

# FastPass

## A Harmonized Modular Reference System for Automated Border Crossing (ABC)

EAB - Research Project Conference, Darmstadt, September 19<sup>th</sup>, 2016

Presented by

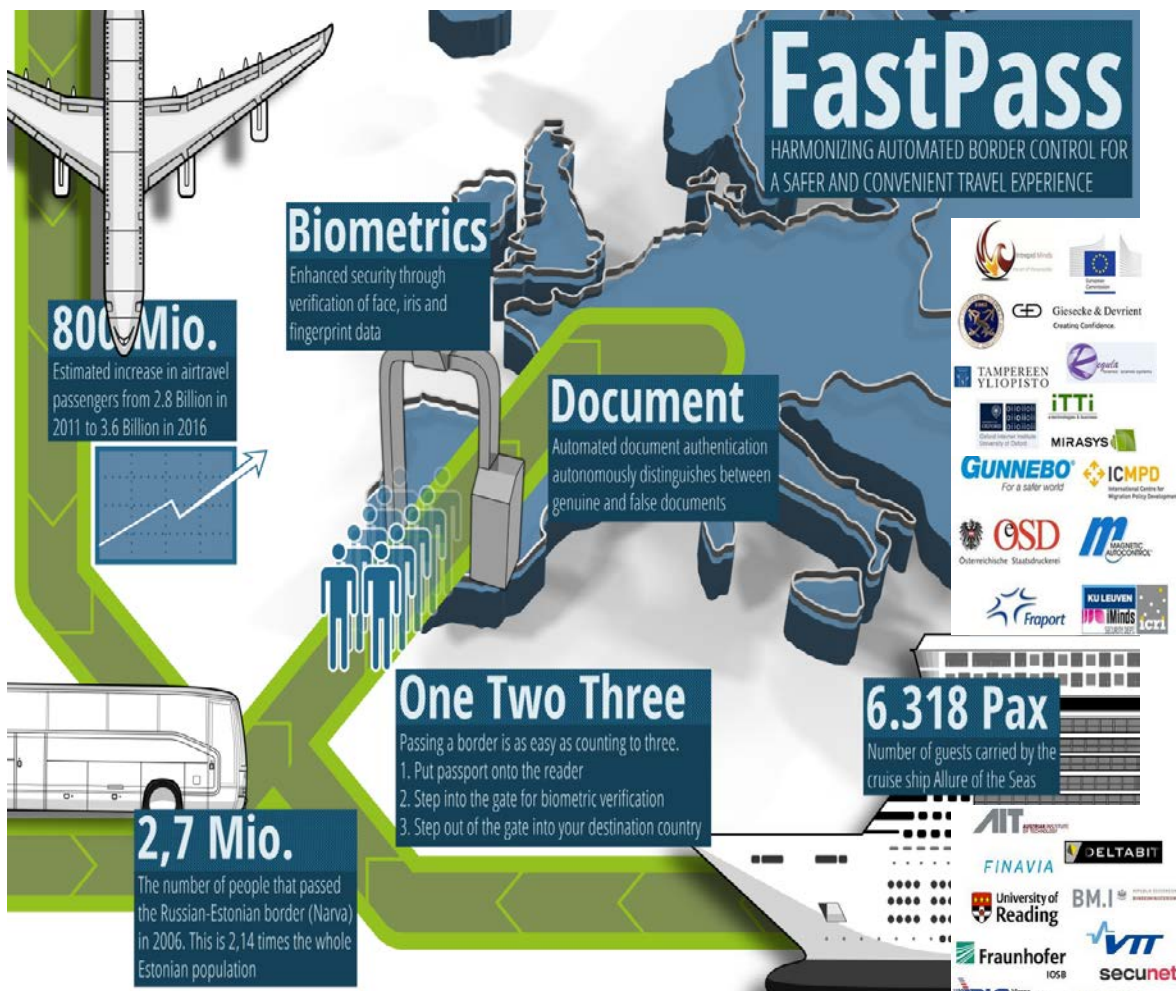
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Digital Safety & Security Department,

