



ICAO | UNITING AVIATION

VDS – application for testing and vaccination certificates

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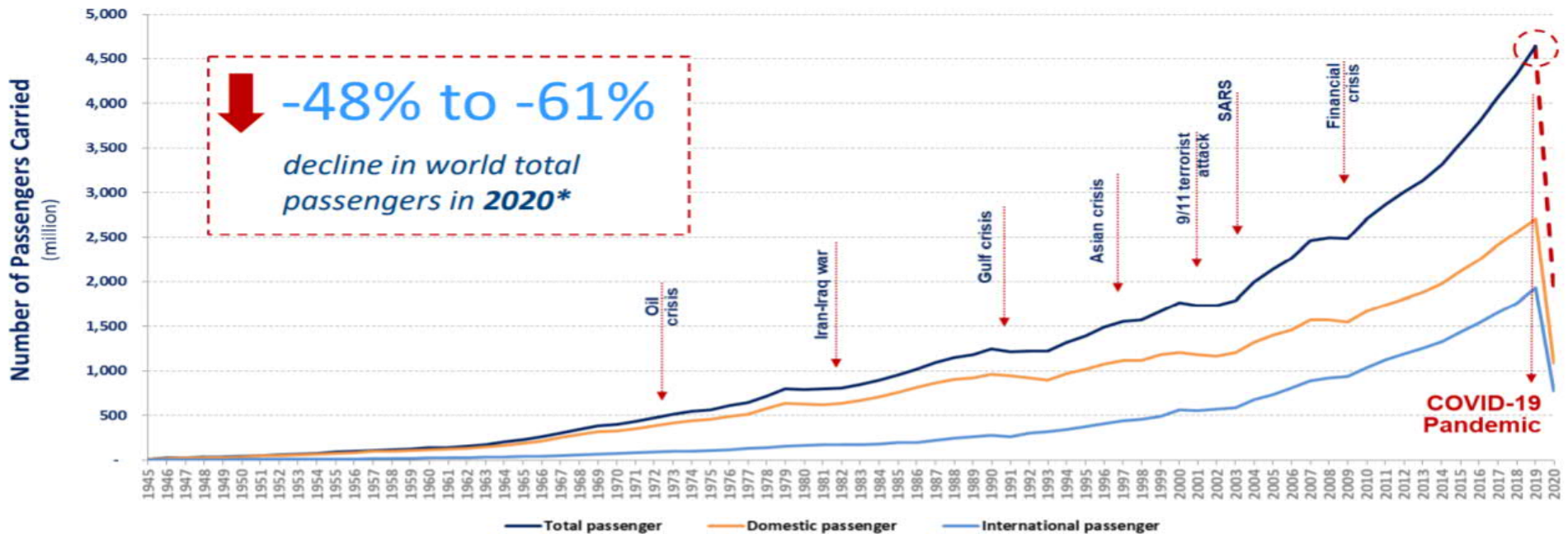
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Current Air Transport Traffic

World passenger traffic evolution
1945 – 2020*



Global passenger aviation operations have grown consistently over the past 60 years. COVID-19, however, brought a dramatic halt to this growth



Aviation Restart & Recovery

- ICAO has been actively providing aviation-related information on COVID-19 and serving as the key facilitator for States, regional organizations and industry partners.
- ICAO has been coordinating with WHO and other relevant UN organizations, regional organizations, industry partners and freight forward representatives, sharing information to design together a path for the restart and recovery of aviation.



Restart & Recovery with Touchless Solutions

- New benefits and facilitating border crossing for travellers
- Increasing security, speed, confidence and trust in border crossing
- Reducing (health) risks associated with large-scale human movements across borders
- “Contactless processing” becomes the new mantra
- Reducing physical touchpoints
- Minimum physical interactions for goods to be screened, cleared and passed onwards
- Exploiting new technologies to support processes is way forward



ICAO Doc 9303 defines global interoperability as:

The capability of inspection systems (either manual or automated) in different States throughout the world to obtain and exchange data, to process data received from systems in other States, and to utilize that data in inspection operations in their respective States...



- ICAO Visible Digital Seals (VDS) for Non-Electronic Documents
- Extends the ICAO PKI infrastructure for digital signatures (security and authenticity) to 2D barcodes
- Leverages the global trust framework being deployed by 145 States issuing electronic passports
- Allows digitally signed medical records to be easily read and validated in a similar way as electronic passports





- **ICAO Guidelines VDS for Travel Related Public Health Proofs (tests and vaccine certificates)**
 - Safe to assume that States will enact their own vaccination proof requirements to mitigate public health risk at the border
 - This has happened with testing proofs and is starting to happen for vaccination on a country by country, ad hoc basis
 - ICAO is presenting a common approach, based on the existing, globally-interoperable trust model for travel documents
- **ICAO Technical Report for VDS for Non-Constrained Environments**
 - Specifies data sets and digital signatures
 - Digital signature optional for tests, mandatory for vaccine certificates



Cornerstones of the specification

- The VDS is designed as a specific token for cross-border travel, as an interoperable proof of health events (test result, vaccination certificate).
- The VDS can be digitally signed to ensure the data is authentic and not been modified.
- The VDS relies on an existing two-level PKI trust model as it is used for e-passports since 2004. It consists of a root of trust (CSCA), a document (barcode) signer, a Public Key Directory and the document itself.
- The VDS is a 2D barcode and is easily readable by most barcode scanners deployed in the travel/border environment.
- The VDS is offline verifiable, without the need for an online connection.

