



# FastPass

## Biometric solutions in ABC systems

Presented by

Markus Clabian

Senior Engineer

Austrian Institute of Technology - AIT

Secure Document World

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## Overview

- FastPass – motivation, facts, objectives and status
- Specific topics and results
  - Document scanning and its impact to ABC systems
  - Biometric challenges and new biometric solutions
    - „on the move“ capture
    - Research on multimodal biometrics
    - Research on face verification in ABC systems
- Summary and next steps

# Motivation

## Challenges :

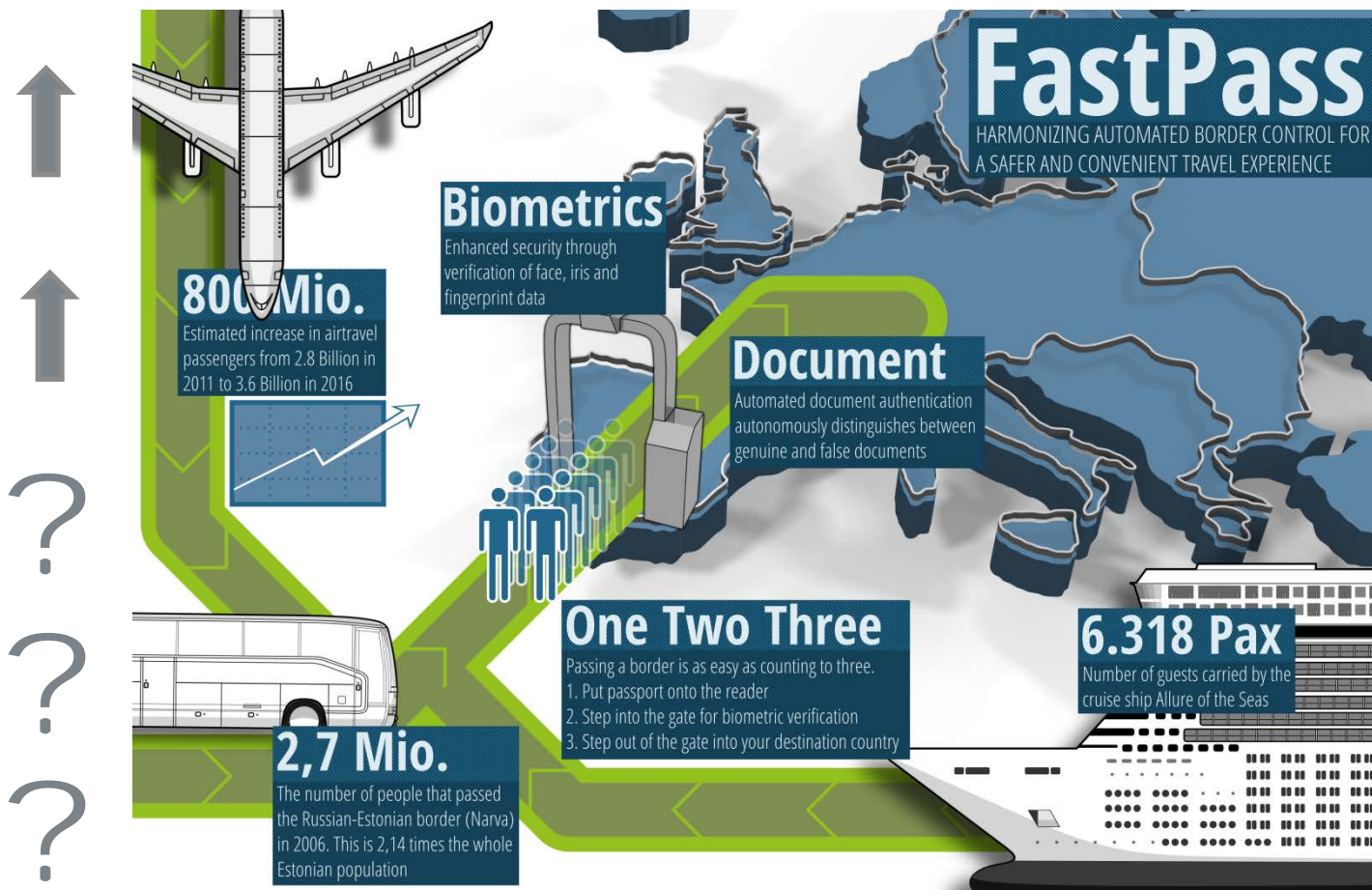
Passenger flow

Requirements on  
the border control  
process

System risk  
assessment

Harmonization

Variety in usage



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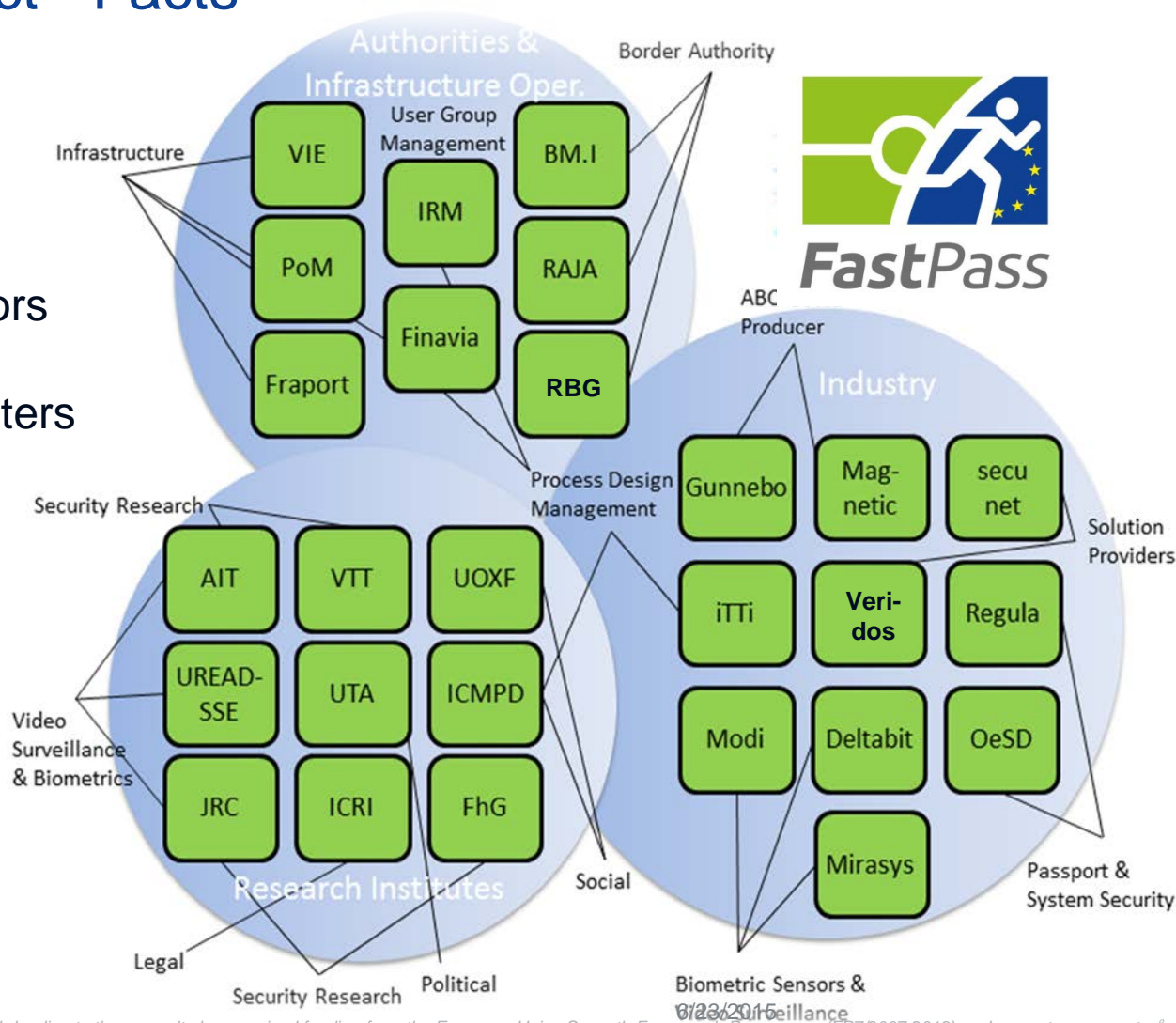
# FastPass – Project - Facts

## 27 partners:

- 3 border authorities