AIT Austrian Institute of Technology, Austria

# FastPass – The Project



## Goal

- Harmonised, modular reference system for ABC
- User-centric approach

## Details

- EU FP7 Security
- Jan 2013 – Dec 2016
- 27 Partners, led by AIT

## Challenges

- Security (Spoofing, Attacks)
- Acceptability
- Harmonization

## FastPass Objectives

### Supporting Innovative Border Crossing Concepts

**Airborder:**  
Comparison of classical method with kiosk biometric token

**Landborder:**  
Process with/without registration

**Cruise ship:**  
Enhance nominal list with biometric information

### Architecture Based on Innovative Technologies

**Reference Architecture with open interfaces**

**Advanced Technology Modules**  
(Passport, Identification, Video Surveillance)

**Security evaluation**

### Integration with EES and RTP

**Extend usability to TCN**

**Evaluate the value of RTP for EU citizens**

### Harmonized ABC Systems

**Usage of passport scanners**

**Usage of kiosks**

**Instantaneous „Go Through“**

**Process harmonization**

### European cooperation

**Liason with commission, EP, Frontex, eu-LISA, FRA**

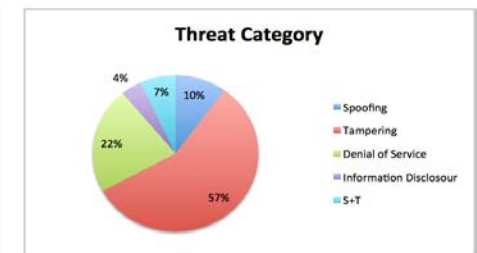
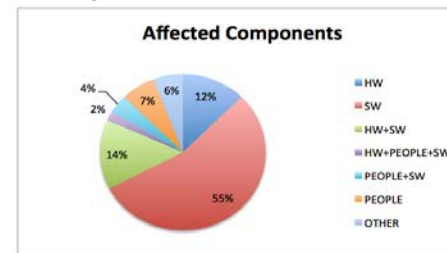
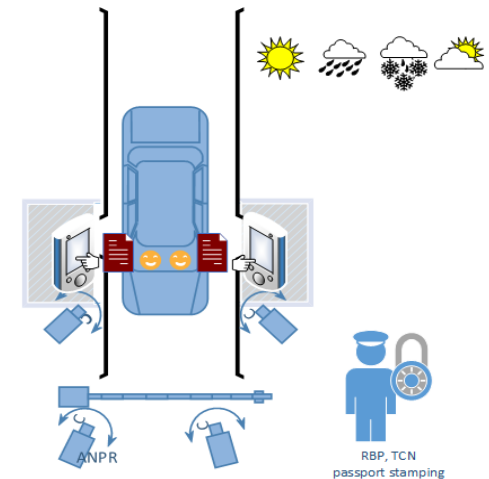
**Liason with other European Research Projects**

**Liason with industry**

**Liason with BG authorities**

## Main achievements

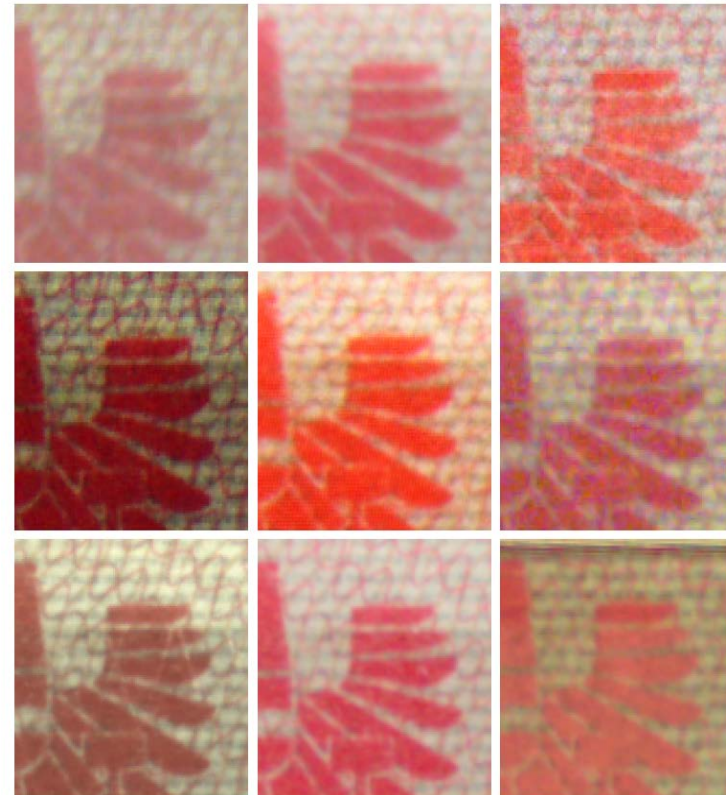
- **Next-generation sensor development and novel frameworks, software and algorithms**
  - On-the-move biometric identification, speed, quality, reduced intrusiveness, counter spoofing and costs
  - Document scanner interoperability
- **Innovative scenarios based on harmonized architectures**
  - Several 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



12.09.2016

# Document scanning

- **Document reader interoperability work**
  - Benchmarking
  - Interoperability
  - Testing
- **Document teacher**
  - To integrate new documents easily
  - To define own rules on documents



