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European RT, Inventory of Best Practises

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Table of Content

1. PROJECT SUMMARY	3
2. INTRODUCTION	4
3. INVENTORY OF BEST PRACTICES.....	5
3.1. DEFINITIONS OF REGISTERED TRAVELER (RT) PROGRAMS	5
3.1.1. ABC-SYSTEM	5
3.1.2. RT-SYSTEM FOR EEA CITIZENS.....	5
3.1.3. RT-SYSTEM FOR 3RD COUNTRY NATIONALS.....	6
3.2. DESK RESEARCH ON BEST PRACTICES ON EXISTING RT-SYSTEMS.....	7
3.3. COMPARISON.....	9
3.3.1. COMMONALITIES	10
3.3.2. DIFFERENCES.....	10
4. OVERVIEW ON CRITICAL SUCCESS FACTORS	11
4.1. GENERAL OBSERVATIONS.....	11
4.2. OPPORTUNITIES	11
4.2.1. GENERAL	11
4.2.2. ABC.....	11
4.2.3. RT	12
4.3. CHALLENGES	12
4.3.1. DIFFERENT PASSENGER TYPES	12
4.3.2. SYSTEM INTEROPERABILITY	13
4.3.3. BUSINESS CASE: WHO PAYS AND WHO WINS?	14
4.3.4. STAKEHOLDERS MANAGEMENT	14
4.3.5. LEGAL AND ETHICAL ISSUES	15
5. SOURCES AND REFERENCES.....	16

1. Project Summary

BEST Network, the Biometrics European Stakeholders Network, is a European Commission ICT Policy Support Programme centred on a European Thematic Network on Trusted information infrastructures and biometric technologies. To facilitate the latest information exchange and expert opinion, BEST Network has brought together key stakeholders including the finest experts from across the EU to determine how biometrics can most appropriately be applied in the context of the Charter of Fundamental Rights of the European Union. BEST Network will focus on promoting the development of new policy implementation schemes through working groups and workshops. This will include the exchange of best practices, common cross border strategies and future pilot activities.

The network is divided into seven key areas/working groups (WG's):

1. Border Control and Immigration
2. Emerging applications
3. European Registered Travellers schemes
4. Biometrics and e-ID
5. Training & Education
6. Testing & Certification
7. Ethical, Legal and Socio-technical aspects

BEST Network will provide policy recommendations from these WG's

This European Thematic Network on biometrics is based on four pillars; 1) technical, scientific, and industrial excellence; 2) legal analysis and compliance; 3) ethical awareness and sensitivity and 4) public and democratic transparency and scrutiny. The objective of BEST Network is to be instrumental in promoting the uptake of secure, convenient and trustworthy biometrics based ICT solutions for large, medium and small ID management systems.

The main objective of BEST Network is to bring together knowledge and hands-on experience with biometric deployments, addressing gaps in the gathering and dissemination of best practices, lessons learned in the scope of studies, pilots and deployments on European and Member States level.

Deliverable D3.1 will look into the best practices on RT schemes, while surging for critical successfactors. It is a preparation on further work to develop reccomendations for a common European approach on RT schemes.

2. Introduction

Despite the many initiatives we can count in Europe, still there is significant fragmentation with regard to the sharing of knowledge and experience with the design and deployment of ACB- and RT-systems. This deliverable looks into the different appearances and definition of Registered Travel systems in Europe. Such an effort is justified, since the definition of Registered Traveler (RT) is being used in different ways.

The early registered traveler projects, dating from the pre-biometric passport age, mostly refer to programs which are limited to a restricted group of users, mostly frequent (EU) travelers. This generation of RT systems were point solutions without interoperability between each other, neither bearing the potential for upscaling and/or wider roll outs.

With the rise of the ePassport, currently three types of automated border passage solutions can be distinguished to cross the Schengen borders:

1. ABC (Automated Border Crossing systems): systems based on the usage of the biometric passport and open to EEA citizens;
2. RT systems based on the enrolment of a biometric sample in addition to the regular passport, open to EEA citizens;
3. RT systems based on the enrolment of a biometric sample in addition to the regular passport, open to 3rd country nationals that have received additional screening and interview procedure (currently being piloted in the FLUX arrangement with US)

Additionally we have the envisaged TCN-RT Systems, which in this stage are only in the planning of the European Commission. TCN stands for Third Country Nationals. TCN-RT systems are targeting third country nationals with a European visa and who frequently visit Europe and for whom a fast lane will be developed. This type of registered travel will be facilitated by the SIS-II system and the associated Biometric Matching System (BMS). As this system is just in a very early stage of development no deployments are yet in use. For that reason we leave these type RT-systems out of the scope of this inventory.