- 4 infrastructure operators
- 11 industry partners
- 5 applied research centers
- 4 universities

## Schedule

- 1.1.2013-31.12.2016
- Demonstrations/Pilots
  - Air (starts in June)
  - Land (will start in 2016)
  - Sea (will start in 2016)



## FastPass Objectives

### Integration with EES and RTP

Entend usability to TCN

Evaluate the value of RTP for EU citizens

### Harmonized ABC Usability

Usage of passport scanners

Usage of kiosks

Instaneous „Go Through“

Usage of fingerprint scanners

### 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

### European cooperation

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

Liason with other European Research Projects

Liason with industry

Liason with BG authorities

# Document scanning and its impact to ABC systems

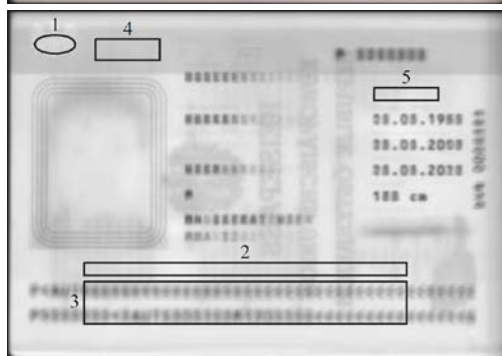
- **Analysis of passport aging effects**



