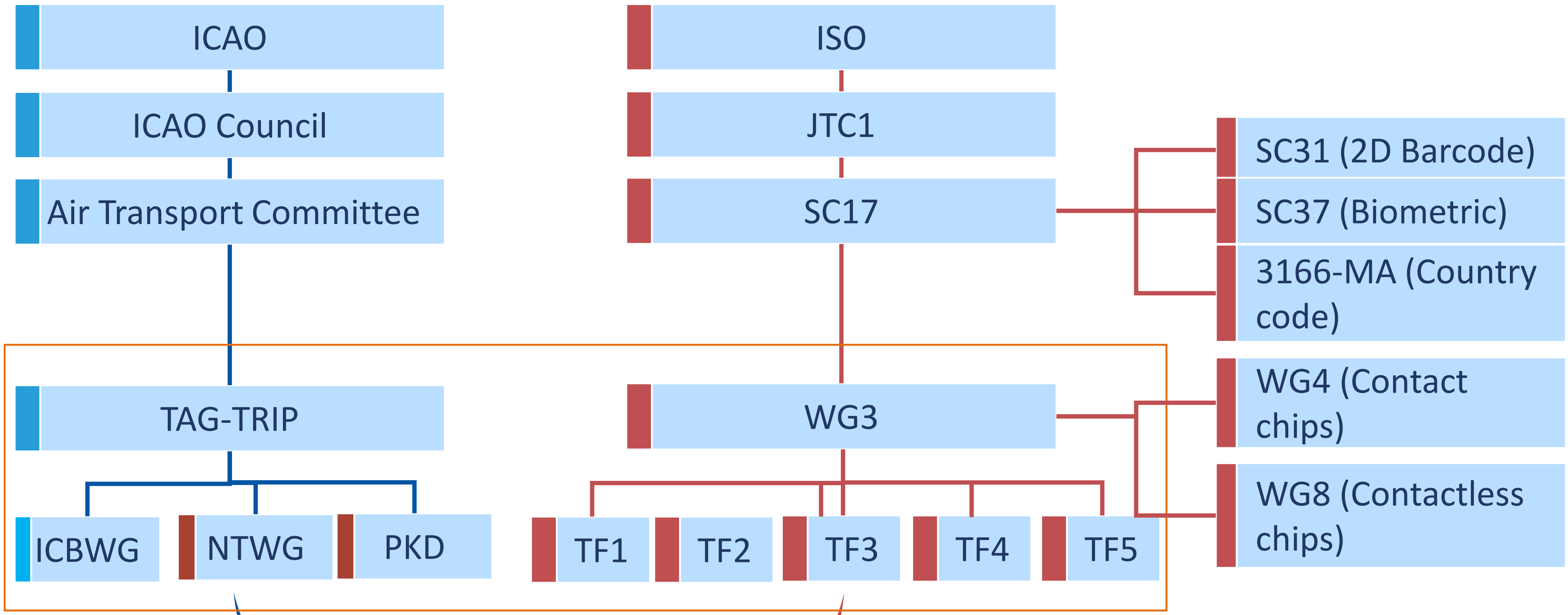
ISO Updates

R Rajeshkumar

Convener – ISO/IEC SC17/WG3

1. ICAO-ISO Relationship

Working Relationship between ICAO and ISO



ICAO

ICAO Council

Air Transport Committee

TAG-TRIP

ICBWG

NTWG

PKD

ISO

JTC1

SC17

SC31 (2D Barcode)

SC37 (Biometric)

3166-MA (Country code)

WG3

WG4 (Contact chips)

WG8 (Contactless chips)

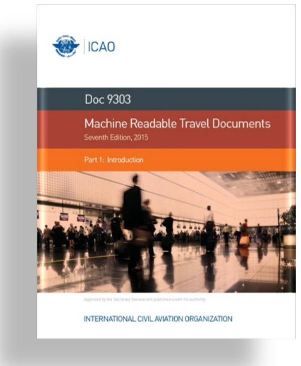
TF1

TF2

TF3

TF4

TF5



ICAO

Doc 9303

Machine Readable Travel Documents

Seventh Edition, 2015

Part 1: Introduction

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ICAO Doc 9303 / ISO-IEC 7501

