



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

RECONNECTING **THE** WORLD

ICAO Role in setting up Digital Credentials Leveraging the ePassport technology

Christiane DerMarkar
cdermarkar@icao.int

ICAO Traveller Identification Programme Officer



ICAO – the background and context

- **Chicago Convention** on International Civil Aviation - drafted in 1944 by 52 nations. The core principles permitting international transport by air, and led to the creation of ICAO on 4 April 1947.
- Today - more than 12,000 international *standards and recommended practices* (SARPs), agreed by consensus by ICAO's now 193 Member States (Annexures).
- **Annex 9** to the Chicago Convention - SARPs and guidance material for facilitation of landside formalities - aircraft and passengers clearance - customs, immigration, health and agriculture.



01

1968
ICAO started to work on MRTDs



02

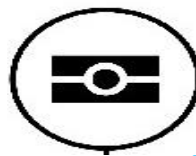
1980
1st Edition of Doc 9303 – Machine Readable Travel Document



03

1995
Started the work on:
1- Biometrics as the best way to link TD to rightful owner and
2- Adding data storage to the MRTDs

e-Passport symbol



04

2004
Introduction of the 1st ePassport



05

2020
ICAO DTC VC specifications adopted and published.



Vaccination certificate in VDS-NC format

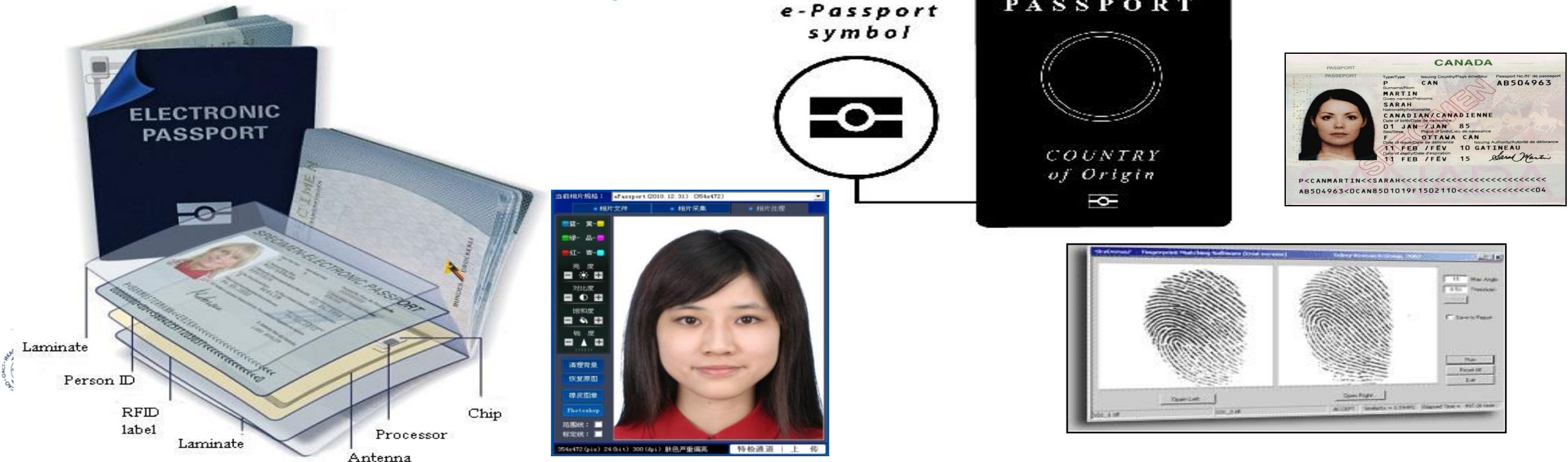
06

2021
VDS-NC and its multiple use case has been adopted by ICAO Council

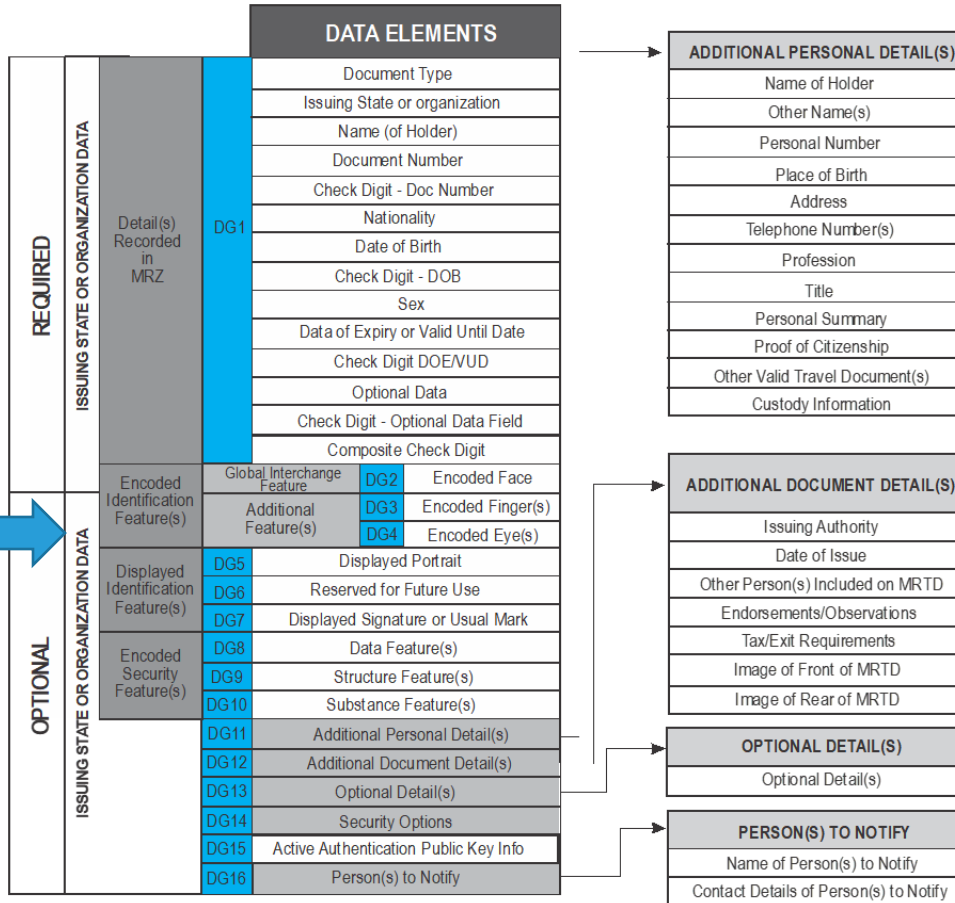


ePassport or Biometric Passport

- ePassports are Machine Readable Passports (MRPs) with a chip (IC)
- The chip is an additional security feature and does not replace the MRZ
- Enhances security of the document
- Biometrics to confirm identity



Purpose of the Passport booklet



- Biographic and biometric information contained in chip establish the “claimed identity”
- Binding between the traveler and the “claimed identity” can be established through biometric matching.

The book establishes the “entitlement” of the traveler to the “claimed identity” – A second factor

From ePassport to the ICAO DTC-VC and DTC-PC



An ePassport can be viewed as a combination of:

- A **Virtual Component (VC)** consisting of the data contained in the chip;
- A **Physical Component (PC)** consisting of the booklet and/or cryptographic link between the VC and the PC and acts as an **authenticator** (second factor).

ICAO DTC Hybrid Model

- The Data from the chip is enclosed in a file structure and called a Virtual Component (VC);
- A device that can be cryptographically linked to the VC and is called the Physical Component (PC).