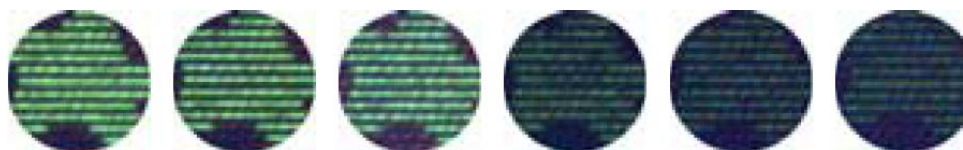
## Variation in genuine passports



Most stable, variation  $\ll 3\%$

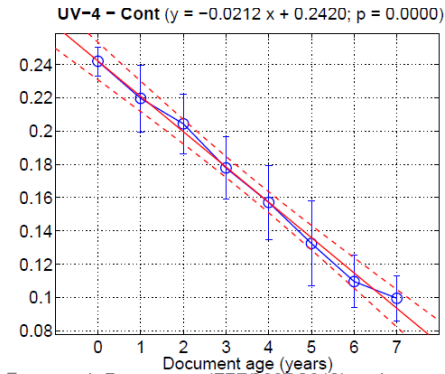
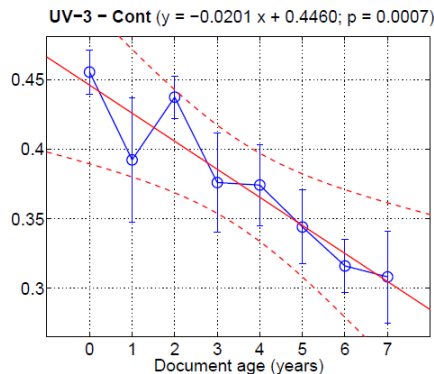
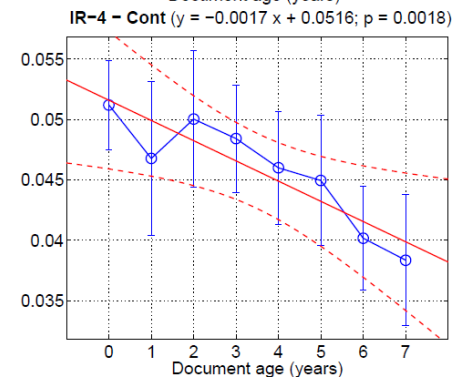
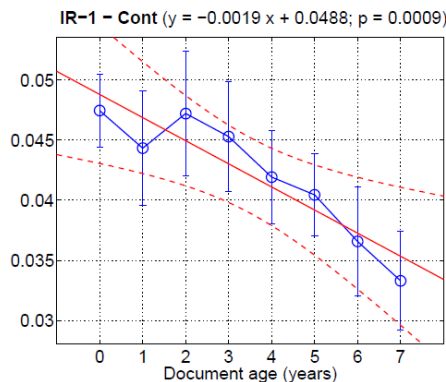
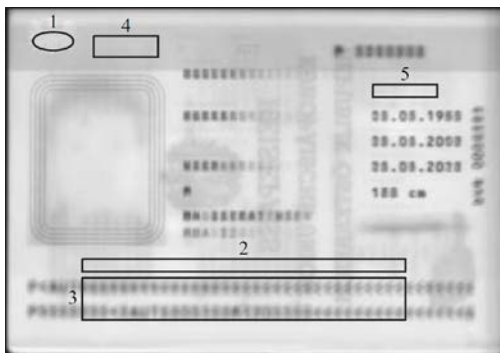
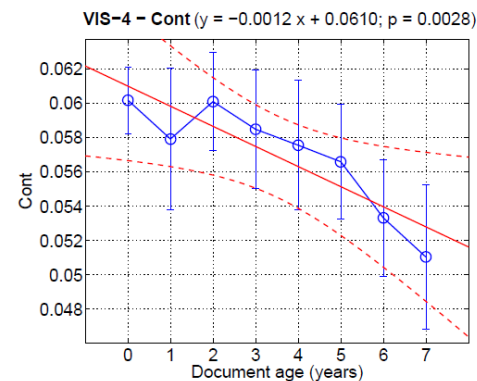
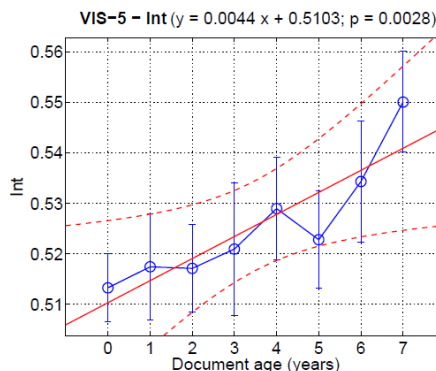