2. Governance

Meetings since TRIP 2023

- Wellington, NZ – March 2024
- Sydney, AU – October 2024

WG3 Structure

- Current Structure
  - TF1 – New Technologies
  - TF2 – Editorial
  - TF3 – Application Issues
  - TF4D – Test Specifications (Physical)
  - TF4R – Test Specifications (Logical)
  - TF5 – Logical (Chip and PKI)

- New Structure
  - TF1 – ~~New Technologies~~
  - TF2 – Editorial
  - TF3 – ~~Application Issues~~
  - TF4D – Test Specifications (Physical)
  - TF4R – Test Specifications (Logical)
  - TF5 – Logical (Chip and PKI)
  - TF6 – Physical Layout
  - TF7 – Optical Readable Data
  - TF8 - Biometrics

Editors and Liaisons

- Editors will have shadow editors – for load sharing and succession planning
- Liaisons
  - NTWG and TAG/TRIP – Convener – R Rajeshkumar (Singapore)
  - ICBWG – Patrick Beer (Switzerland)
  - SC17/WG4 – Kenichi Nakamura (Japan)
  - SC17/WG10 – Kenichi Nakamura (Japan)
  - SC37 – Andreas Wolf (Germany)
  - PKD – Peter Campbell (New Zealand)
  - SC27 – Gaetan Pradel (Luxembourg)

Doc 9303 Fast Track

- Have submitted word versions to JTC1. Need to send pdf versions and editable graphics – ballot will open after about 6 weeks and will run for 8 weeks. If no major objections, ISO/IEC 7501 will be published and be in sync with 8th edition of Doc 9303
- ISO/IEC 18745-1 is published as ISO standard. Will be converted to an ICAO TR
- ISO/IEC 18745-2 is published by WG8 – transfer requested to WG3. Will also be converted to ICAO TR
- Then all parts of 18745 can be fast tracked using same process

3. TF2 Updates

Current Work

- FALP/13 decisions
  - Transition from ISO/IEC 19794-5 to 39794-5 for DG2 (facial image)
  - Deprecation of BAC & requirements to support PACE for eMRTDs
  - Adoption of the document type indicator’s 2nd character for passports
- FALP/13 timelines
  - are supposed to be adopted in Annex 9 “Facilitation” as standards
  - shall be specified in Doc 9303 as well
    - as Annex 9 and Doc 9303 address different audiences
  - are not yet adopted completely in Doc 9303 8th Edition
- Revision of Doc 9303 8th Edition – parts 4,8 and 11
  - To keep it consistent with the ICAO FALP/13 decisions for Annex 9