The purpose of this deliverable is to look into the definition of Registered Traveler, to make an inventory on best practices and to zoom into the commonalities and differences between the existing deployments.

3. Inventory of Best Practices

3.1. Definitions of Registered Traveler (RT) Programs

The inventory shows roughly two types of RT-systems, each with other requirements and target group of travelers:

1. ABC-systems
2. RT-systems for EEA citizens
3. RT-systems for 3rd country nationals

3.1.1. ABC-system

An ABC-system is a machine assisted border passage, using the e-passport for identification and the biometrics which are stored in the chip of the e-passport for verification and authentication. Although there has to be a certain level of supervision for oversight and handling of exceptions, the system works in an automated way. Because there is no reciprocity towards non-European countries, the system works within the Schengen area only.

Charaterizing elements for a ABC-System are:

- Open to EEA citizens
- designed to expedite common travelers by providing fast lanes
- use of biometric verification based on the EEA biometric passport
- participation is voluntary
- entitled if in the possession of a biometric passport
- No additional charges
- no back ground checks nor interviews with Government officials.

The e-Gates in Portugal called RAPID is one of the first e-passport based ABC-projects to be based on the principles mentioned above. In cooperation with the Portugese Federal Ministry of the Interior, Federal Police, Lisbon International Airport, this automated border control apparatus is being introduced in 2007. It is designed to assist passengers with e-Passports from the EU, EEA and Switzerland ages 18 years and over. Applying face recognition technology, the system compares the facial image from chip in the e-Passport with the live image of the user. being taken in the gate. Passengers do not need to be enrolled to use the system. The e-Gates can be used for entry and exit. Currently similar systems are being piloted in the UK, Finland, Austria, Germany, France (no face recognition but fingerprint) and Netherlands.

3.1.2. RT-system for EEA citizens

An RT System for EEA citizens refers to a program where travellers that are not yet in the possession of a biometric passport, can –on a voluntary basis- make use of automated border crossing facilities.

These systems can be seen as intermediate solutions, until the population of EU ePassport holders has reached a critical mass and the ABC solutions have proven themselves in terms of processing capability and failsafeness.

Charaterizing elements for RT-systems for EU citizens are:

- Open to EEA citizens

- designed to expedite common travelers by providing fast lanes
- use of biometric verification on a token (other than passport)
- participation is voluntary
- No additional charges
- Confirmation of registration by Government officials.

Often airport and airline operators manage these RT-system facilities in close cooperation with and under control of the border officials. The automated border passage in these cases are part of a bundled services program, i.e. combined with other airport fast track services for parking, check-in, security etc.

Examples of these type of systems are: The Privium automated border passage , UK Iris in the UK (nextgen ACSplus operated by BAA), Fasttrack at Fraport airport, Parafe at Aeroport de Paris (facilities operated by ADP)

3.1.3. RT-system for 3rd country nationals

Characterizing elements for an RT-system for EEA citizens:

- designed to expedite pre-approved, “low-risk”, trusted travelers by providing fast lanes & dedicated inspection processes
- use of biometric identification
- participation is voluntary
- no entitlement
- fee based-pay for use
- all applicants are subject to background checks, and if required interview with Government officials

A nice example of the latest initiatives in Europe to develop an interoperable RT System is FLUX. FLUX is a governmental partnership that uses biometric data from passengers of participating countries for identification. This RT-Program is intended to link existing RT programmes from individual countries on a reciprocal basis and to offer a network of interconnected fast lane facilities to registered/trusted international travelers.

The United States of America and the Netherlands are the first countries to join the FLUX arrangement Citizens of these countries can apply during the testing period. After this initial period, which is scheduled to end in April 2010, FLUX will be available for other countries to join. Application fee’s of the national programs plus a FLUX fee apply.

3.2. Desk research on best practices on existing RT-systems

Whenever controls are mandatory for crossing borders, e-Passports will assist border control authorities to channel a considerable number of passengers through automated control systems.