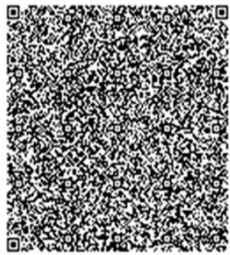


Vaccination Certificates

- World Health Organization (WHO) is determining overall medical requirements for certificate to ensure continuity of care
- Vaccination certificates can be issued without a VDS;
- ICAO specification to be deployed for an international vaccination certificate, the token used *specifically* for the cross-border travel;
- Pax can get an international certificate for travel, well after the vaccination event itself.



Vaccination Certificates

Proof of Vaccination (EU)	Issued by UTO	Version 1	
PERSONAL INFORMATION			
Person Name: Gary West	Person Date of Birth: 1985-03-02	Passport: P9876543E	ID Card: U1234567A
VACCINATION/PROPHYLAXIS INFORMATION			
Disease or Agent Targeted: COVID-19	Vaccine or Prophylaxis: COVID-19 mRNA vaccine	Vaccine Medicinal Product: Comirnaty	Marketing Authorization holder: Pfizer BioNTech
Number in a Series of Vaccinations/Doses: 1/2	Batch/Lot Number: VC35679	Date of Vaccination: 2021-02-01	Administering Centre: RIVM
			

- Data set to be defined by WHO Smart Vaccination Certificate (SVC) work streams
- Travel document data included
- Digital signature mandatory



- ICAO proposing specifications
- Short validity period of the test result
- Part of a multi-layered risk-based approach
- ICAO is encouraging States requiring a negative test result to consider lifting or limiting quarantine or self-isolation measures



Test Results

- Data set defined by ICAO Manual 10152
- Travel document data included
- Digital signature optional, but highly recommended

Proof of Testing	Issued by UTO	Version 1	
PERSONAL INFORMATION			
Full Name: Gerald Cook	Date of Birth: 1990-01-29	Document Type: Passport	Document Number: E1234567P
SERVICE PROVIDER			
Name of Testing Facility/Service Provider: General Hospital		Country of Test: UTO	
Mobile Number: +00 68765432	Email Address: genhosp@mail.com	Address: 12 Utopia Street	
DATETIME OF TEST & REPORT			
Specimen Collection DateTime: 2020-12-12T12:00:00+08:00		Report Issuance DateTime: 2021-02-11T14:00:00+08:00	
TEST RESULT			
Type of Test Conducted: molecular(PCR)	Result of Test: negative	Sampling Method: nasopharyngeal	
OPTIONAL DATA FIELD			
Comment: Recovered COVID-19 patient			
			



Digital Signing

- What we are proposing is that the final signing service for a token specific to travel be derived from the existing trust model for eMRTDs.
- We are suggesting the Travel Document Issuing Authority's (TDIA) existing PKI be leveraged to apply the final digital signature *on behalf* of the health authority, rather than the health authority establishing an entirely new PKI.



Example of centralized approach for both vaccination / test results

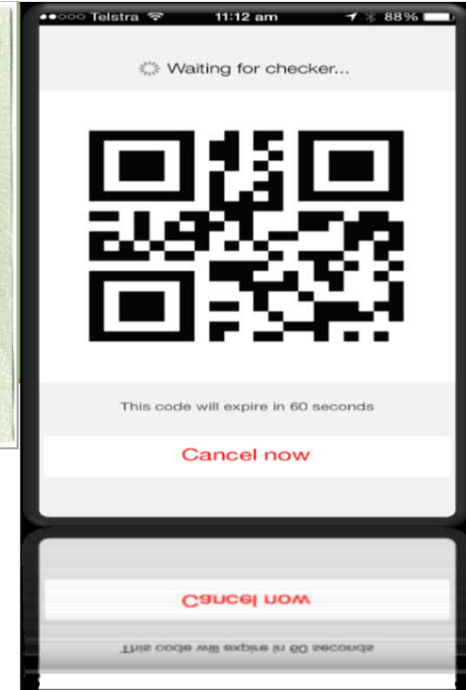
- Data set is sent to a central signing service which:
 - a) recognises the point of issuance as registered/authorized and
 - b) creates the VDS by signing data using barcode signing certificate.
- The VDS is then returned to the passenger (e.g. in digital or pdf).
- The digital signature can be applied centrally, in other words remotely from the test center

De-centralized approach:

- In more advanced setting – digital signature can be applied by lab



1. Globally Interoperable
2. Data stored on VDS only
3. Usable on paper and with digital solutions
 - similar performance/security in both cases
4. Does not necessitate significant process change
5. ICAO specification – respects state sovereignty in issuance and validation



VISIBLE
DIGITAL
SEAL

- Allows unique identification through association with person's ID
- Can be physically printed or shown on a digital screen
- Can be applied to existing paper certificates or digital passes already used
- No storage of data beyond the holder - compliance with data protection



Existing Infrastructure and Systems

1. Cheap to implement (No Country Left Behind / NCLB)
2. Can be validated offline
3. A low-cost solution – signed barcodes emailed/ uploaded to a central repository and printed at home or stored in digital wallet
4. Border authorities can familiarity and connectivity with existing eMRTD trust model – no need to onboard new verification system.



VISIBLE
DIGITAL
SEAL

- Readable using existing scanners in airport, e.g. for boarding passes
- On-paper use allows for cost-effective implementation
- No transactional costs following initial implementation
- Technical specifications are already developed, understood and agreed



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THANK YOU