## Tested Devices



3M AT9000 MK2



ARH Combo Smart



ARH PRMc



Bundесdruckerei VE 600



DESKO ICON Gen I



DESKO PENTA Gen 4.0



Regula 7024m.111



Regula 7034.111



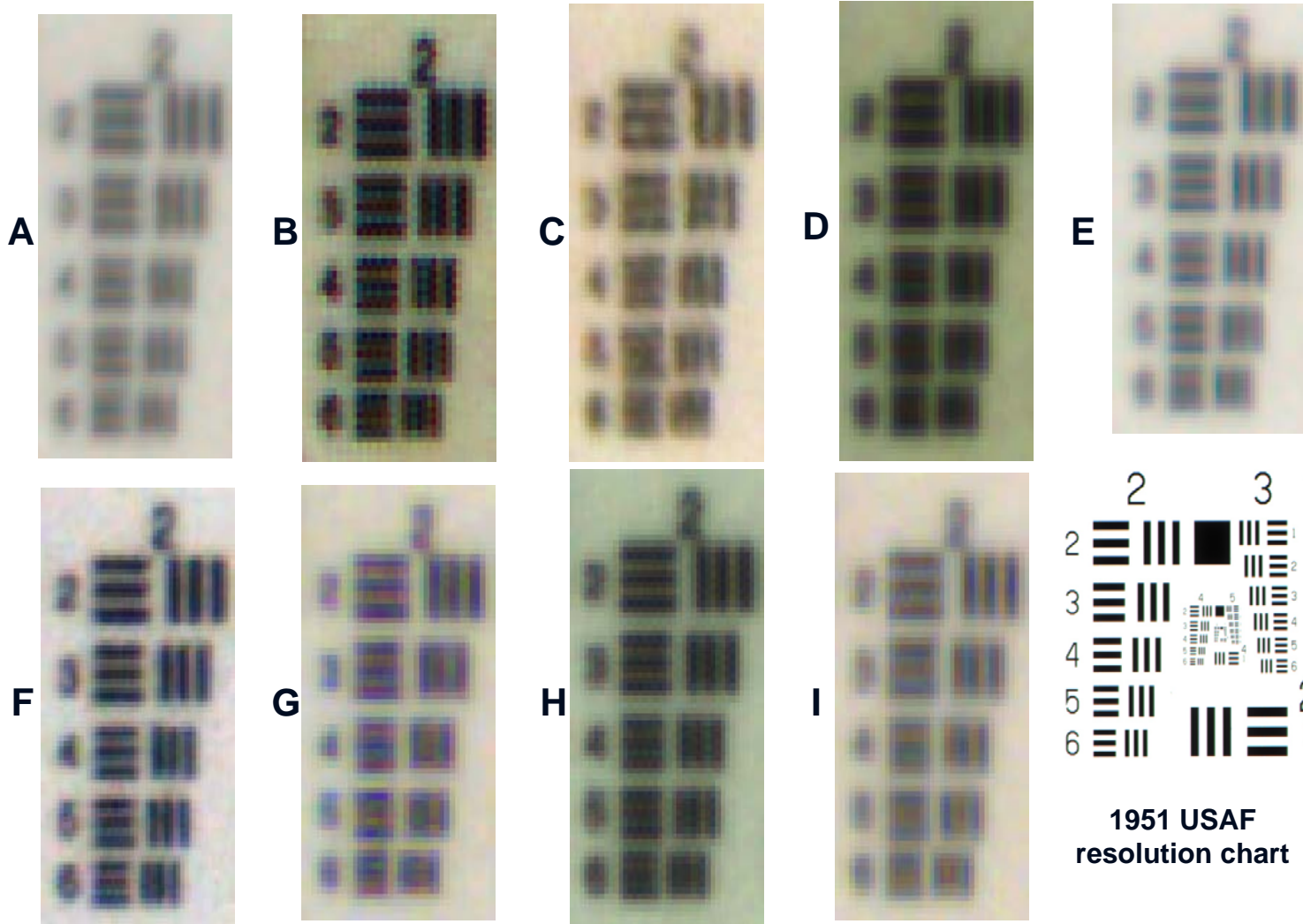
Suprema RealPass-V

## Anti-Glare

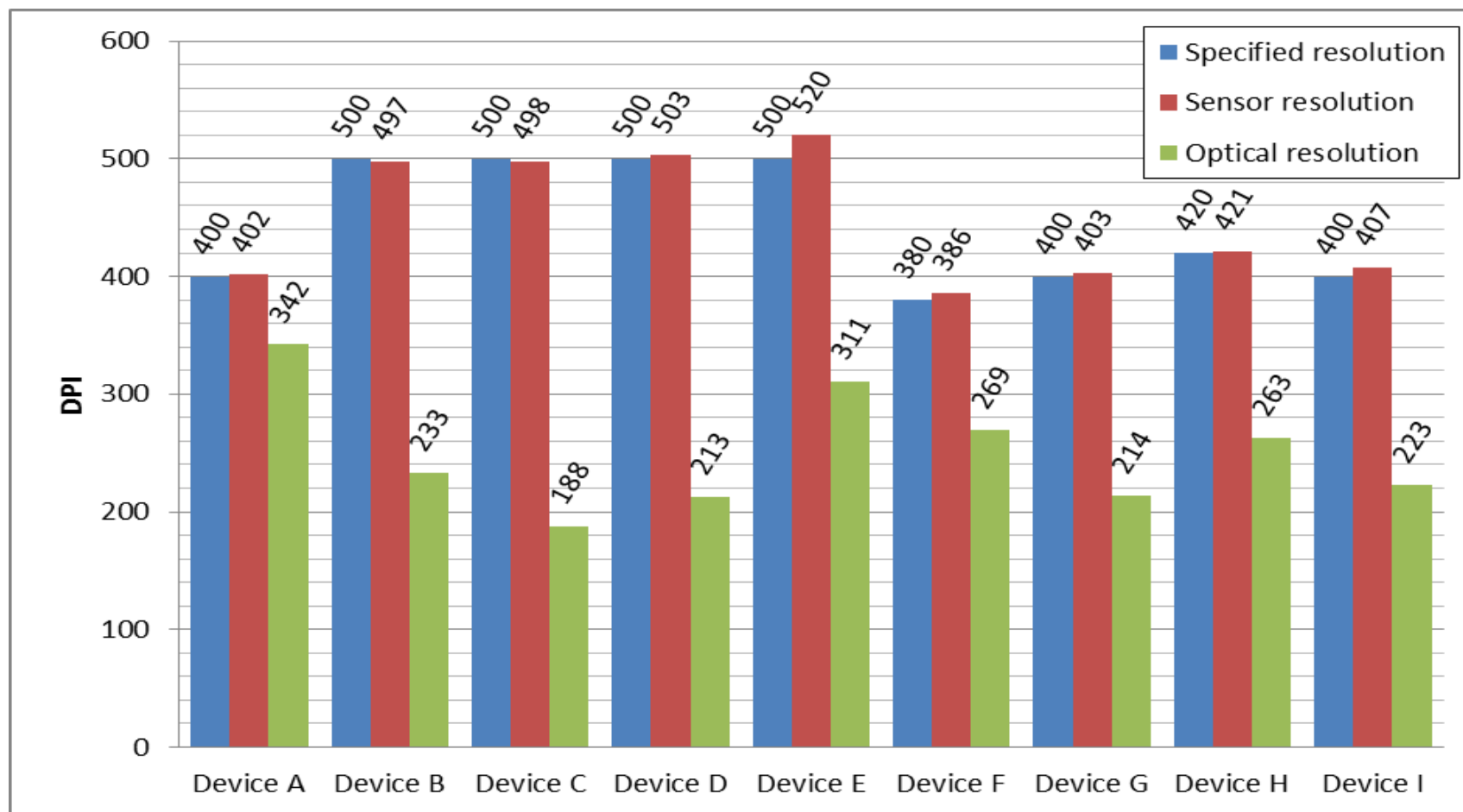
- 6 out of 9 devices featured anti-glare functionality; 3 out of 6 with consistent OVD-free images
- **Minor accordance** between glare responses of the same document.
- Ideally, **glare-free and separate reflection image(s)** are available.