Still stable, variation around 3%



Not stable, variation up to 52%

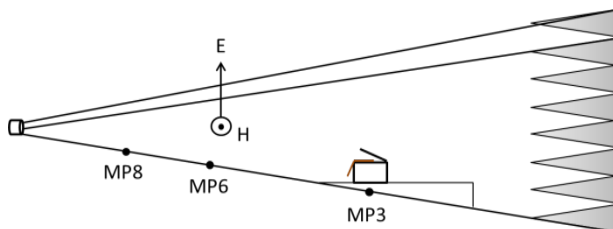
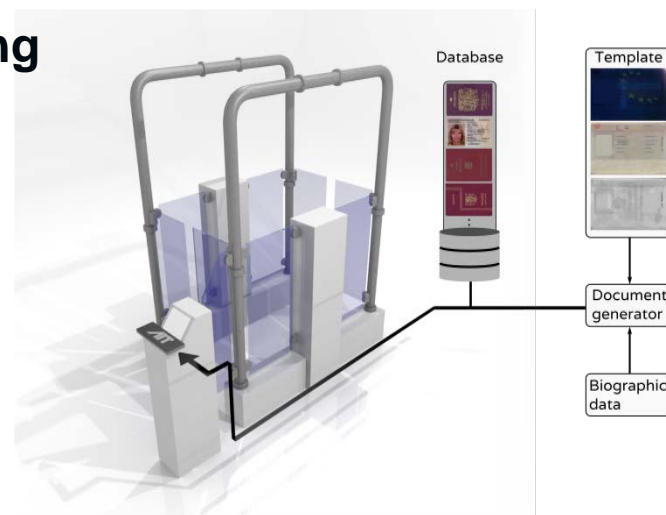
# Aging effects





# Document scanning and its impact to ABC systems

- **Analysis of passport aging effects**
- **New methods for improved feature checking**
- **Robust to presentation attacks**
  - Device mimicking a passport
- **Passport Simulator as testing tool**
  - Black-box testing of whole ABC gate
  - Automated simulation of large quantities of passports
  - Testing robustness against the active display
- **Robust to IEMI**
  - Vulnerability of electronic document readers against High Power Electromagnetics

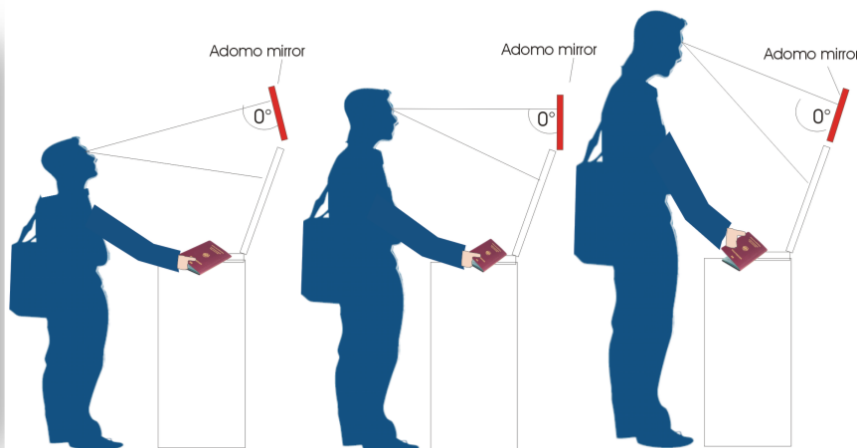


## Biometric challenges in ABC

- Biometric modalities in passports: face and fingerprint
- Most installations rely on faces
- Only RTP programmes use other modalities (fingerprint and iris)
- Algorithmic performance found in NIST is not always reproducible in ABC installations
- Face recognition is slow, but getting faster
- Biometric spoofing is a relevant issue
- ABC gates shall be extended to TCN (+ VISA) holder, fingerprints must be checked against VIS
- Token for segregated 2-step process could also be biometric
- Present three FastPass results that contributes to solve these challenges