ICAO DTC Types

Three Types

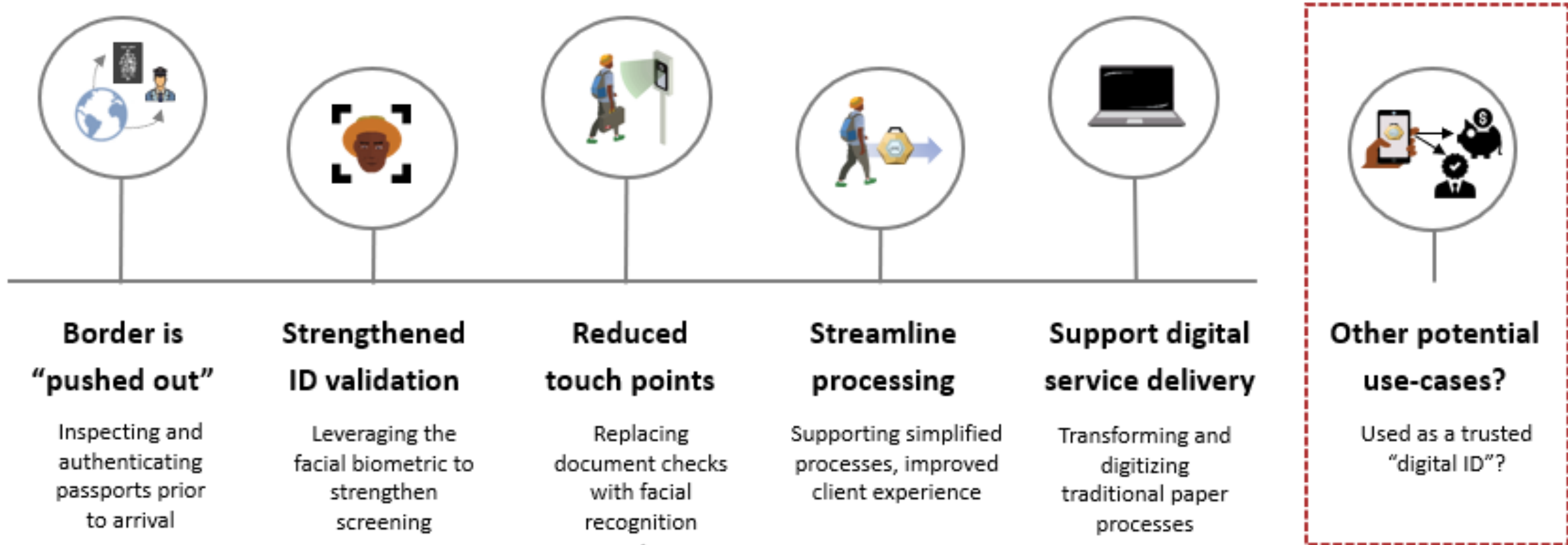
1. eMRTD bound DTC
 - Chipdata is read from existing travel document creating the VC
 - The eMRTD booklet acts as the authenticator and can be considered a PC
 - Anyone can create this DTC
2. eMRTD-PC bound DTC
 - Chipdata is read from existing travel document creating the VC
 - Option to cryptographically link to a different physical device(PC) with the eMRTD as a fallback
 - Can only be created by the same authority that issued the eMRTD
 - DTC can be issued any time after the issuance of the eMRTD
3. PC Bound DTC
 - No eMRTD is issued, but only a PC with form factor different from an eMRTD
 - Can only be created by an eMRTD issuing authority
 - No eMRTD available as a fallback

ICAO DTC Specifications

- ICAO DTC-VC Technical Report approved in 2020
- ICAO DTC-PC specifications divided into two phases
 - Phase 1 – maintain backward compatibility to the extent possible with existing inspection systems and replicate behavior of eMRTD – The Technical Report approved 2023
 - Phase 2 – investigate other form factors like mobile phones – currently a gap analysis is being conducted to identify the difference between policy requirements and technology landscape

Use Cases :

- Seamless Travel
- Advance Travel Authorization (ETA/DTA/...)
- Improving border processing time
- Emergency Travel Document



ICAO DTC: To be or not to be

- The ICAO DTC is essentially a digital replica of the chip.
- It is the extraction of the data on the ePassport chip into another digital medium.
- if the ICAO DTC extracted is broken into micro-credential, and then signed by an entity other than the issuing authority

