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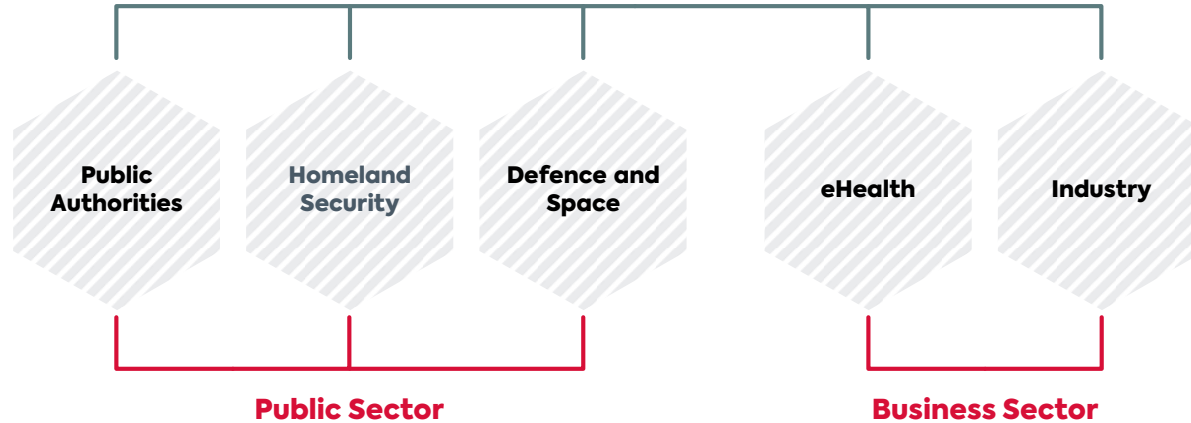
Christian Rathgeb

High quality facial image acquisition



Company Overview

secunet Security Networks AG



11 Sites
in Germany



over 650
Employees



secunet.com

Homeland Security Division
100+ experts covering biometrics, cryptography, IT security

Products, Consulting and Services:

- Mobile, stationary and automated border control systems
- Security solutions for capturing and processing biometric data
- Comprehensive public key infrastructures for eID
- Solutions for the electronic processing of classified information



High-Quality Facial Image Acquisition | Why?

Regulation for European Entry / Exit System (EES) requires ISO compliant facial images

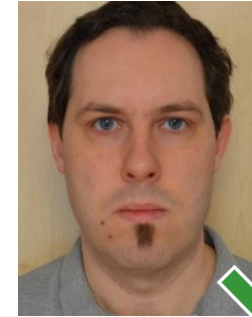
- For all Third Country Nationals (TCN) – of **any age or body height**
- Only maximum +/- 5 degrees deviation from **frontal pose**
- **High resolution cropped full-frontal images** (800x600 px minimum)
- **Homogeneous illumination** needed

Flexible, fast and convenient
» camera solution for stationary border control desks required!

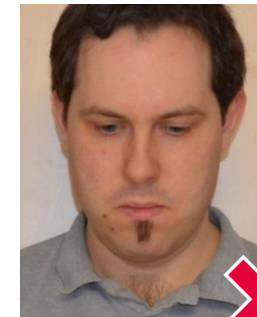


Why is a high-quality biometric acquisition according to the EES regulation so important?

- EES database will contain several **hundred millions identities** of TCN
- EES regulation rules for each first-time registration (enrolment) a full 1:N identification to perform deduplication and check for misuse
 - » Every falsely classified identity has to be manually checked by a border guard
 - » Results in higher processing times and certainly longer queues
- For low error rates, **high quality acquisition of biometric data is the key**
 - » EES regulation rules compulsory compliance to ISO/IEC 19794-5:2011 for the acquisition of facial images



