



# *MobilePass*

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A distributed mobile solution with three components:  
a Capture/Display device  
a Fullpage Passport scanner and  
a Central system

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Department Safety and Security

# MobilePass

A secure, modular and distributed mobile border control solution for European land border crossing points

Proposal	MobilePass - 608016
Funding	Security Call, 7th Framework Programme
Topic	SEC-2012.3.2-3: Mobile Equipment at land border crossing points
Type	CP – Capability Project
Duration	2.5 Years
Budget	~ 4.2 M€
	Develop new technologies needed in mobile scenarios and embed them in the actual border crossing workflow. Bring together system- and component producers, research institutions and governmental authorities. The entire innovation process, from development to integration, will continuously be evaluated by border guard authorities.
Coordinator	<a href="mailto:MobilePassCoordinator@ait.ac.at">MobilePassCoordinator@ait.ac.at</a> ; +43 (0) 664 815 78 42

# MobilePass

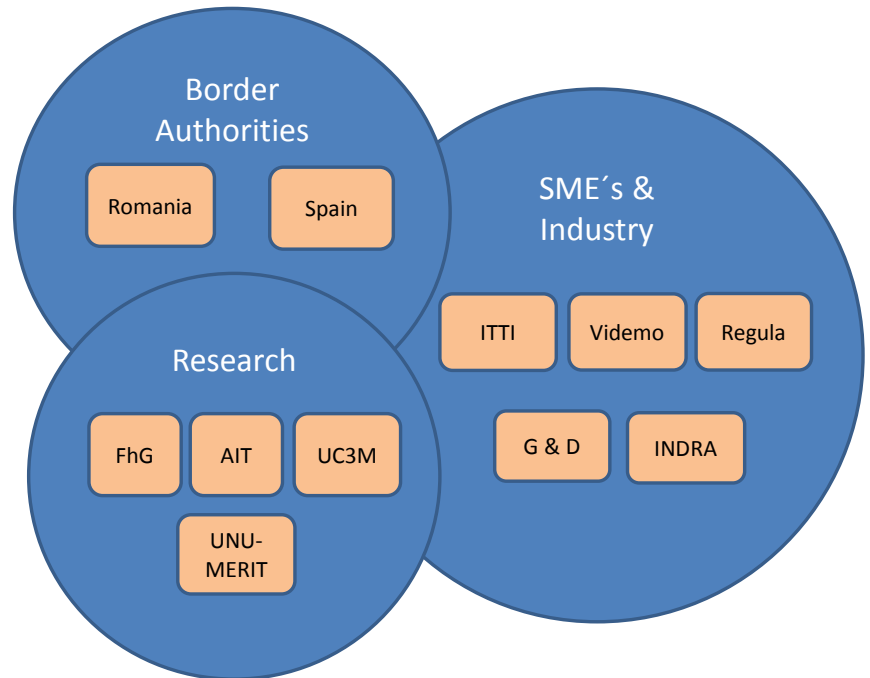
A

**secure**, (TPM, re-engineering, remote attestation, access control)  
**modular**, (embedded hardware, used only as a scanner, interfaces, API´s)  
**distributed**, (communication, wireless connectivity, nat./int. DBs, certificate stores)  
**and mobile** (usability, battery, robustness, HMI, requirements)  
**border control solution** (processes, workflows)