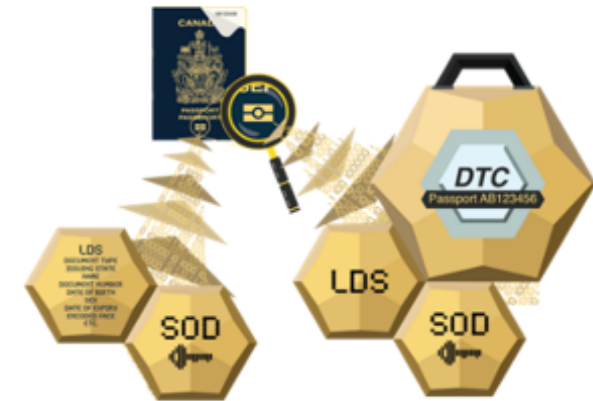
This cannot be considered an ICAO DTC



What is a Digital Travel Credential (DTC)?

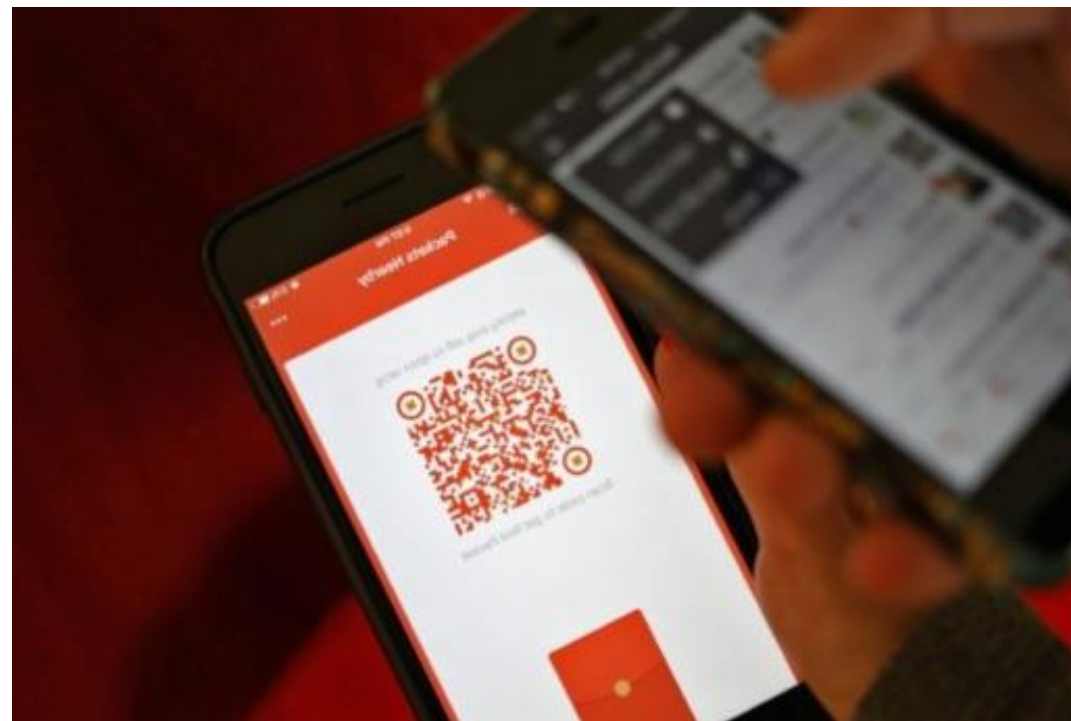
A **DTC** is an **electronic machine-readable document (eMRTD) in a digital format** consisting of a virtual component and a physical component, conforming with the specifications contained in DTC Technical Reports (and once incorporated, Doc 9303), which maintains a cryptographic link to the issuing authority and can be used in place of a physical passport.

It's the **conformance with ICAO's Doc 9303** which makes a DTC **ICAO-compliant** (or not).