ISO/IEC 19794-5:2011
compliant



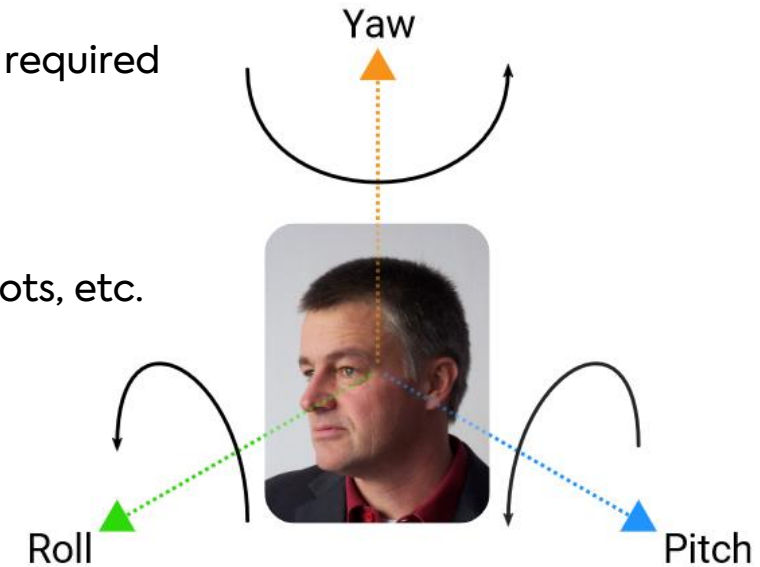
ISO/IEC 19794-5:2011
non-compliant



Biometric requirements - Face

Implications of EES regulation for facial image acquisition

- Commission Implementing Decision (EU) 2019/329
 - » Specifications for quality, resolution and use of fingerprints and facial image for EES
 - » FPIR < 0.1%, FNIR < 1%
 - » Acquisition and quality compliant to ISO/IEC 19794-5:2011 Frontal image type required
- Photographic requirements from ISO/IEC 19794-5:2011
 - » Pose of head (Pitch, yaw: < 5°, roll: < 8°)
 - » Neutral expression required, equally distributed lighting on the face, no hot spots, etc.
- Implications in terms of ISO/IEC 19794-5:2011 compliance
 - » When using pose correction, the Frontal subtype must be “Post-processed”, not “Full” (table 19)
 - » Original image needs to be sent (section 10.3.2)
 - » Post-processing discouraged, introduced for cases without alternatives (section 5.7.7)

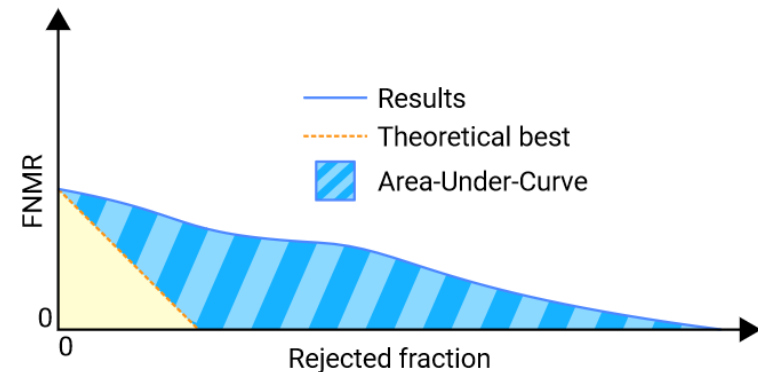


Why it matters

Impact of bad image quality on biometric recognition performance

- Impact on the EES
 - » Biometrics Performance depends heavily on a high quality of the features
 - » Processing is error-prone and introduces more error sources
- NISTIR 8238 Ongoing Face Recognition Vendor Test (FRVT) Part 2: Identification by NIST
 - » Executive summary clearly says:

» *“With good quality portrait photos, the most accurate algorithms will find matching entries, when present, in galleries containing 12 million individuals, with error rates below 0.2%. The remaining errors are in large part attributable to long-run ageing and injury. However, for at least 10% of images - those with significant ageing or sub-standard quality - identification often succeeds but recognition confidence is diminished such that matches become indistinguishable from false positives, and human adjudication becomes necessary.”*



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easytower



How can high quality image acquisition be achieved?