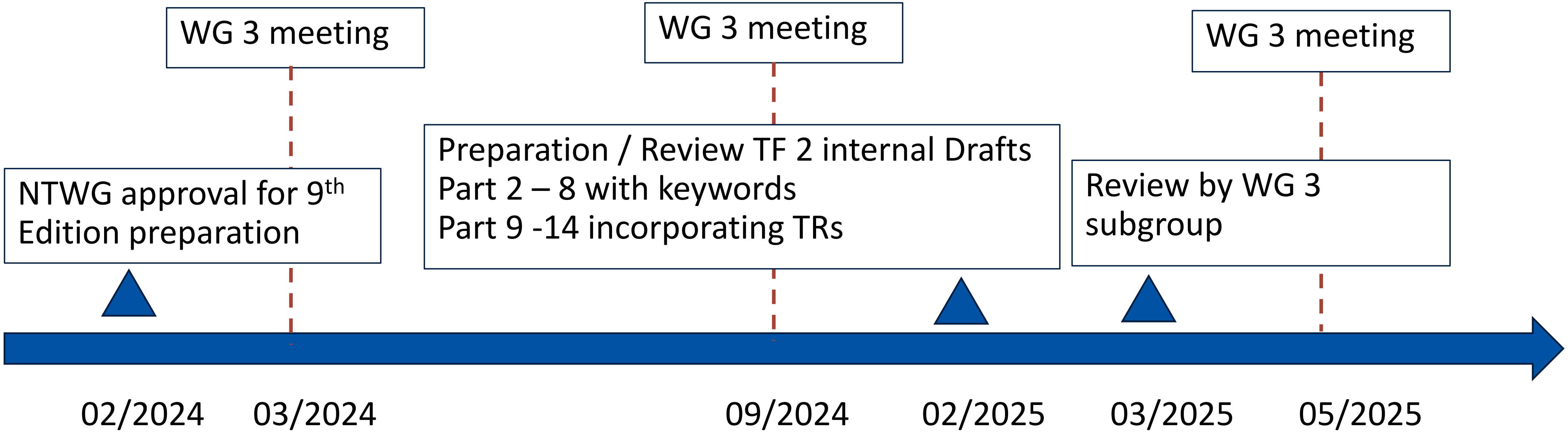
Further revisions

- Further Clarifications & Corrections to be included in this revision
  - Part 4: Description of the document type indicator (NTWG request)
    - “PT – Alien passport” → “PT – Alien/Non-Citizen passport”,
  - Part 11: Clarification on Chip Authentication → TF 5

Towards the 9th edition of Doc 9303

- Focus on editorial work
  - Incorporate published ICAO Technical Reports
  - Harmonize the terminology with the terms to be adopted in Annex 9 “Facilitation”
  - Express provisions in part 2 – 8 using the keywords SHALL, SHOULD, MAY etc.
  - Clarifications & correction of obvious errors / inconsistencies
  - Deprecate Doc 9303-6 for TD2 sized MROTDs

Doc 9303 9th Edition – Tentative Schedule



WG 3 meeting

WG 3 meeting

WG 3 meeting

NTWG approval for 9th Edition preparation

Preparation / Review TF 2 internal Drafts
Part 2 – 8 with keywords
Part 9 -14 incorporating TRs

Review by WG 3 subgroup

02/2024 03/2024 09/2024 02/2025 03/2025 05/2025

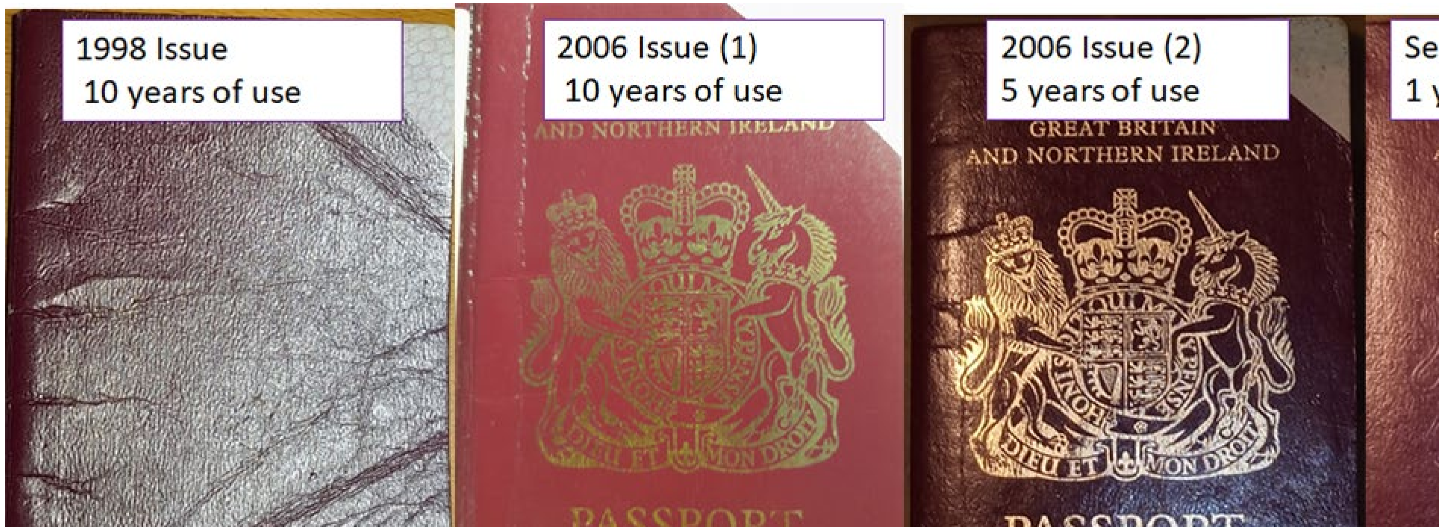
4. Other work items

Technical Reports in progress

- eMRTD Bound DTC-VC Extended – add additional photo to the VC
- DTC-VC – Transmission Protocol
  - 2 existing protocol (OpenID4VP, ISO/IEC 23220-4 REST API) and 1 protocol under development (Browser API) are candidates
- DTC-PC Phase 2 – defining a Physical Component with alternate form factor (mobile phone)
  - Focus on security and certification of the device before defining the protocols