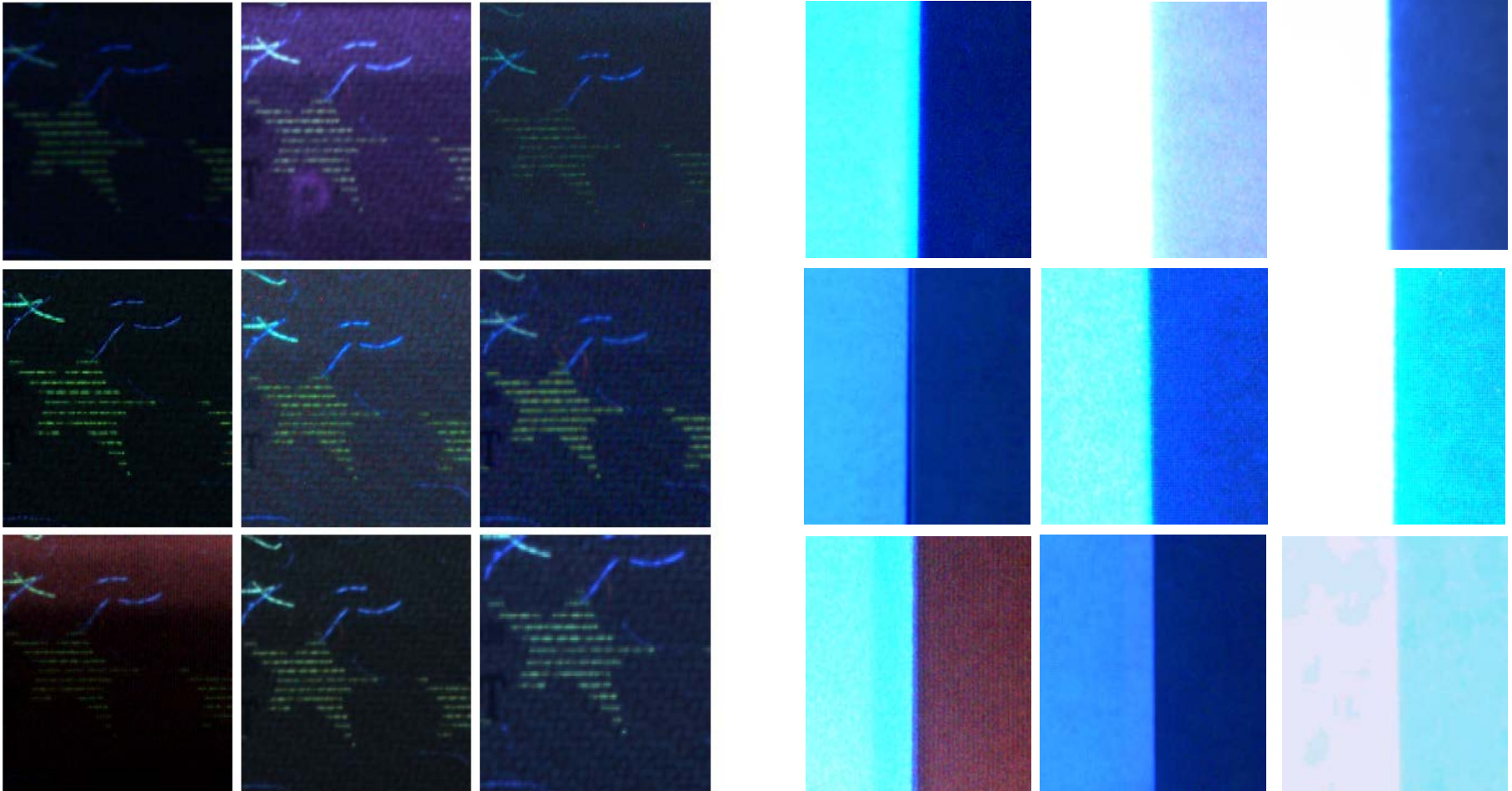
# Optical Resolution



## Comparison of different document/passport readers performance for optical verification



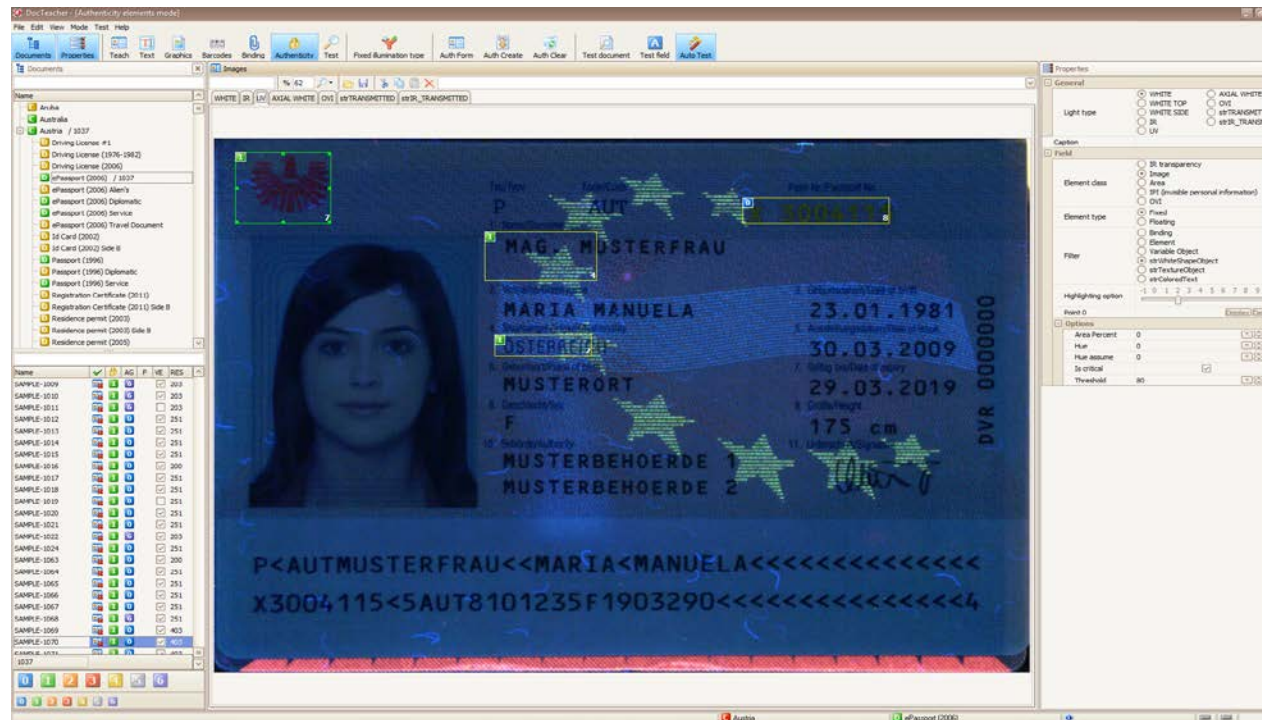
## UV: Examples





# Document verification: DocTeacher

Features: Standard features (Importing, Cloning, Resizing...etc), Teaching mode, Objects editing mode, Testing mode, Batch processing.



## Benchmarking & Interoperability Conclusions

### For device manufactures

- Effective optical resolution does not fully exploit capabilities
- Relatively broad range of sensor noise levels (4 dB range)
- All readers provided very low geometrical lens distortions