- Frontal image acquisition with **height adjustable camera system** at every border crossing point where TCNs are registered for EES
- **Diffuse lighting** to ensure **homogenous illumination** throughout the captured face and to avoid shadows and hot spots
- **User guidance** and process indicators in self-service systems to let travellers capture their faces and fingers easily, intuitively and fast

Integration

The flexible Mounting Concept

- Border control booths typically
 - » are different in sizes, forms and materials
 - » have protecting glass windows or not, and
 - » have limited space for officers and their visibility of the border control area.

» **secunet easytower is mounted in front of the booth and, hence, provides flexibility for all types of booths.**



Installation Options

Different Possibilities for Installation

- Left and right corner in front of the booth

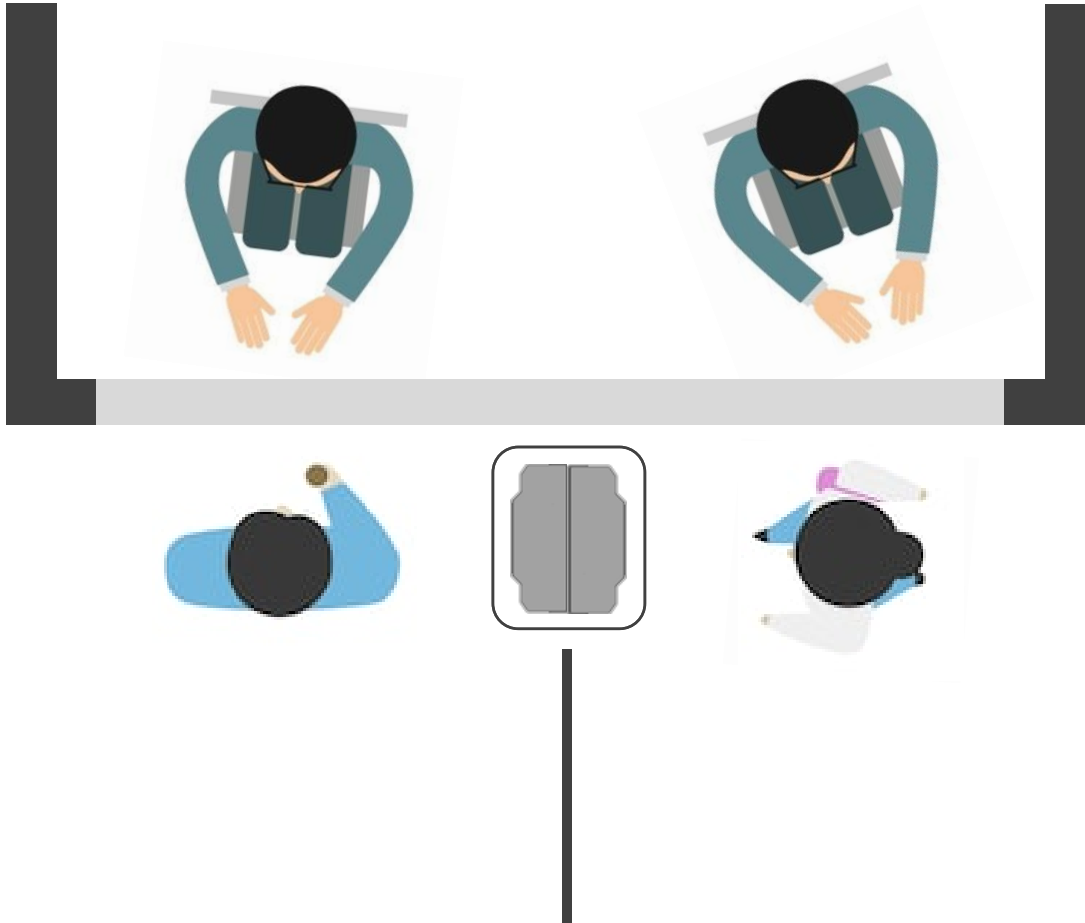


- In the center – back to back – in front of the booth



The Process

System's Point of View



1. Officer starts border control process as usual (document checks, police search, ...).
2. If facial image acquisition is needed officer asks traveller to turn around to easytower.
3. Camera automatically adjusts to height of traveller, sets proper lighting and captures high-quality facial image.
4. Facial image acquisition is finished, officer continues with border control process.