## Face recognition on the move

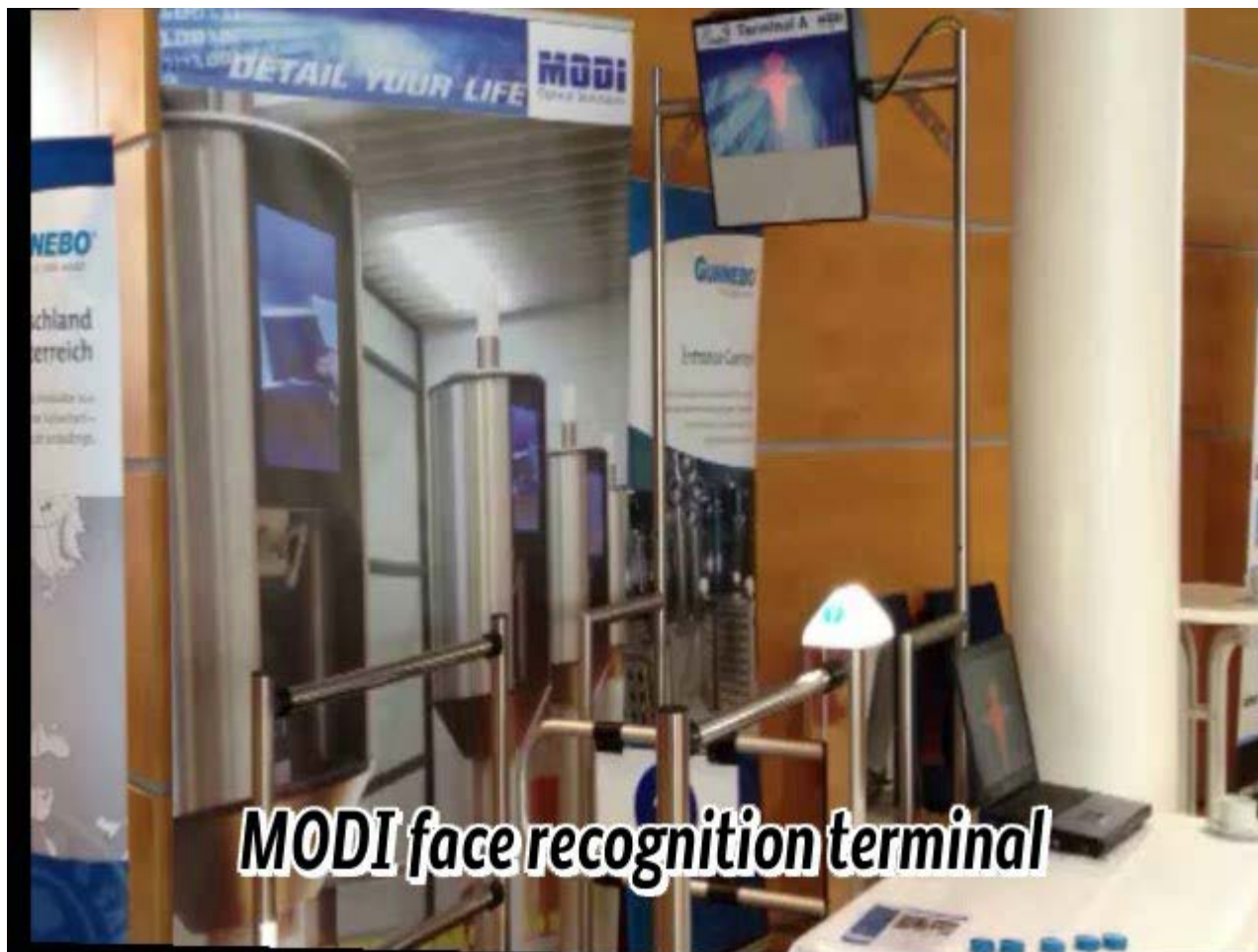
- Mirror based face capture
- Face recognition with addition NIR
- Liveness detection against
  - Face Image or video
  - Masks
- Optional
  - Iris capture from a distance



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## Face recognition on the move