Many passengers have begun enrolling in “fast track” or “frequent traveller” programmes. Control authorities are using these person’s biometrics, such as facial images, fingerprints or iris patterns (also combined) to allow them to cross borders through automated means.

The systems used for such programmes typically require pre-enrolment during which the personal data and documentation of enrolees is verified by border control staff in order to minimize the risk of fraud. Although a few States have negotiated business partnerships, most systems are not interoperable. Therefore, enrolment to use one system will not automatically allow use of any other system.

Numerous EU and non-EU countries have begun implementing ABC systems at their borders, most using the e-Passport as the token of choice. EU countries are currently only issuing e-Passports, and it is estimated that all other types of passports will have been phased out by 2016. ACI-EUROPE and other experts predict that ultimately, as additional biometrics are added to the e-Passport, and passenger numbers continue to rise, more states will opt for the e-Passport in future semi or fully ABC systems.

Currently there are registered traveller programmes for EEA citizens, for Third Country Nationals, and there are automated border control programmes for e-Passport holders.

ACI EUROPE believes that in order to achieve the desired high level of technical harmonization in the European Union, the research and development of the relevant solutions should be coordinated at EU level by EU agencies such as the Joint European Research Facility, and evaluated in cooperation with FRONTEX.

In this context; FRONTEX, together with the relevant national authorities should evaluate and ensure compliance with the strict immigration law requirements such as those imposed under the Schengen Treaty.

Only under such conditions would a European, and later an international standard be reached. The various ABC and RT programmes provided below, both as pilots and systems in operation throughout the world, may possibly be incomplete. The details listed will certainly change as technology improves and knowledge grows from experience gained.

Below the most recent listing of European RT and ABC systems is displayed.

Country	Programme Name	Airport	Biometrics Technology	Status
Australia	SmartGate	BNE, CNS	Face e-Passport	- Introduced August 2007 - For Australian and New Zealand citizens - Entry only
Austria	ABC System	New terminal : VIE	Face	- Planned pilot

Canada, USA	NEXUS Air	JFK, LAX, ATL, ORD, SFO, MCO, YVR	Iris Smartcard	<ul style="list-style-type: none"> - Entry only - Operational - For US and CAN citizens, and permanent residents of at least three years
China	e-Channel, APC, AVC	HKG	Fingerprint Smartcard	<ul style="list-style-type: none"> - Entry and exit - Operational - For citizens and permanent residents
Czech Republic	ABC System	PRG	Face	<ul style="list-style-type: none"> - Planned Pilot : - Technical study available - Fall 2009 pilot
Dubai	E-Gate	DXB	Fingerprint Smartcard	<ul style="list-style-type: none"> - Entry only - Operational - available for all travellers with entry permit
Finland	ABC System	HEL Vantaa Airport + Pilot at Vaalima Land Border (Oct. 2009)	Face	<ul style="list-style-type: none"> - Pilot start: July 2008 - Operational since April 2009
France	PARAFES	CDG	e-Passport Fingerprint	<ul style="list-style-type: none"> - Pilot since August 2007 - Entry and exit - For EU/ EEA and CH
Germany	ABG	FRA	Databank Iris	<ul style="list-style-type: none"> - Entry and exit - For EU/ EEA and CH, and permanent residents
Germany	EasyPASS	FRA	e-Passport Face	<ul style="list-style-type: none"> - Pilot since October 2009 - Entry and exit - For EU/ EEA and CH
Malaysia	Immigration Autogate	KUL, PEN, BKI, MYY, KCH, LGK	Fingerprint e-Passport e-ID (MyKad)	<ul style="list-style-type: none"> - Introduced August 2000 - Entry and exit - For Malaysian citizens
NL	PRIVIUM	AMS	Iris Smartcard	<ul style="list-style-type: none"> - Introduced October 2001 - Entry and exit - Targets frequent flyers with an EU nationality
NL	No-Q	AMS	e-Passport Face	<ul style="list-style-type: none"> - Pilot Q1 2010 - Exit
Portugal	RAPID	LIS, FAO, FNC, OPO Plans to expand to seaports	Face e-Passports	<ul style="list-style-type: none"> - Introduced May 2007 - For EU/ EEA and CH - Entry and exit
Singapore	(eIACS) enhanced Immigration Automated Clearance System	SIN	Fingerprint Smartcard	<ul style="list-style-type: none"> - Operational since March 2006 - Entry and exit - For citizens and permanent residents
Country	Programme Name	Airport	Biometrics Technology	Status
Spain	ABC System	MAD	Face Fingerprint	<ul style="list-style-type: none"> - Planned pilot - 2009 finalizing technical solutions - 2010 pilot
Switzerland	Augreko	ZRH	Face e-Passport	- Planned pilot from mid 2010
UK	ABC System	MAN, STN + 10 other airports	Face	- Pilots