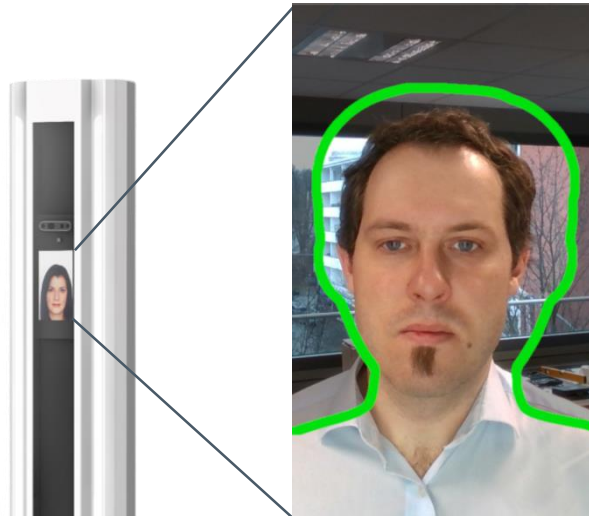
The Process

Passenger's Point of View

Advanced and intuitive user guidance:

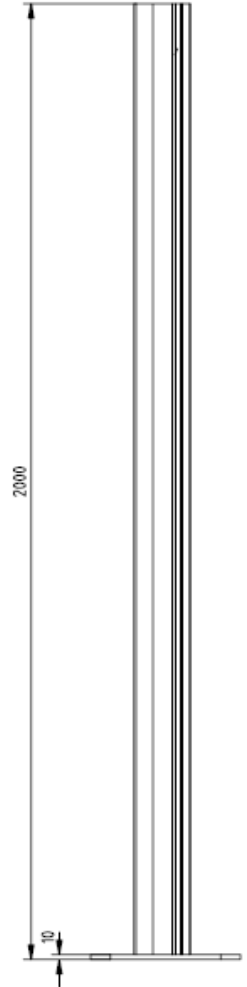
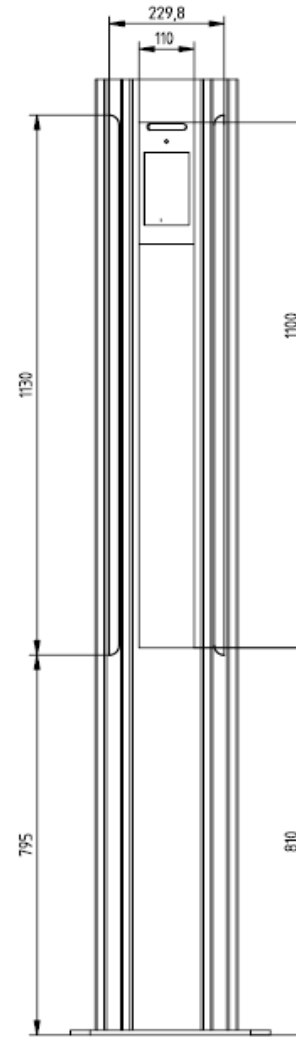
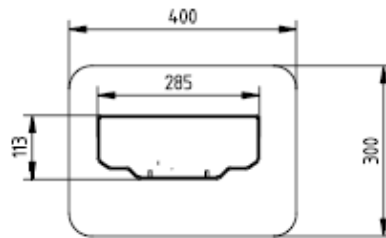
- Digital mirror provides live video feedback and highly intuitive user guidance
- Possibility to display further multilingual instructions – managed and triggered by border control officer
- 2D barcode reading to further speed up processes – e.g. for transferring previously answered questions on mobile phones into the border control application