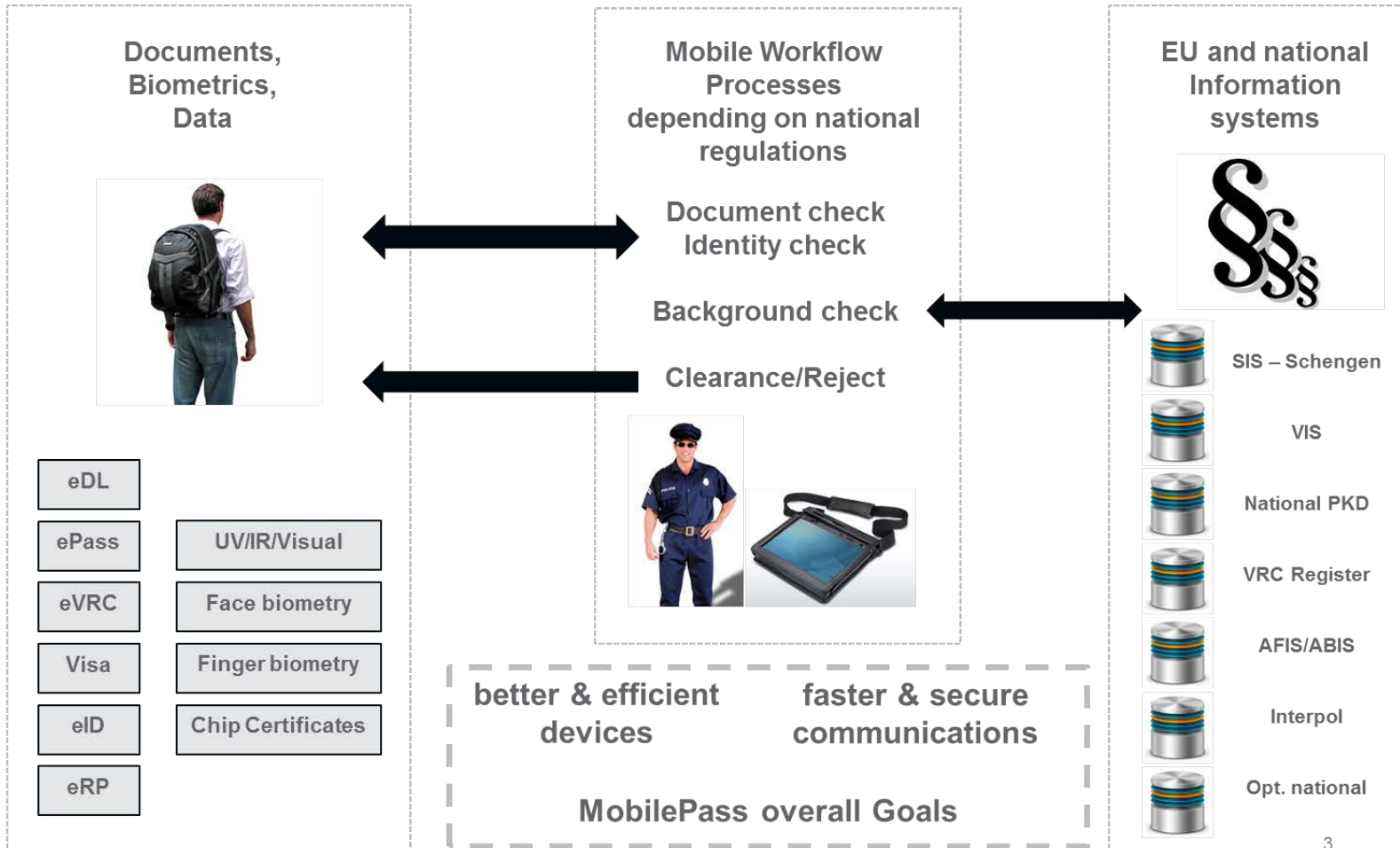
for European land border crossing points.

# Consortium

- University and Research Centers
  - AIT (Embedded systems, Architecture on mobile devices)
  - FhG (2/3D Capture and image enhancement)
  - UC3M (Identification technologies, Fingerprint Biometry, standards and evaluations)
- SMEs
  - Regula (Fullpage Passport Reader)
  - ITTI (communication systems)
  - UM-MERIT (Ethics)
  - VIDEMO (Face Biometry)
- Industry
  - G&D (Integrator)
  - INDRA (Integrator)
- National Service Provider, National Authorities
  - RBP Rumanian Border Police
  - SBP Spanish Border Police