- Illumination wavelength / bandwidth one of several factors influencing quality
- Camera settings & image processing have much stronger impact
- Glare reduction is essential for accurate processing of glossy documents
- Shading and color calibration are necessary for successful interoperability

# Benchmarking & Interoperability Conclusions

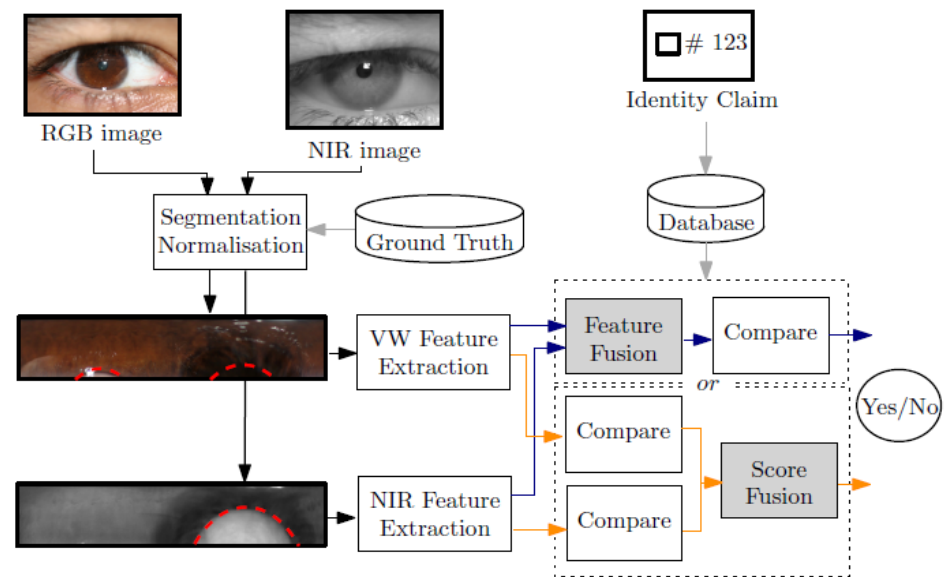
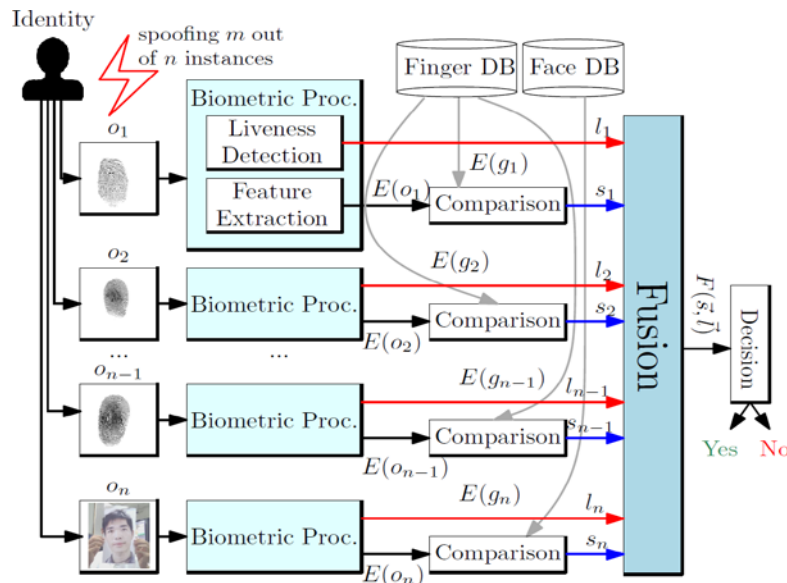
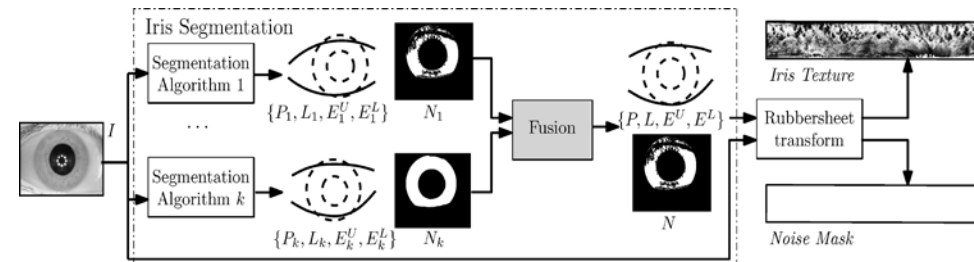
## For end-users

- Selection of devices
- Change of device provider
- Optical interoperability is major concern
- Important factors: glare reduction, low noise level, high true optical resolution