1. Turn towards easytower and look into the camera.
2. Stand still
3. Turn back to officer



Dimensions

- Width: 28,5 cm
- Depth: 11,3 cm
- Height: 200 cm
- Standard base plate: 40x30 cm
- Captures full frontal images - compliant to EES regulation and ISO/IEC 19794-5:2011 - of persons with body height from ~115 to 200 cm
- Also easily accessible by wheelchair users and children
- High-quality engineered system
- Usage of long-lasting materials and components



Fingerprint reader add-on Slap Acquisition

- Optional possibility to mount a fingerprint reader onto secunet easytower
- **Flexible mounting** on either side of the easytower system
- **Saves space** due to re-using secunet easytower as mounting point
- **Reduces cost** due to avoiding additional constructional work for fingerprint readers
- Only **one touchpoint for biometrics** simplifies the communication process between the border guard and the traveller
- Four finger slap acquisition
- Quality assurance with NFIQ2.0
- QA must also be available on-device at the border



„NFIQ
2.0“ = 89



Fingerprint image source: <https://www.nist.gov/document/nfiq2qualityfeaturedefinitions.pdf>

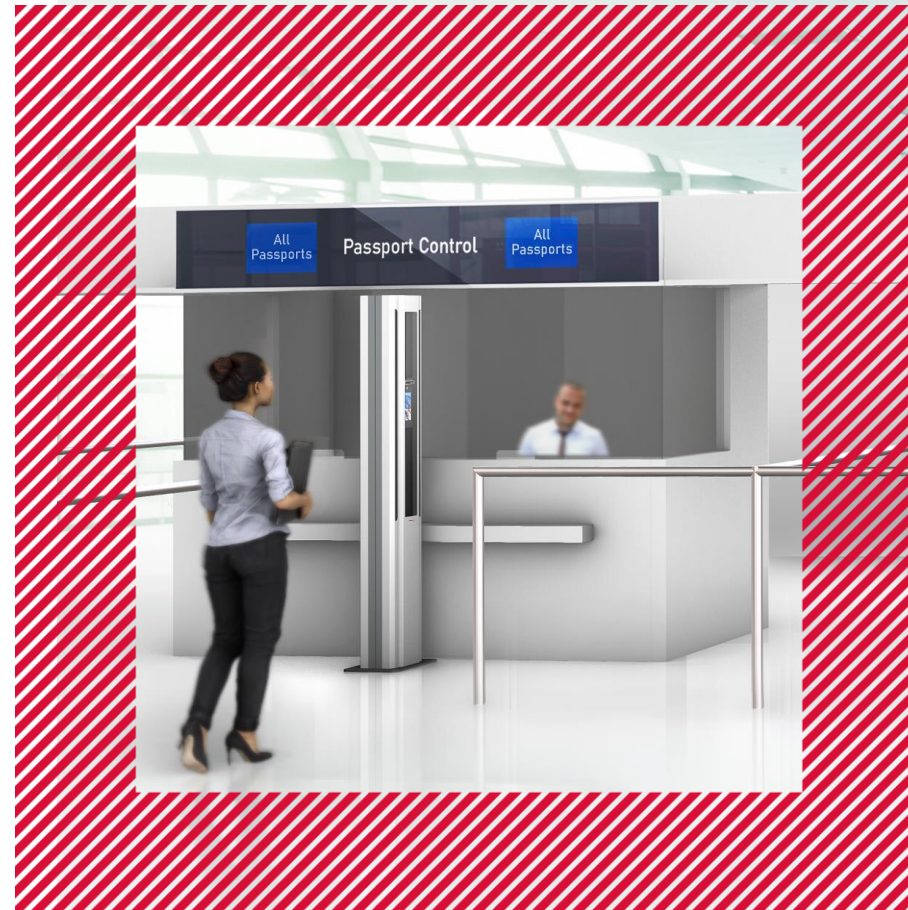
EES-compliant.

Intuitive, convenient and easy to use
(with user guidance)

High-end camera solution
**guarantees fulfillment of EES
quality requirements.**

**Diffuse lighting and quality
assessment** based on ISO criteria.

**Stand-alone system allows flexible
mounting in all possible set-ups
and environments** while providing
high-quality facial images.



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