# Overview

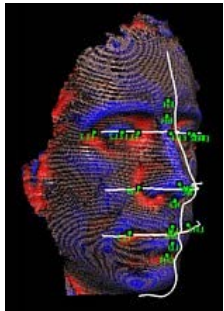


# Modular System Architecture

## Objective: 1



**Fast, Mobile**  
UV/IR, fullpage  
Passport scanner



**Fast, Mobile**  
face verification  
camera



**Fast, Mobile,**  
**contactless**  
fingerprint  
scanner/camera

**Advanced Components,  
Objectives: 2,3,4**



**Terminal Devices**

**Information  
systems**



**Fast, Reliable, Secure  
communication  
Objective: 5**



## Device approach (birds eye view)



Symbolic image

- Camera for MRZ, OCR-B Text (at a distance)
- Face Capture & Verification (integr. Illumination)
- Fingerprint Capture & Verification (contactless)
- 2-way connectivity
  - 3G,4G,LTE : Information Systems
  - BT,WIFI: other Scanners
- RFID ePassport Reader
- Trusted Platform Module (TPM)  
e.g. secure boot
- 3 Factor Authentication of User
- Remote Attestation of Device
- Pipeline Operation
- “Zero” - handed Operation
- Open API´s

# Device approach





# The “optimal” Device ?



Display,  
Communication &  
Control Unit



Face capture unit



Fullpage passport  