ISO/IEC 18745-1 revision – Physical Test Specifications

- Test for Hot Stamp on the cover to be investigated



1998 Issue
10 years of use

2006 Issue (1)
10 years of use

2006 Issue (2)
5 years of use

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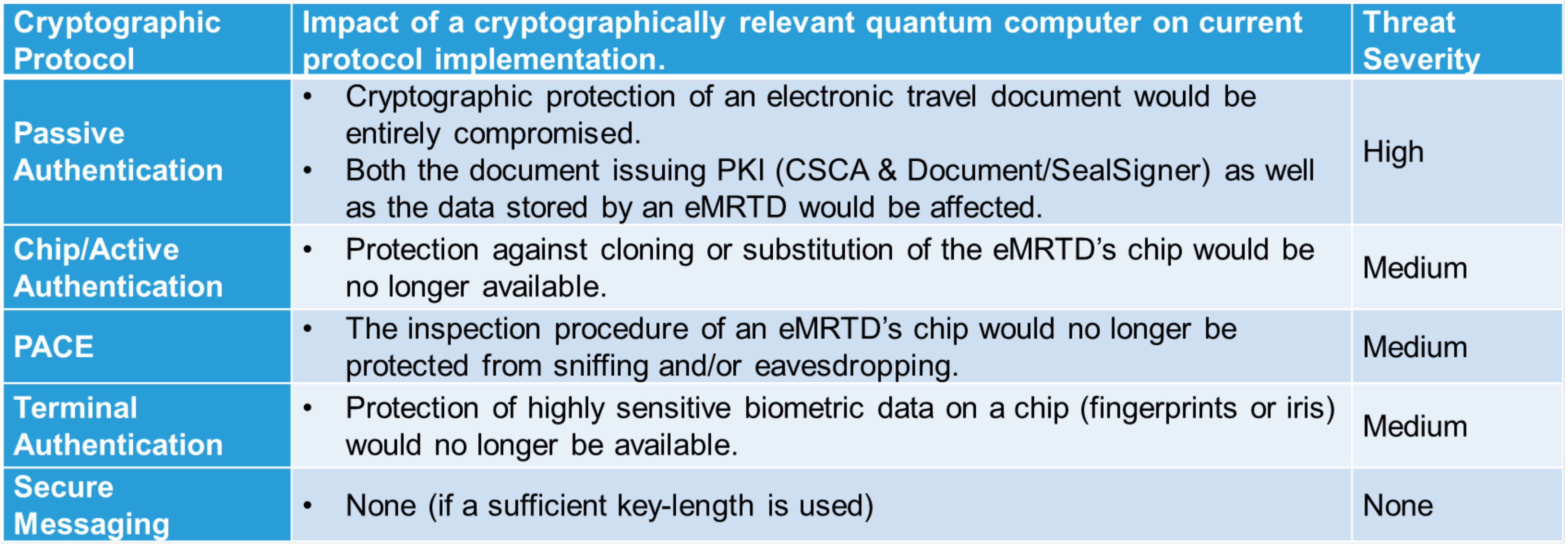
Research on Post Quantum Cryptography



Cryptographic Protocol	Impact of a cryptographically relevant quantum computer on current protocol implementation.	Threat Severity
Passive Authentication	• Cryptographic protection of an electronic travel document would be entirely compromised. • Both the document issuing PKI (CSCA & Document/SealSigner) as well as the data stored by an eMRTD would be affected.	High
Chip/Active Authentication	• Protection against cloning or substitution of the eMRTD's chip would be no longer available.	Medium
PACE	• The inspection procedure of an eMRTD's chip would no longer be protected from sniffing and/or eavesdropping.	Medium
Terminal Authentication	• Protection of highly sensitive biometric data on a chip (fingerprints or iris) would no longer be available.	Medium
Secure Messaging	• None (if a sufficient key-length is used)	None