# Biometrics and Video surveillance

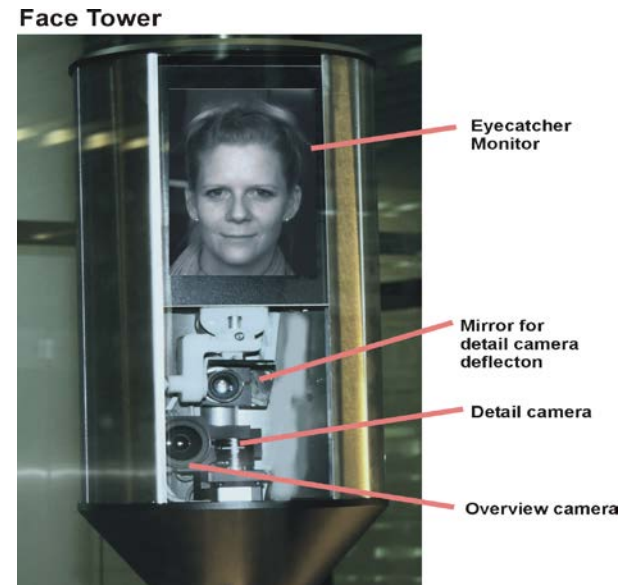
## ■ Algorithms and software

- Segmentation for iris recognition
- Spoofing resistant multimodal fusion
- Multispectral iris recognition



# Biometrics and Video surveillance

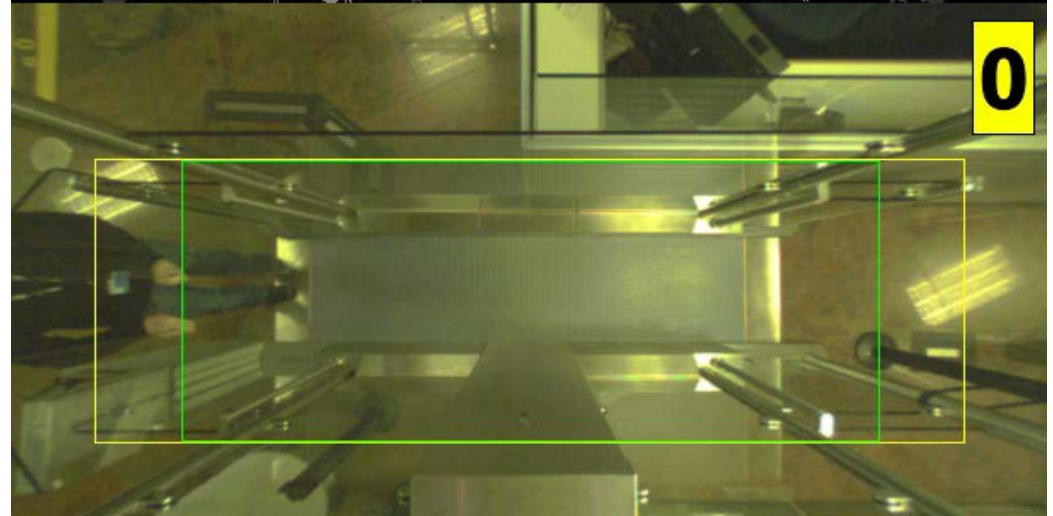
- **Hardware and sensors**
  - On-the-move face verification
  - Iris recognition
  - Person separation
  - Left-item detection



## Example: Person separation for e-gates



E-gate test installation:  
Vienna Airport, Non-Schengen-Arrivals



Video

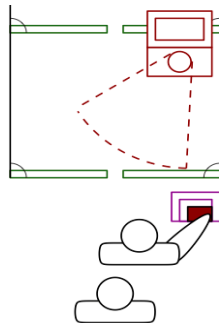
The work has been supported by the FastPass project. The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 312583. This publication only reflects the author's view and the European Union is not liable for any use that may be made of the information contained therein cannot be copied, reproduced or modified in the whole or in the part for any purpose without written permission from the FastPass Coordinator with acceptance of the Project Consortium.

## Air border

June 2015

- Classical passport reading at the eGate (slow)
- New Biometric sensor (Face)
- Different workflows tested (M1, M2)

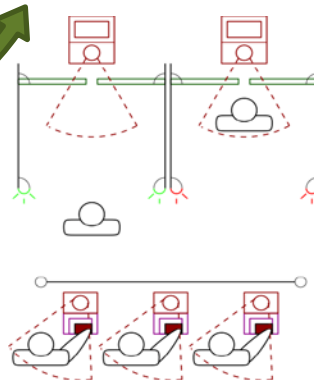
### Stage 1 "Baseline Mantrap"



May 2016

### Stage 2 "Segregated 2-step Kiosk"

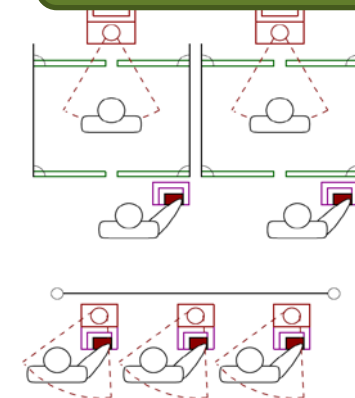
- Passport reading at the Kiosk (parallel, faster)
- Passport/Face (fast read) enable the eGate
- Passport as token, Face as token (K1, K2)