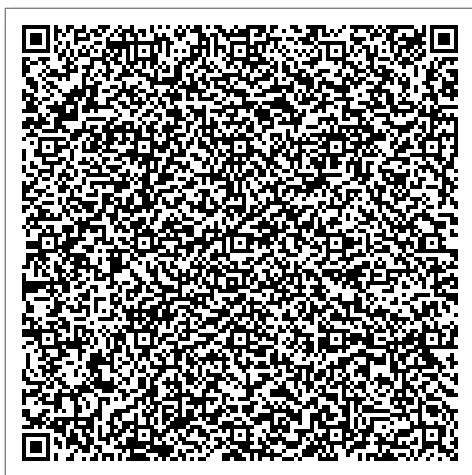


ePassport chip data is stored in a globally interoperable format: the Logical Data Structure or LDS. The information required to verify the primary LDS data is stored in a separate component of the chip, called the Document Security Object or SOD.

Visible Digital Seals (VDS) for Non-Electronic Documents – New Part 13, 9303, 8th Edition



ICAO Visible Digital Seal for Non-Constrained Environments (VDS-NC)



- Encodes minimum dataset for tests, vaccinations and recovery certificates and **Digital Travel Authorization (DTA)**
- Machine readable using standard barcode scanners (e.g. at check-in, bag drop, boarding gates)
- Digitally signed, using the same infrastructure as used by more than 160 States issuing ePassports

Technical Report published

<https://www.icao.int/Security/FAL/TRIP/PublishingImages/Pages/Publications/Visible%20Digital%20Seal%20for%20non-constrained%20environments.pdf>

Digital Travel Authorization (DTA)

- Intended to be used for eVisa situations
- Normal practice is to send a PDF document with no security features
- VDS-NC for DTA can be used to protect such documents with a standardized 2D Barcode
- **Common data set per Doc 9303**
- **Online application**
- **No passport submission or consular appearance required**
- **Photo optional**
- **Verifiable on the spot through 2D barcode**
- **Paper or fully digital format**
- **Compatible with ETS/ iAPI**

Digital Travel Authorization	Issued by UTO	Version 1	DTA Number: N156702B
PERSONAL INFORMATION			
Name of the Holder:	Date of Birth:	Nationality:	Sex:
Anna Maria Eriksson	1952-03-11	USA	F
Passport Number:			
L8988901C			
DIGITAL TRAVEL AUTHORIZATION			
Place of Issue:	Valid From:	Valid Until:	
Peacetown	2021-06-06	2026-06-06	
Duration of Stay:	Number of Entries:	Type/Class/Category:	
5 years, 0 months, 0 days	Multiple	Tourist	
Additional Information:			
Employment Prohibited			
			

Electronic Verification of eMRTDs and ICAO DTCs assures:



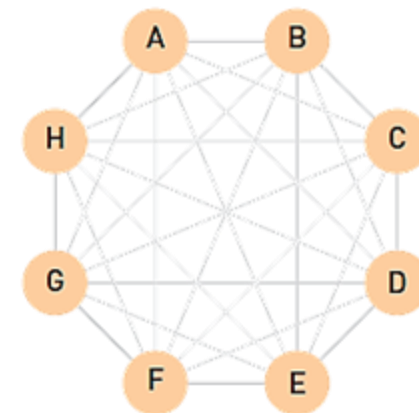
Recipients must verify the digital signature on the ePassport chip to ensure:

Authenticity

- Issuance by genuine authority

Integrity

- Data hasn't been changed since issuance (including the facial image)



Without the PKD



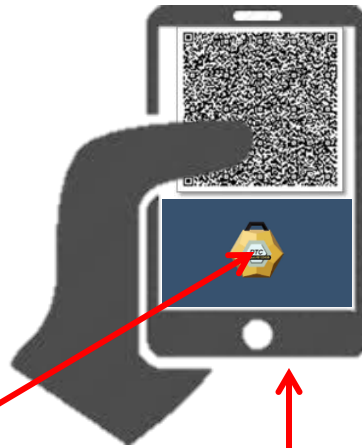
With the PKD


More than 150 ICAO Member States are issuing ePassports



Mobile Identification using ICAO specifications

Passport or Digital Travel Credential (DTC)



 DIGITAL TRAVEL AUTHORIZATION notification of decision



DTA in VDS format



Vaccination certificate in VDS-NC format



Thank You