Status quo of Post-Quantum Cryptography

- First cryptographic primitives for digital signatures and key encapsulation are available
  - Stateful hash-based signature schemes: XMSS, LMS
  - NIST competition on Post-Quantum Encryption Standards released first 3 final standards: ML-KEM (CRYSTALS-Kyber), ML-DSA (CRYSTALS-Dilithium), SLH-DSA (Sphincs+)
- Primitives must be implemented into cryptographic protocols
  - Specifications for using PQC algorithms in X.509 certificates or CMS are still mostly in draft status

Doc 9303 cryptographic key length review

- Review all currently allowed cryptographic algorithms, domain parameters and key lengths in Doc 9303 (part 11, 12 and 13)
- Analyze the impact of further cryptographic primitives (e.g. SHA-3), key-lengths or domain parameters (e.g. finite fields > 2048 bits)
- Ad-hoc group prepared first draft
  - Only covers review of currently allowed algorithms
  - Idea: Map each algorithm & key length to a security strength
- Document is still under discussion
  - Challenge: Keep balance between raising security and technical feasibility
  - No recommendations for the time being

ICAO Datastructure for Barcodes (IDB)

- In previous version 1.1, two documentType were introduced:
  - “NH” for healthproof messages
  - “NA” for travel document messages
- Issue for countries that need to differentiate visa signer from other travel documents (Iceland)
  - In version 1.2, new documentType "NB“ introduced for visa and/or DTA
- New worked example for TD1 MRZ
- In future, new worked examples will be created and published to Github site – no revision of TR for each example. Major revision will incorporate the worked examples

5. 39794-5 Application Profile

39794-5 Application Profile

- New encoding for DG2 agreed by NTWG and endorsed by TAG/TRIP
- Inspection Systems need to be ready by 2026 to handle the new encoding
- Issuers to switch to new encoding by 2030
- Interoperability event for testing readiness of Issuers and Inspection Systems – Sydney, October 2024

Preparation

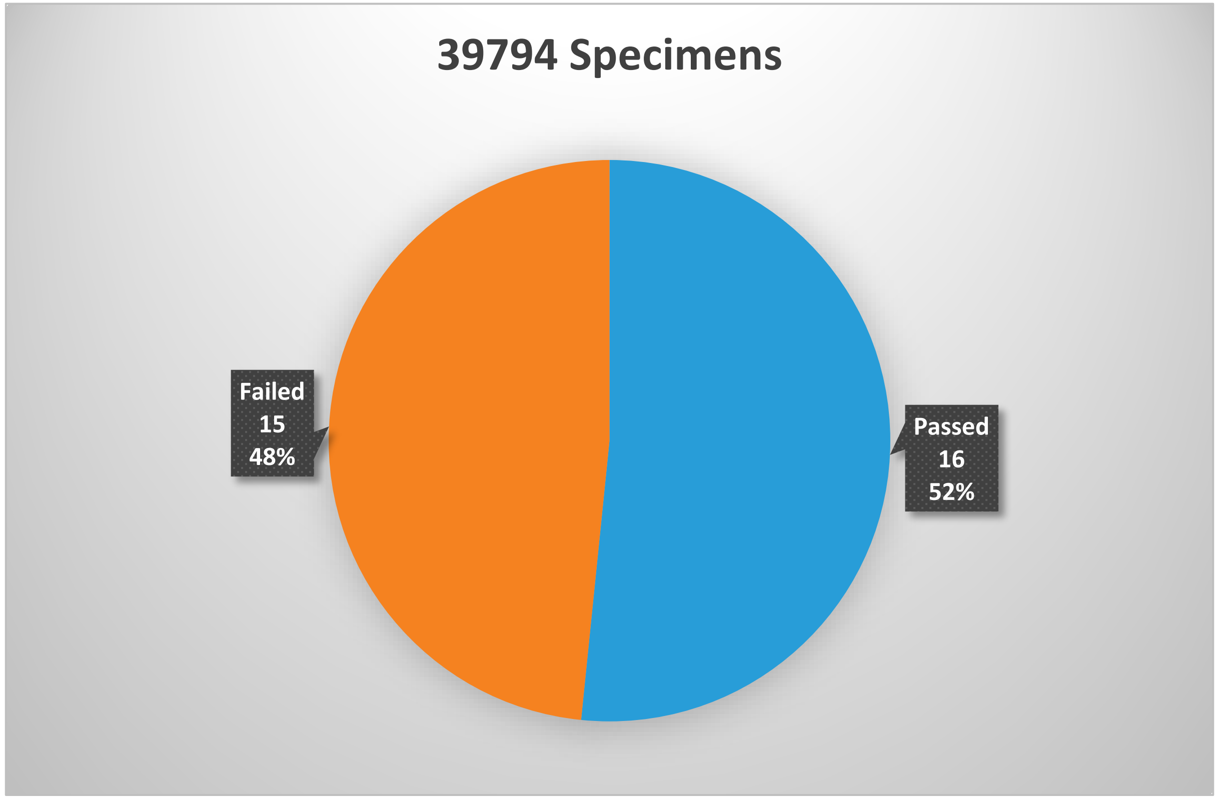
- Silver dataset created and published to WG3 github site
- Additional test data created to simulate future extensions that might be defined by SC37
- Quite good participation
  - 13 eMRTD participants
  - 12 Inspection participants