Sept 2016

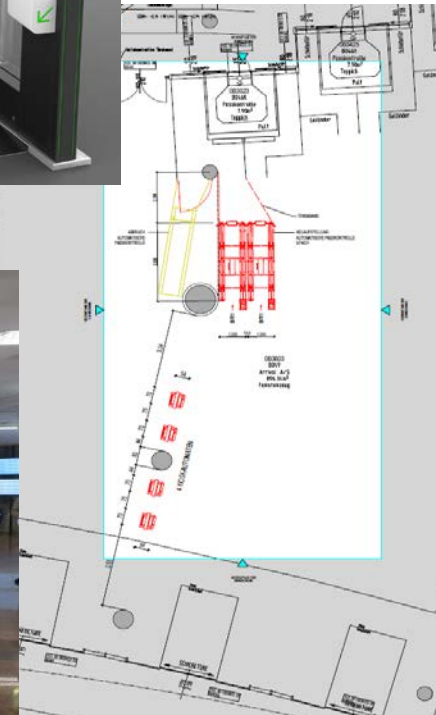
- Registration at Kiosk is valid for longer period
- **Face& Finger Identification** (Update of biometric units also for continued Stage 2)
- R1 as simulation

### Stage 3 "RTP with Multibiometrics"



## Air border

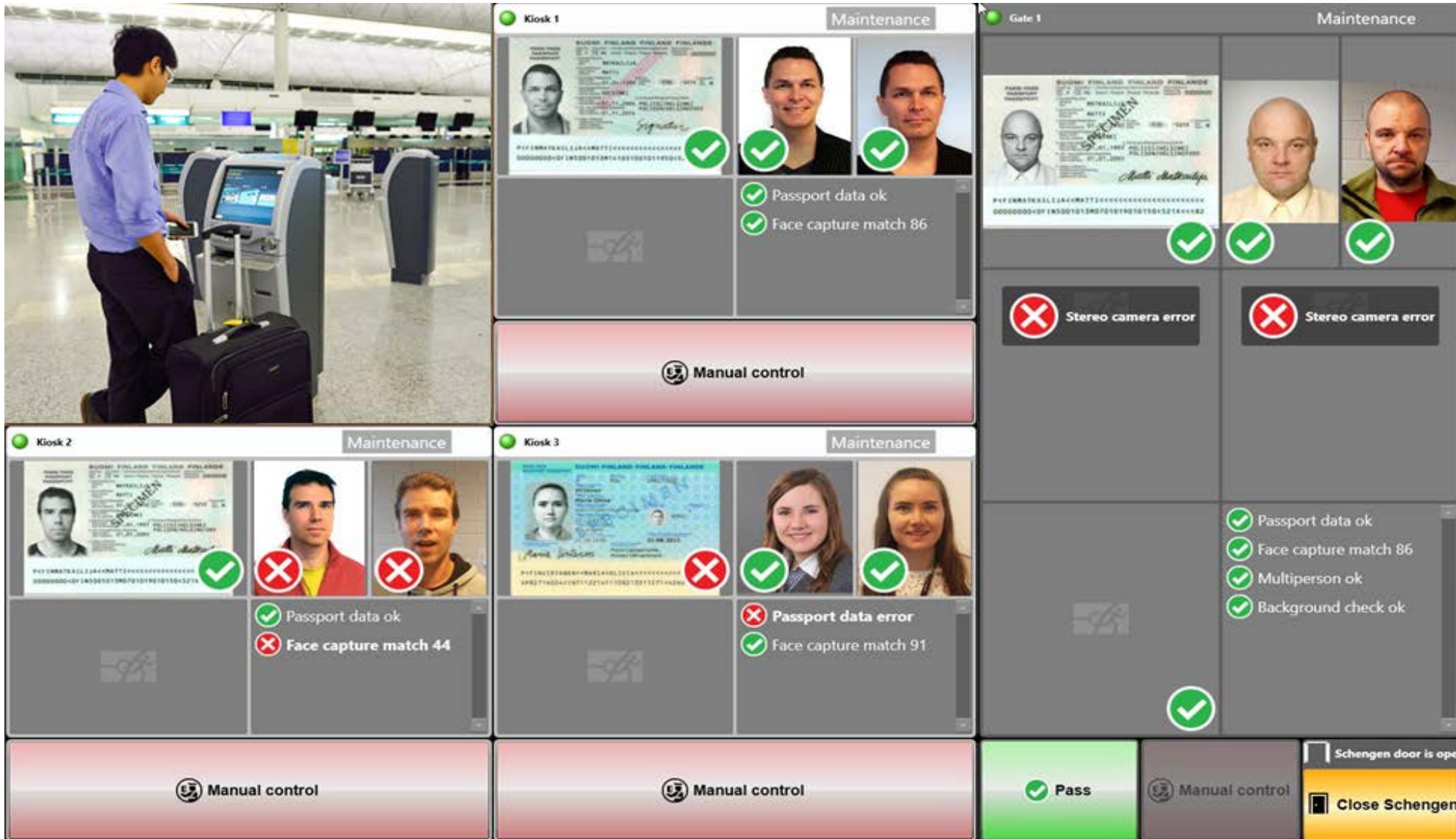
- Operational Test at Vienna International Airport
- Comparison of several installation types
- Documents: ePassports
- Travellers:
  - Stage 1: EU/EEA/CH
  - Stage 2 +3: + TCNVH, + TCNVE
- Biometrics:
  - Face (all Stages)
  - +Finger (Stage 2),
- RTP (Stage 3) will be simulated



## Air border



# Border guard GUI (airborder)



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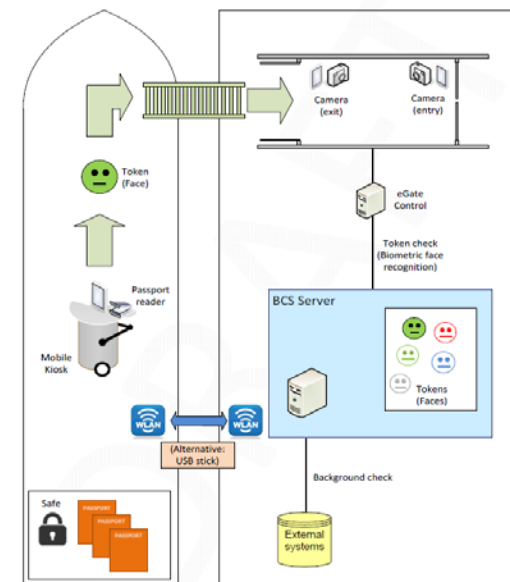
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## Cruise ship