scanning

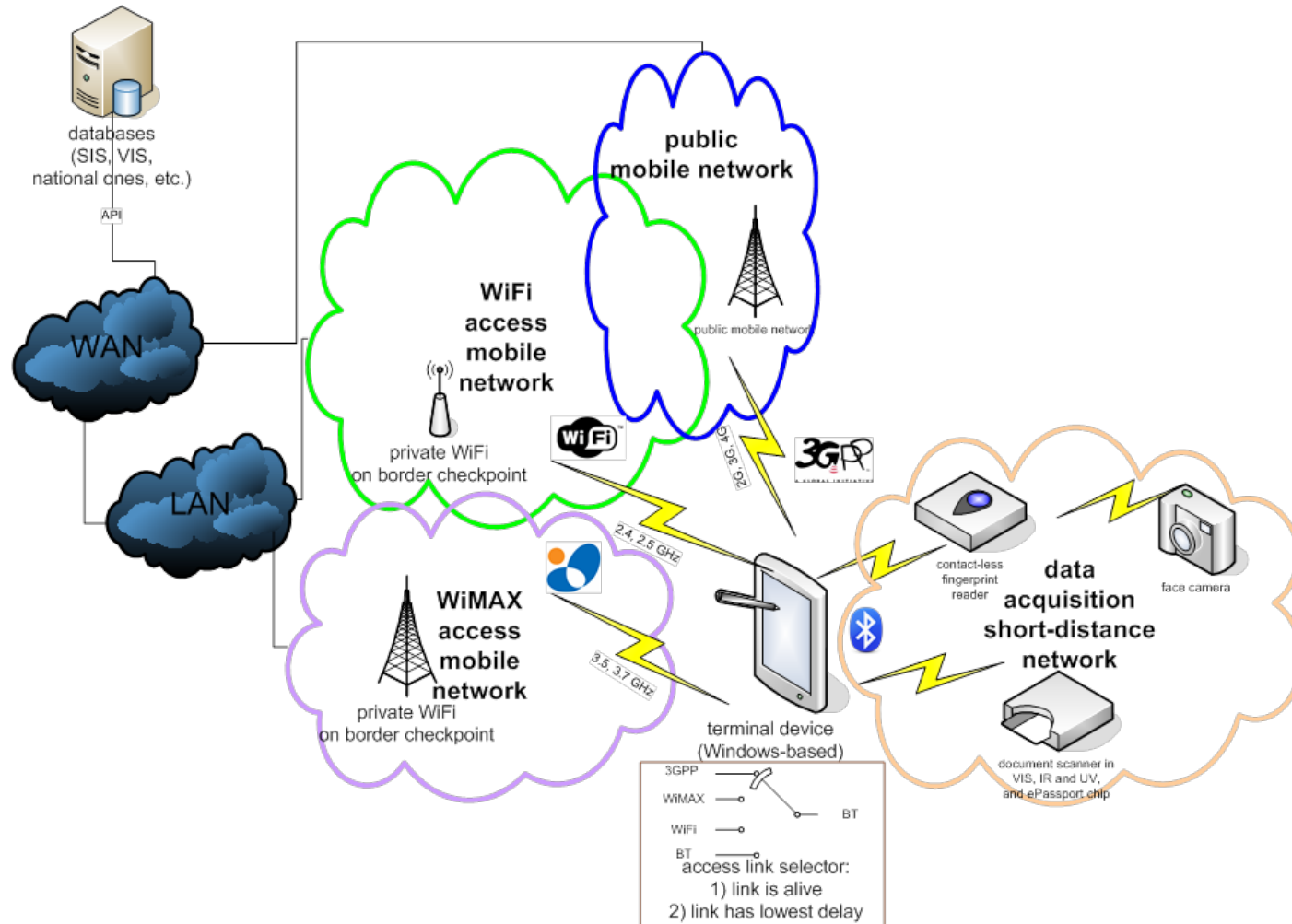


Fingerprint capture unit



Vehicle Identification  
Number

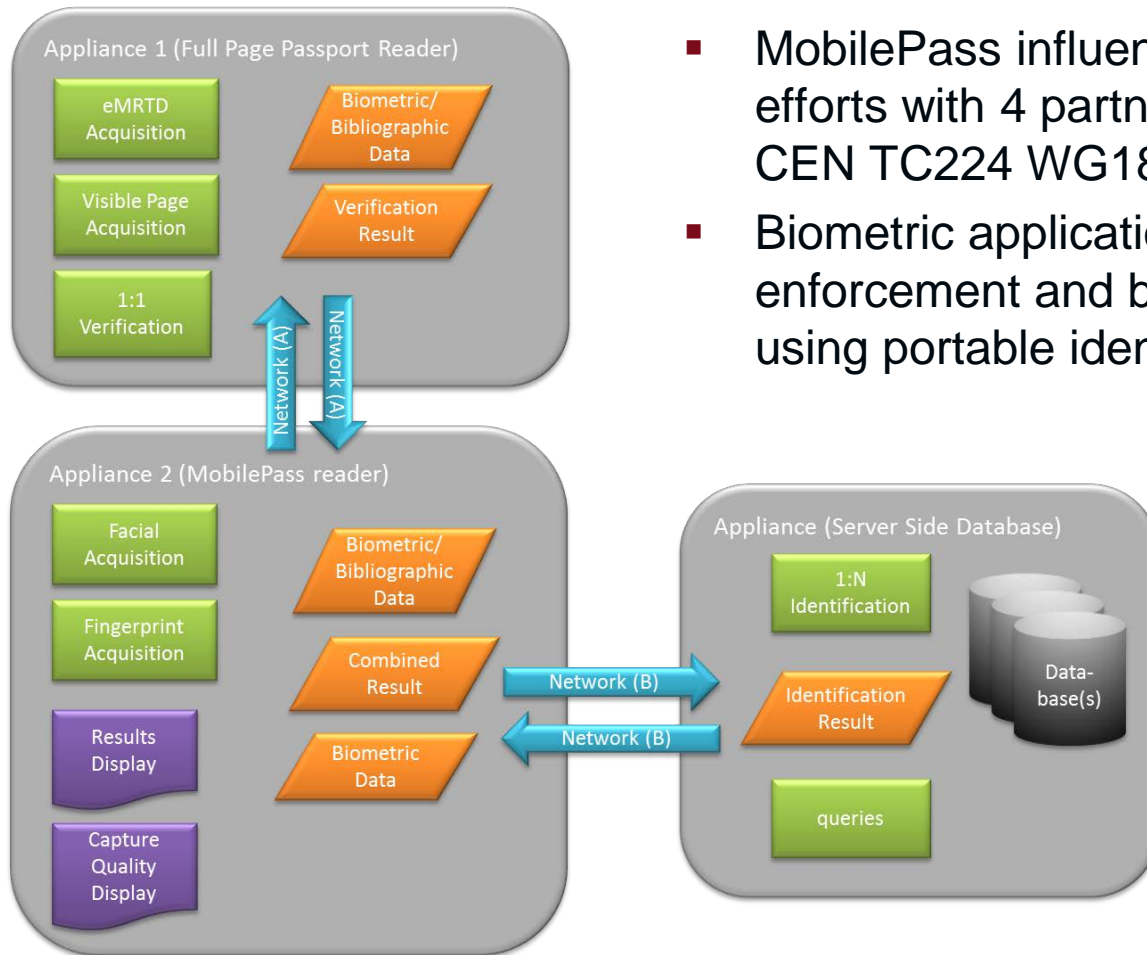
# Device Connectivity



# Communication Issues

- **Transmission Security**
  - Firewall (embedded), IDS (Intrusion detection system)
  - Stealth port scans
  - Common Gateway Interface (CGI) web attacks
  - Operation System (OS) fingerprinting attempts
  - Traffic flow anomalies
  - Distributed Intrusion Detection System (DIDS)
- **Transmission availability**
  - Automatic link selection depending on rules:
    - link is down
    - some QoS parameters are degraded: delay, throughput, transmission time
  - Accelerate the process of selection of a new link by an auxiliary table with the ranking of links used with success till now is managed
- **Penetration Tests**
  - Black, white and grey box tests
  - Vulnerability scanner, Security scanner, Vulnerabilities Assessment System

# Three Components on three Appliances



- MobilePass influences the standardization efforts with 4 partners represented in the CEN TC224 WG18
- Biometric application profiles for law enforcement and border control authorities using portable identification systems

## Three Components

- **Document check device**
  - Mobile, man worn, lightweight, battery operated
  - RFID reader, electronic security feature check
  - Camera, UV,IR, optical document security feature check
  - Radio connectivity
- **Display, Face- and Fingerprint Reader device**
  - Mobile, man worn, lightweight, battery operated
  - Sunlight readable display
  - 2-way radio connectivity (3G/4G/LTE + WIFI/BT)
  - Secure operating system (signed boot image)
  - Attached to forearm (hands free!)
  - De-tachable
  - Capture face
  - Capture fingerprints
- **Base Station**
  - Manages Workflow
  - Communicates with 2 devices



# Three Components

Base Station Side

Border Side



Information Systems



Workflow Engine „Server Application“



3G/4G LTE  
WiFi  
WMAX



- Fullpage UV/IR Reader
- Hip worn
- MRZ + Visa scanning
- eMRTD scanning
- works in combination with main device