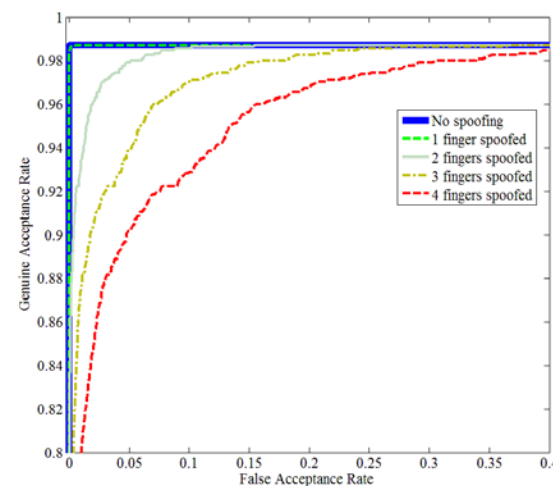
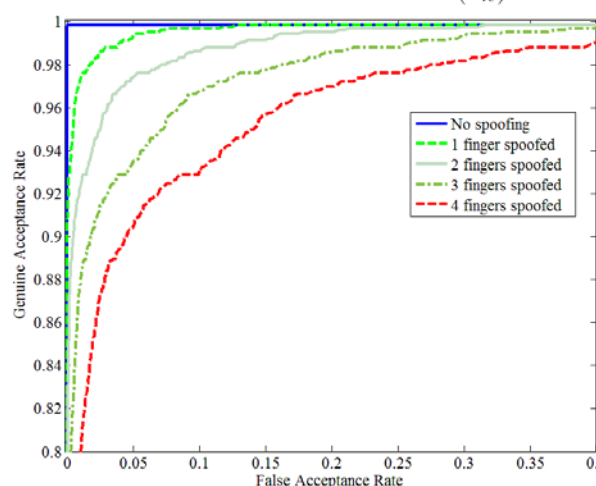
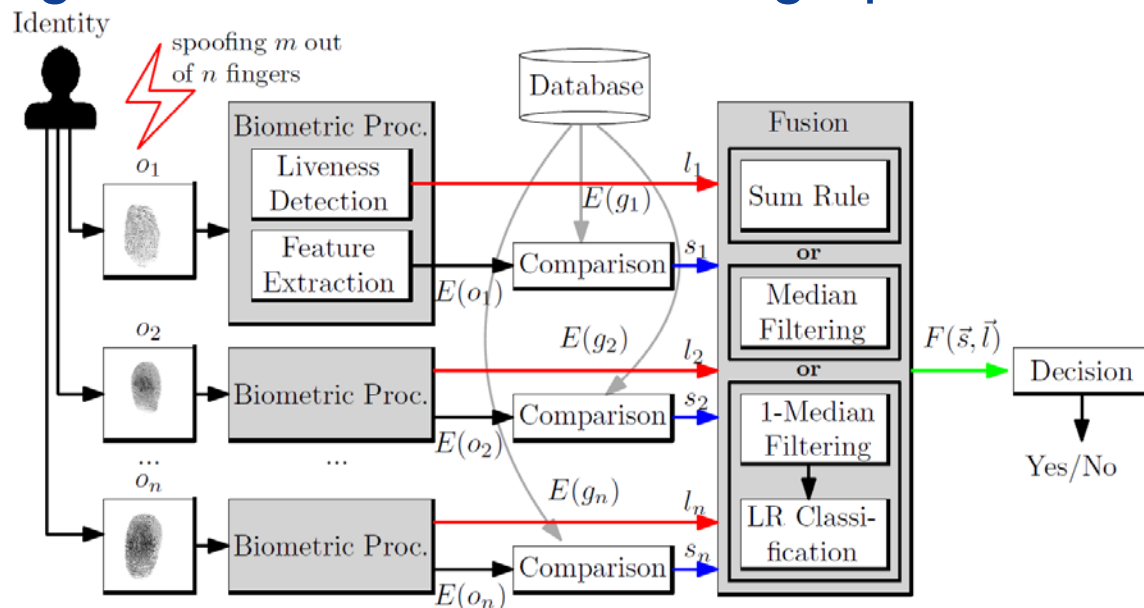
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# Multibiometric spoofing detection - shown for fingerprints

- Know problem:
  - one spoofed modality influences recognition rate strongly
  - Additional modality
- New algorithm:
  - Median filtering integrating matching and spoofing scores
- Result
  - Median filter outperforms standard algorithms
  - Equal Error Rate remains stable





