with various stakeholders and deep understanding of the problems and of the technological resources needed.

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Thank You !

Contact information

www.fastpass-project.eu

Email: FastPassCoordinator@ait.ac.at

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FastPass – the system/technology, that

- **…is secure**
  - Resistent
    - to latest attacks on document scanner,
    - to biometric spoofing
  - Risk Assessment, Security Assessed by dedicated methodology
- **…you like**
  - UI developed with extensive feedback from different European border guards
  - Process and procedures developed with extensive evaluation from traveller groups
  - Respects privacy and data protection (Data protection impact assessment – DPIA)
- **…is harmonized – and shows new processes and scenarios**
  - ONE reference architecture serving many processes
  - First European solution for cars at land border with ABC
  - First solution for cruise ships
  - Real comparison of different approaches on an airborder crossing point

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