Conduct of the Test

- Reference implementation of Inspection System
  - Used to do a smoke test to pick out issues with eMRTD samples brought by issuers
- Reference implementation of eMRTDs for testing inspection systems
- Additional eMRTDs to do negative tests
- Anonymized – Result not linked back to a company or product

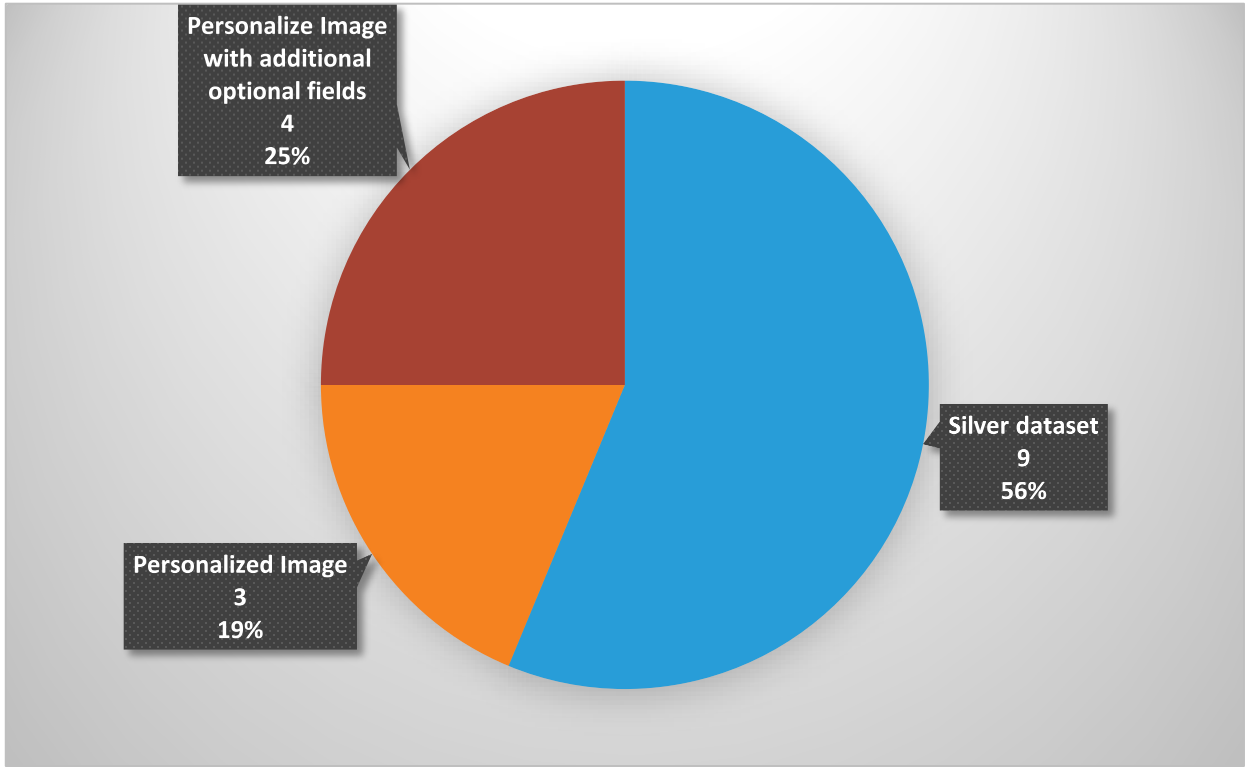