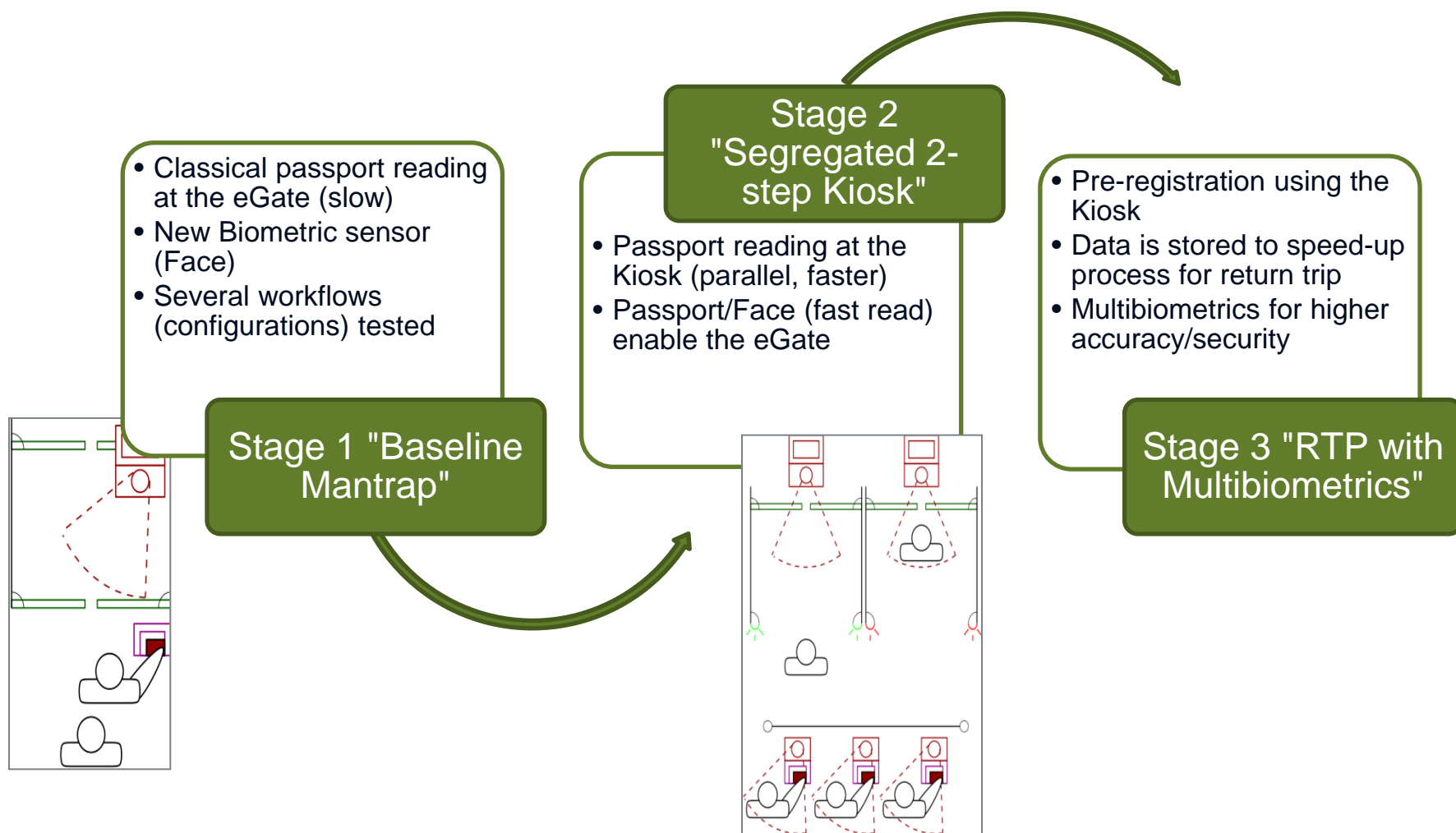
# Evaluation of Face Recognition Technologies for Identity Verification

- Based on stored data from real installation in Vienna
- FRR and FAR for different algorithms and different thresholds
- Frontex recommendation is FRR of 0.05 at a FAR of 0.001
- 2 out of 3 commercial algorithms achieve these rates
- Age of the passport has an influence on detection rates
- Nationality of passport has an influence on detection rates

⇒ Will be presented at

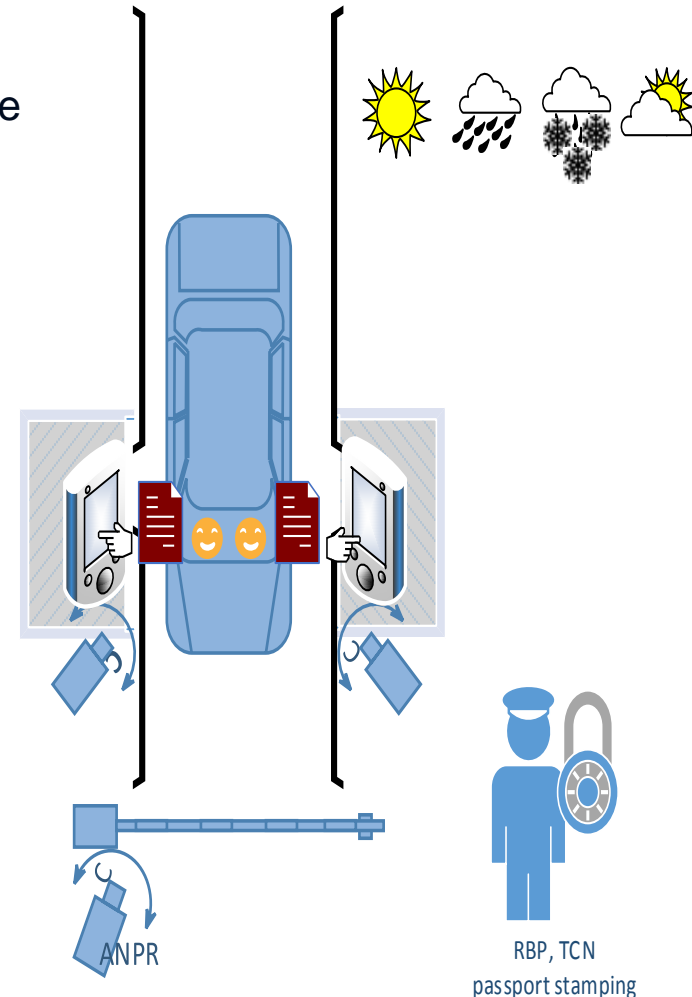
*12th IEEE International Conference on Advanced Video and Signal based Surveillance (AVSS)*