WiFi



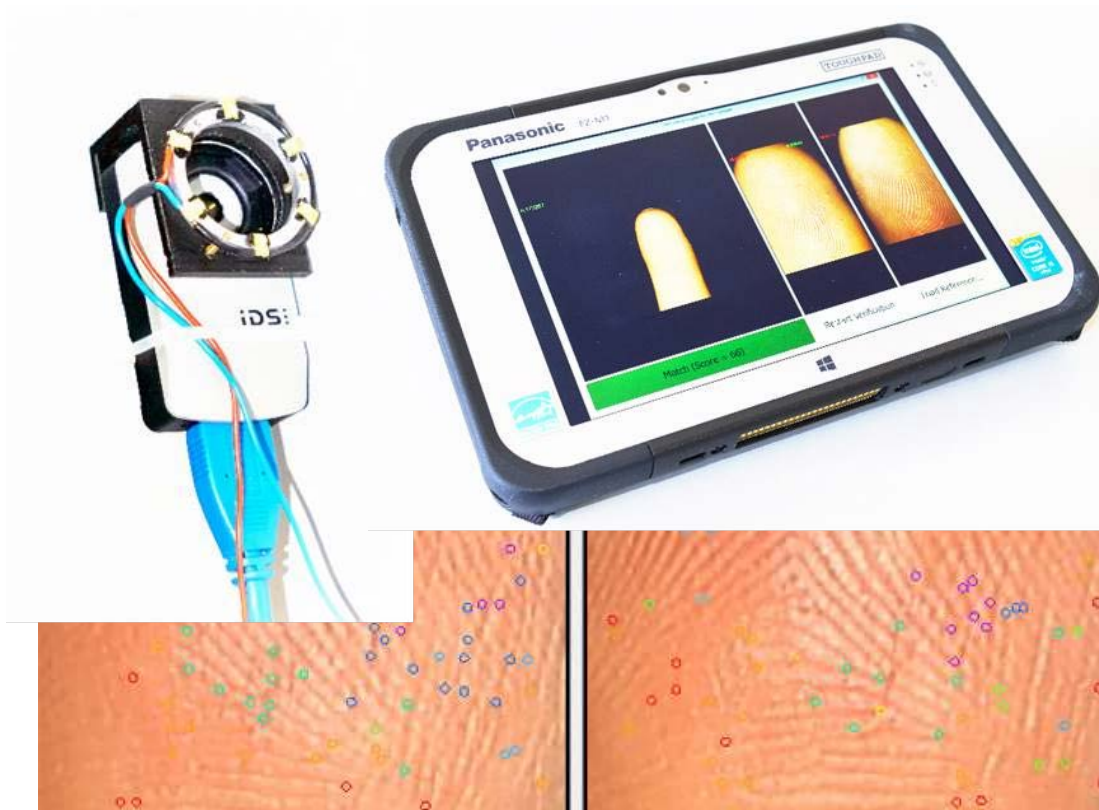
- MobilePass Device
- Wrist worn
- Shows potential of camera
  - MRZ + Visa scanning at a distance
  - Contactless fingerprint scanning
  - Fast facial capture
- Uses modern powerful "handy" components
- works in combination with main device
- Potential to replace main device