- 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 test)
- RTP will be simulated



FastPass sea  
(Last update: 03.12.2014)



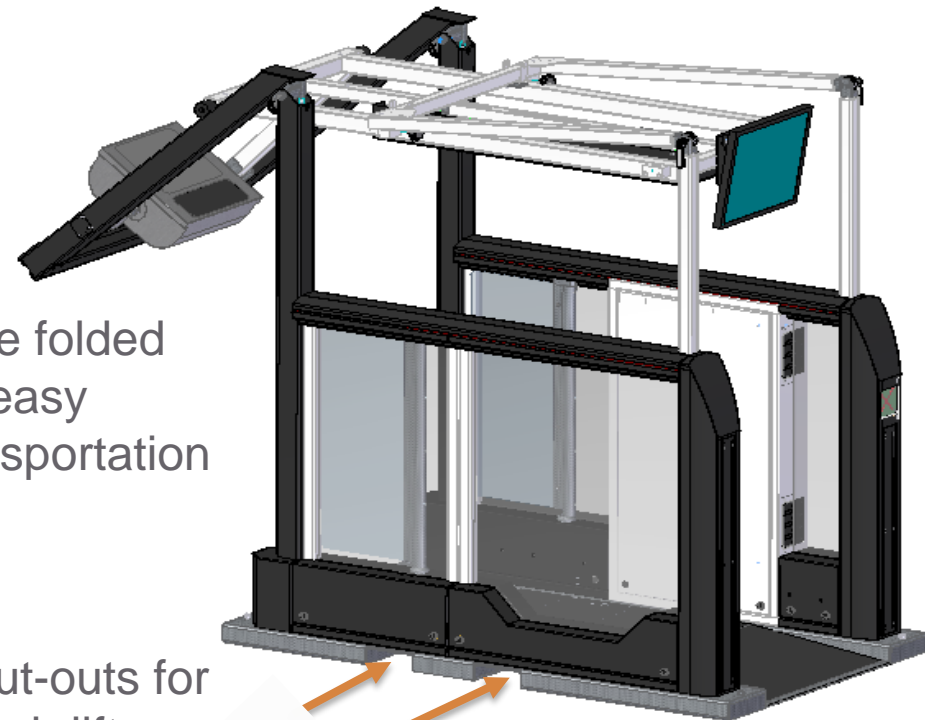
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## Sea border eGate

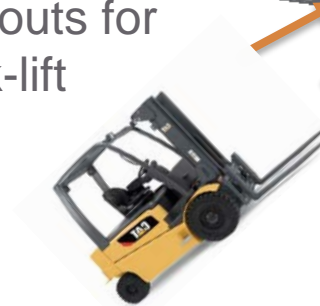


Gate in  
normal size



Gate folded  
for easy  
transportation

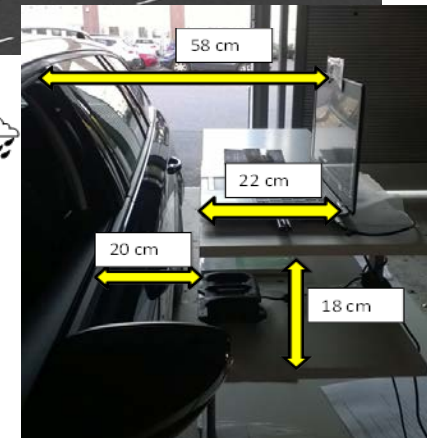
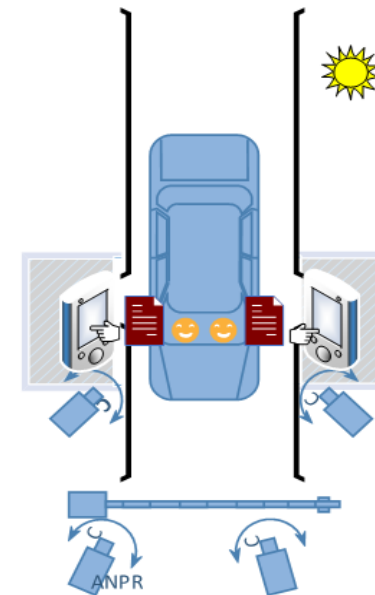
Cut-outs for  
Fork-lift



Design for Piraeus, 1 gate  
- No mantrap  
- portable

## Land border

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



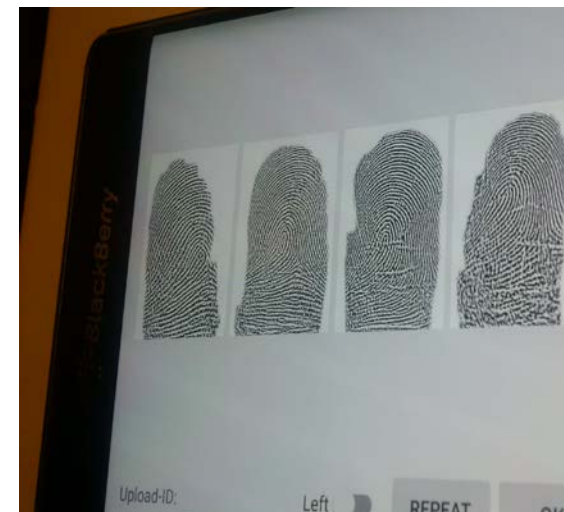
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## FastPass – the system/technology, that

- **...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

# From FastPass to MobilePass to Smartphone



12.09.2016

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Thank you for your  
attention!

### **FastPass@BIOSIG'16:**

A. Sequeira, L. Chen, J. Ferryman, F. Alonso, J. Bigun, K. Raja, R. Ramachandra, C. Busch and P. Wild, **Cross-Eyed - Cross-Spectral Iris/Periocular Recognition database and competition**



<https://www.fastpass-project.eu/>