# FastPass – Air border scenario



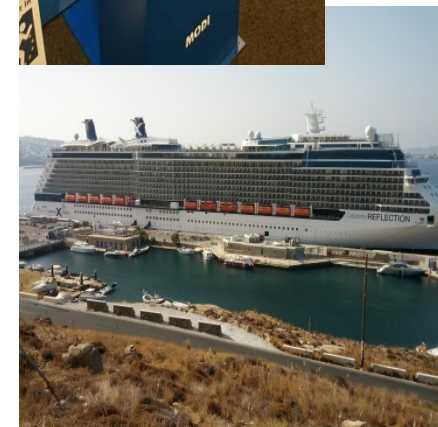
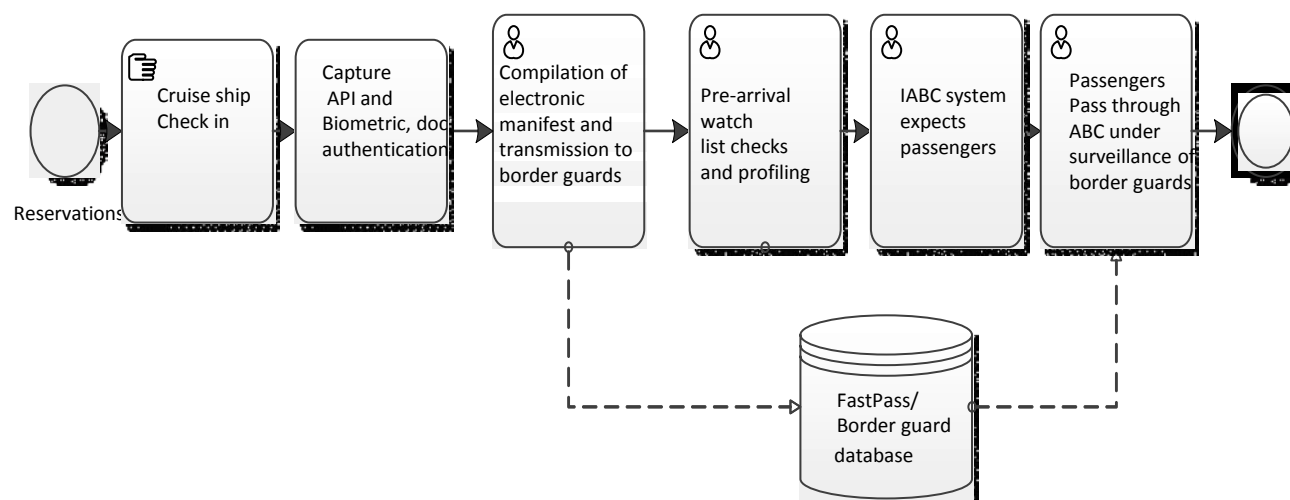
## FastPass – Land border scenario

- Land border traffic increasing steadily
- New processes and infrastructures needed to handle the traffic
- Both EU citizen and TCN
- Definitive portion of regular travellers
- No land border ABC in EU exists
- Existing land border solutions use RTP type solutions
- Biometrics in outdoor conditions is an issue



## FastPass – Cruise ship scenario

- Carriers collect API from passenger travel
- Special provisions in the Schengen Borders Code for cruise ships
- Facial images are collected for ship management
- Cruise ship passengers are considered low-risk for *passport* control
- Cruise ship companies demand fast, flexible and convenient disembarkation/re-embarkation (mission critical)



## FastPass – the system, 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
  - First solution for segregated two step process with face as biometric token
  - Real comparison of different approaches



# Thank You !

## Event information

### ISBC 2015

# 1st International Workshop on Identification and Surveillance for Border Control (ISBC 2015)

August 25th, 2015; Karlsruhe, Germany



## Contact information

[www.fastpass-project.eu](http://www.fastpass-project.eu)

Email: [FastPassCoordinator@ait.ac.at](mailto:FastPassCoordinator@ait.ac.at)