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.
1968
ICAO started to work on MRTDs

1980

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

2004
Introduction of the 1st ePassport

2020
ICAO DTC VC specifications adopted and published.

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

- Primarily designed for Visa sticker.
- Hence highly space optimized
- Requires specialist software to decode the contents.
- Might not be readable by normal barcode scanners
- Requires mechanism for barcode signer certificate exchange
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
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)
Mobile Identification using ICAO specifications

Passport or Digital Travel Credential (DTC)

Vaccination certificate in VDS-NC format

DTA in VDS format
Thank You