UK	IRIS	LHR, LGW, MAN, BHX, STN	Iris Databank	<ul style="list-style-type: none"> - Operational since January 2006 - For EU/ EEA and CH, permanent residents and Visa holders - Entry only
USA	Global Entry	20 major airports US	Databank Fingerprint	<ul style="list-style-type: none"> - Entry - Frequent travellers - Operational - For users of NEXUS, citizens of US & CAN, and pre-screened third countries citizens (currently only NL through FLUX)
USA/ NL	FLUX - Alliance	20 major airports US + AMS	US: Databank Fingerprint NL: Iris SmartCard	<ul style="list-style-type: none"> - Pilot until April 2010 - Combination of existing GlobalEntry and PRIVIUM programmes - Pre-registration & vetting (extensive background checks)

source: ACI Europe

3.3. Comparison

the overview below will give more insight into the potential variety of organizing, developing and operating a RT or ABC system. Although not all data were made available there still remains a good overview on the differences and commonalities.

System	Privium	Frankfurt	PEGASE	IRIS
Modality	Iris	Iris	Fingerprint	Iris
Biometric mode	Verification	Verification	Verification	Identification
Biometric HW	LG	OKI	SAGEM	Panasonic/SAGEM
Biometric SW	Dartagnan Middleware SW, LG SDK	Iridian	SAGEM	Iridian
Biometric FRR	< 0.01 %	Confidential	1.5 %	n/a
Operational FRR	1.5 %	Confidential	Not available	n/a
Biometric FTE	0 %	Confidential	0 %	0 %
Unicity test	No	Yes	Yes	Available
Unicity FRR	n/a	Confidential	3-5 %	n/a
Side door	yes	yes	yes	no
Man trap Yes Yes Yes No				
Owned by	Schiphol	Bundespolizeiamt	SAGEM	Home Office

	Group			
Supplied by	Dartagnan	BOSCH	SAGEM	SAGEM
Financed by	Schiphol Group	Bundespolizeiamt	Air France	Home Office
Operated by	Koninklijke Marechaussee	Bundespolizeiamt	Police Aux Frontières	Home Office
Price for passengers	99,00 Euro	0	0	0
Registered passengers	36 000 (end of Q1 2007)	20 900 (end of 2006)	10 000 (end of 2006)	80 000 (end of April 2007)
Crosses a day	1850	100	100 - 150	1600
Token	Contact smartcard	Passport	Contactless smartcard	None
Stored on token,	Member number iris templates, 'query string'	MRZ	Card number	n/a

source: Frontex

Summarizing we can see the following main commonalities and differences between the four systems:

3.3.1. Commonalities

- all systems use biometrics to automate the identity verification (1:1) or the identification process (1:n)
- all projects are built on a public/private partnership
- all participants need to be registered
- all systems are used on a voluntary basis

3.3.2. Differences

- non of the four system have the same token. Project IRIS has even no token at all, because the identification is provided by a 1:n search based on iris recognition. This is great from a customer point of view but an obstacle for interoperability.
- all the schemes are financed differently: we see respectively the airport, police, airline and the Ministry of Internal Affaires.
- all systems have a different physical appearance and recognition from traveller point of view

4. Overview on critical success factors

4.1. General observations

If there is one conclusion to be drawn from the inventory it will be that there is an overall lack of common approach. Though many countries have begun applying automated border controls at borders, they have not yet taken the opportunity to begin a large scale cooperation with other European and third country authorities. A common fear is shared by experts and organizations such as ACI Europe and Frontex that this lack of communication and reluctance to share information could ultimately conclude in failure to reach a common standard for applying automatic control measures at border check points, for both RT-programs as for ABC-systems. In fact this opinion has been confirmed by the several early ABC-systems, which have been facing an early end of their life cycle, in most cases even after the pilot phase.