Can also be detached and operated with one hand

# Progress Embedded Device



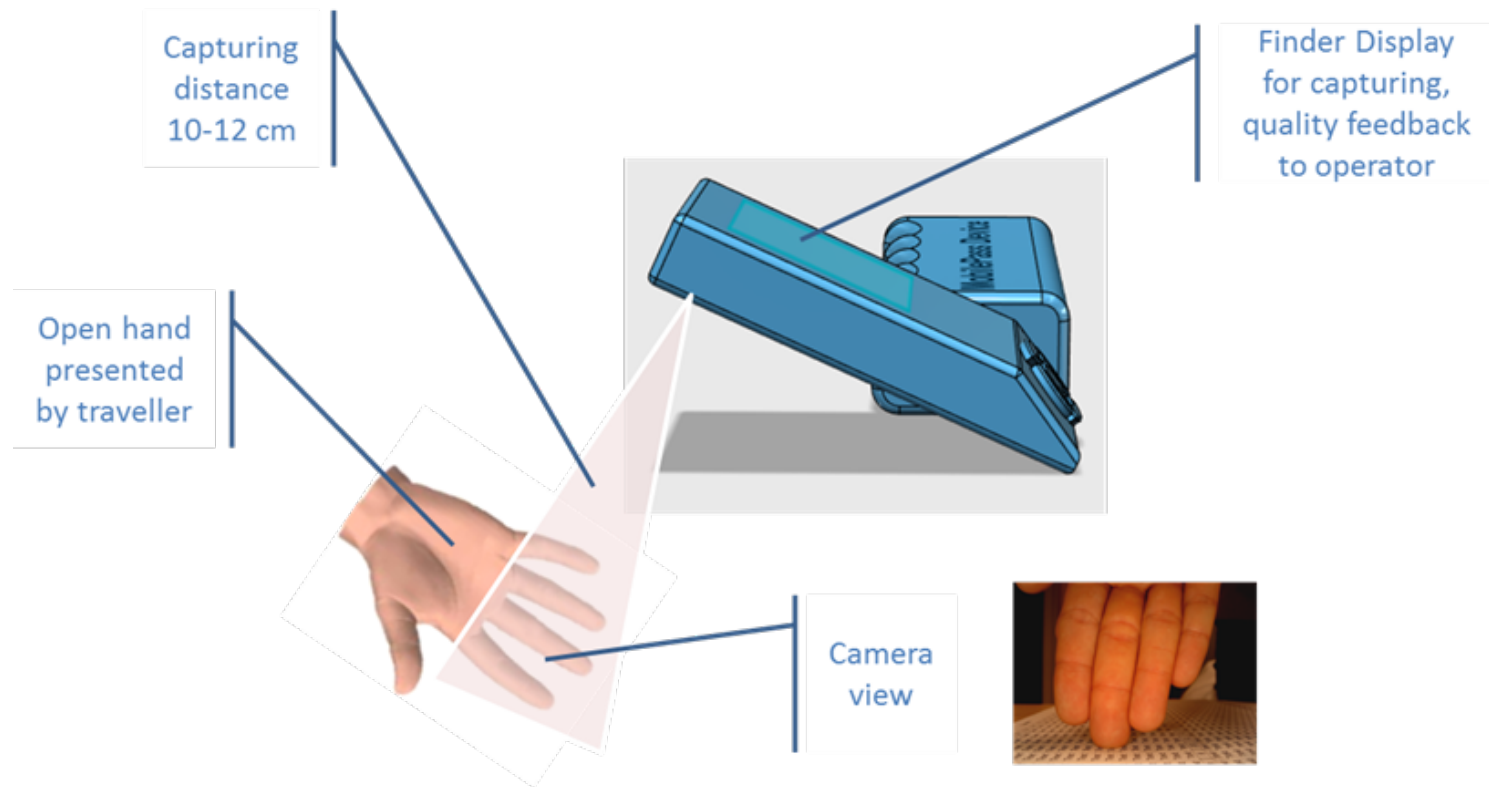
# Progress Fingerprint (© FhG)



- Automated detection of visible finger in ROI (to avoid manual exact pointing / stabilization)
- Fingertip Segmentation
- Normalisation & contrast enhancement
- Fingerprint Quality Assessment (Sharpness-Measurement & NFIQ)
- Minutiae Extraction and matching (NBIS Library)
- Constant capturing  
Best shot selection
- Prototype on Tablet working !

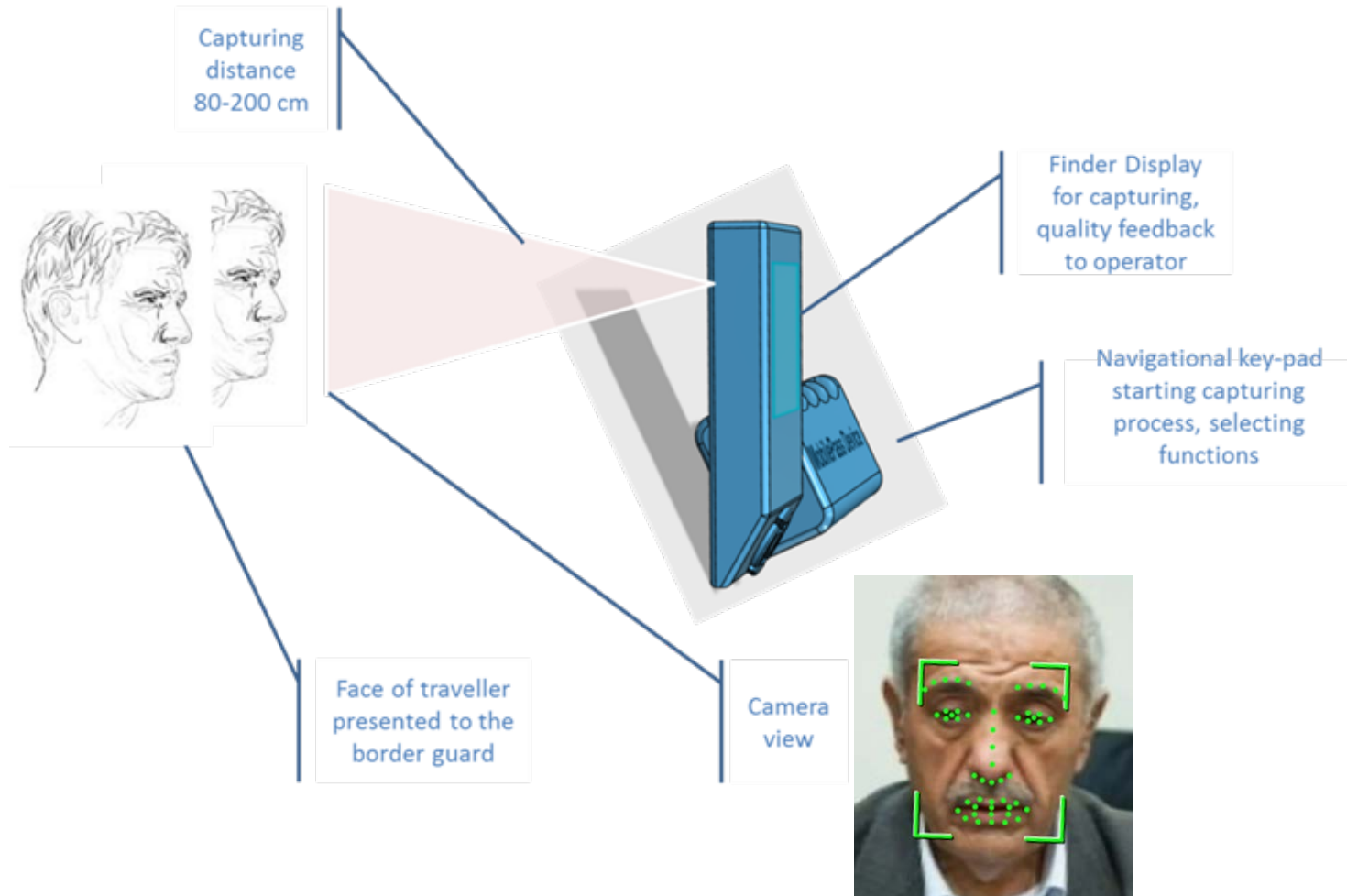


## Capturing fingerprints



# Handling

## Capturing face



# Challenges

- Compare flat fingerprint scans with “camera” fingerprints
  - Standard deflection model sufficient ?
  - Capture 3D image ?
- Increase processing power
  - How to utilize 4 CPU´s ?
  - Additional help with embedded FPGA attached to CPU ?
- Border Guard Officer Support when capturing biometrics
  - Capture Display Help
- Standardization of interfaces
  - Web services, BioAPI, define a new display/control API ?
  - Minimum Display for Border guards ?
- Ergonomics
  - Grip ?
  - Attachment on forearm ?
  - User Interface ?

# User Interface

MPD 45% PR 78% 3G

Mr. Mobile Pass  
Male  
EU, Austria  
31.10.1962

Spanish flag ✓ Passport ✓ Database ✓ Woman ✗ Fingerprint ✓

## Project Advisory Board Member

- Invitation to join the board
- Your participation in the Advisory Board is voluntary, and may be disengaged at any time
- As a Member of the Advisory Board you have no formal obligation to achieving the deliverables of the MobilePass project
- Travel costs are reimbursed
- If interested: please drop me a note
  
- Two workshops planned (one day) in Vienna (first in September)
  - Presentation of MobilePass achievements
  - Short presentations welcome
  - Discussion about improvements of Mobile Border Control Process
  - Recommendations from border guard's point of view
  - Recommendations from ethical and legal point of view

# AIT Austrian Institute of Technology

your ingenious partner

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