The introduction of the biometric passports has provided a common tool for identity verification based on the identity claim through the travel document, verified by biometrics. At least for the ABC-systems the e-passport has laid down a starting point concerning the means of identification and verification of identity for ABC-systems. However, this will not be enough as a basis for developing a model for a uniform European ABC-systems and/or a common approach for RT-systems.

Important critical success factors are:

- Embedding of the ABC and RT in the new operations of border/ security control authorities
- systems interoperability
- user friendly, recognisable systems, which require limited instructions and are simple to operate
- a clear business case
- integration of ABC/RT systems in the overall aviation processes (IATA Simplifying Passenger Travel , Simplifying the Business)
- a well defined and elaborated public/private partnership (airports, airlines, governments)

4.2. Opportunities

4.2.1. General

In general it is expected that RT-systems and ABC-systems will contribute to:

- a more efficient border control (and ultimately passenger facilitation) process
- a more convenient border crossing experience
- a higher level of security

This implies benefits for all main stakeholders: travellers, airports and border control authorities. Secondary benefits will be brought to several industries, such as airlines and travel agencies.

4.2.2. ABC

In the early stages of ABC at the beginning of this millennium (RT was not yet in the picture) most cases were driven by **convenience**, mainly target to the frequent travelers. Privium at Schiphol Airport is a nice example of a service based application, where people can become

member in order to be treated as first class travellers: ABC as a premium experience. Although the border crossing with Privium itself only takes several seconds, it was not efficiency which was the main business driver. Privium has several proprietary elements, such as the brand name and the Privium smartcard, which is being used for identification and authentication through iris recognition. As the credentialling of upcoming Privium members was not accepted by non-EU countries, the membership only facilitated border crossing at Schiphol Airport. This makes Privium suitable to a selected audience, explaining why Privium –other than the launch of a white label Sapphire in Indonesia- did not expand to other airports within and outside Europe.

When the new e-passports and the integrated biometrics were introduced, the way for mass ABC was opened. People didn't need to register in order to receive a verified and background checked credential. Soon Portugal introduced the e-Gate, showing the perfect business case for fast track border crossing for the mass. As there are no fees or memberships involved, the business case lies primarily in improving the *efficiency* through automated means. The business case for this new form of ABC is clearly reciprocal: the authorities win because more passengers can be processed with less staff, Once ABC systems can process passengers faster than border officers can, the passenger also wins because border crossing takes less time. It has to be said though, that improvement of the overall border processing times, require a fundamental process redesign of the overall airport passenger processing in the light of IATA's Simplifying Passenger Travel: one time identification with the ePassport at baggage drop off and as a next step paperless boarding (based on biometrics). Border Control Authorities only intervene in the mean time those passengers that have security issue.

Because of a better balance between the main business drivers the future for the fast tracking ABC systems based on the e-passport seems bright.

4.2.3. RT

One of the intrinsic limitations of ABC is its inability to become the automated gate to non-Schengen countries due to the absence of a background check, that will be accepted by both the country of origin as the country of destination. So in order to provide an ABC service between Europe and non-European countries a different scheme is needed: registration of the travellers into a scheme where all parties can rely on the credentialling seems to be indispensable. Additional security checks on the registered travelers add security to the process of border crossing. In theory this should provide three business drivers:

- security because the travelers have been screened in advance so they are known to the authorities
- convenience because the traveler doesn't need to undergo extensive checks during border control process
- efficiency because the pre-screened travelers can be processed faster

4.3. Challenges

4.3.1. Different passenger types

In order to be in compliance with ICAO Standards and Recommended Practices Annex 9, and IATA Simplified Passenger Travel (SPT), airports must adapt their facilities and infrastructure to meet the needs of the various types of travellers:

- ***originating departing/arriving passengers***
These are persons who are now flying, and whose starting trip has not been with an airplane. Arriving passengers however, have flown to their final destination airport, and will not continue their journey by airplane. Both originating departing and arriving passengers, travelling to or coming from a non Schengen country, must process through a border control at first point of entry into a Schengen country.
- ***transfer passengers***
Passengers arriving at an airport, and on the same day, boarding a different airplane (with another number), to continue their journey are referred to as Transfer. The originating departure airport and final destination must be different. For statistical purposes, transfer passengers are always counted twice (once for inbound and again for outbound). Travellers arriving from a non Schengen country, within the EU or outside, regardless of whether they hold an e-Passport, must proceed through a border check point before being allowed to enter a Schengen area.
- ***transit passengers***
Any travellers that interrupt their travel, and then continue with the same flight they arrived. Transit passengers, unless they wish to exit the transit areas, do not require passing any border controls.

It has to be noted that besides the ICAO Annex 9, more and more the airport security measures drive the adjustment of airport facilities and infrastructure. Border control- and security checks are expected to be integrated more and more in the near future both in the front end at the checkpoints as well in the back end where authorities share the information between them(selves).

In order to offer a harmonised travel facilitation in the meaning of RT or ABC we face the following challenges:

- how to meet the needs of the individual travellers
- guidance with the fundamental organisational change of border control authorities that will change from doing the manual border control manual control
- no standardized technology/infrastructure for reading e-passports
- no standard for passport and visa control for allowing the use of a common system for automated border management
- no partnerships on EU with third country airports and their border control authorities
- establishing well functioning public-private partnerships to develop and operate the program

4.3.2. System interoperability

An “international user” interface approach for e-Passports will benefit not only the control authorities, airport managing bodies and carriers, but most importantly the passengers. Conformity with ICAO and ISO standards will allow the relevant authorities to read and verify electronic e-Passports from various issuing authorities. Currently there is no consensus on the look-and-feel of European ABC systems. A proliferation of different systems and travel documents will create confusion for both the immigration authorities and the travelling public.

This will damage the overall perception of the systems, while creating relative high costs for the development, deployment and maintenance of the individual systems.

Also, the e-Passport technology itself has to be further developed to be suitable for ABC. The e-passport originally was designed to provide for an additional means of security check on the authenticity of the document, and not for (fully) automated border crossing. Next generation e-Passports will improve with advancements in the chip and encryption methodologies. It is the expectation that this will further limit reading times and error rates. Also, to date there are – within the EU- variances in the quality of the e-Passports, that influence its usability for ABC. over time. These differences are expected to disappear although this may take one or 2 generations of passports.

4.3.3. Business case: who pays and who wins?

The relevant costs of implementing automated border controls, apart from the investment in equipment, equally concern:

- integration in the operational processing procedure (interfaces);
- the infrastructure required for enrolment (if required) and control, kiosks, marketing schemes, networks, particularly at airports where the availability in space is often limited;
- costs of qualified personnel, including training, and
- maintenance-related costs.

These costs are significant so a strong justification of the investments is needed. Therefore a clear understanding of the business case is needed.

4.3.4. Stakeholders management

RT and ABC projects are characterized by a large variety of stakeholders which need to be involved with the development, implementation and deployment of the project. The following main stakeholder relationships can be identified:

- immigration (gov.) and travel facilitation (airports)
- border control authorities of different countries
- aviation industry & authorities

Projects where these stakeholders have been integrated into all parts of the development process show the best results in terms of costs, process flow and traveller's experiences.

A strong working relationship between airports and border control authorities is essential in order to successfully plan the best possible locations to install ABC gates, so that the monitoring of both entering and exiting passengers, as well as communication with the travellers when necessary, will be facilitated. Additionally, any elements of potential discrimination of specific groups of the population should be avoided by designing facilities and systems that take all people in consideration (persons with reduced mobility, young travellers etc.).

4.3.5. Legal and ethical issues

Interoperable systems require the exchange of data. For European ABC-systems this will be mainly an issue between European member states. For RT-systems, which facilitate automated border control between Schengen and non-Schengen countries, this exchange of personal data is more intense and more relevant in order to be build trust between the nations. This implies that all documentation and personal data, from the time of collection to storing and throughout the processing stages, must be handled securely and in accordance with data protection and privacy laws. The ABC and RT systems must prevent personal data from being copied, manipulated or passed on to a third parties without the knowledge and permission of the individual concerned.

EU Directive 95/46/EC lays out the legal framework regarding the processing of personal data and the free movement of such data¹. National regulators should harmonize and adopt a supporting policies which protect personal data when used and processed for biometric systems. In all cases, whether the biometric data are being stored on a token or in a database, it should be clear for the user how personal data are being managed. If two countries would decided to develop a RT System between their borders (such as FLUX for the Netherands, US and Canada and Germany that will join in the near future), the conditions for vetting and data exchange should be clearly negotiated and communicated openly to the users.

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