eMRTDs – 39794 Specimens

- Correctly encoded specimens – 52%
- Wrongly encoded – 48%



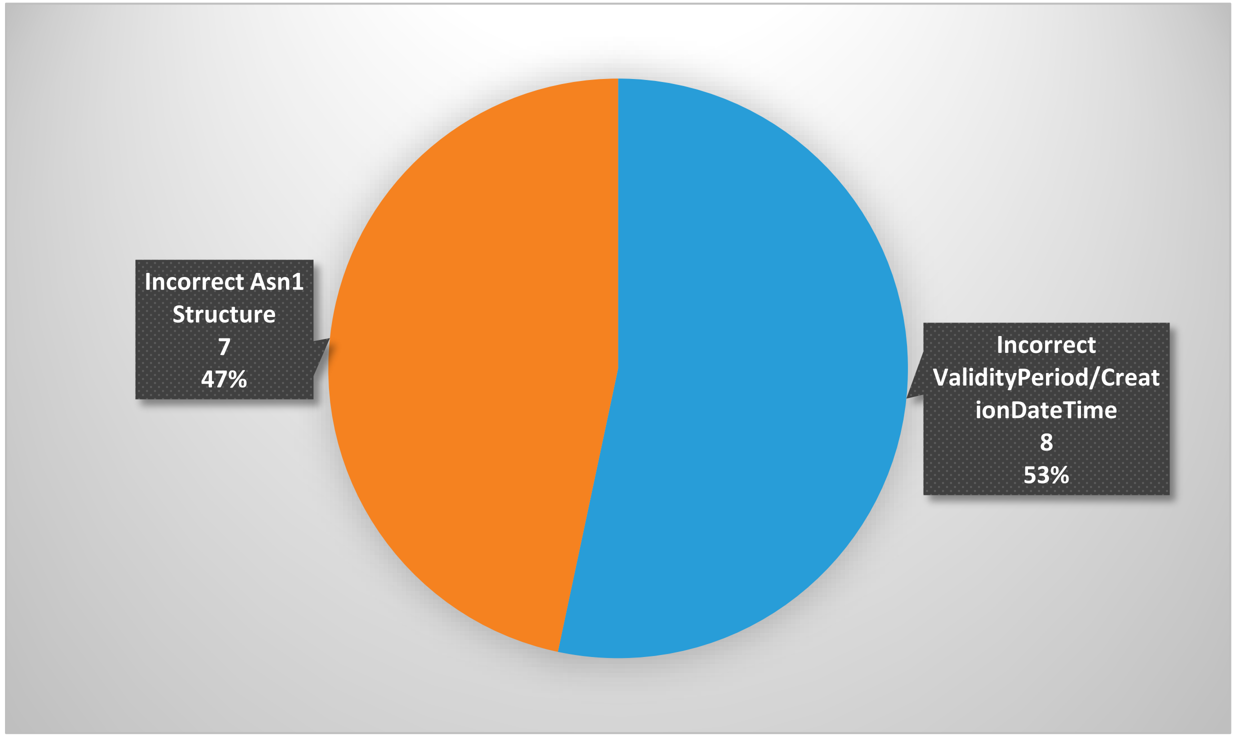
eMRTDS – Specimens that passed

- 56% simply re-used the silver data set
- 19% used the same metadata as the silver data set but with different images
- 25% created new DG2 from scratch and got it right



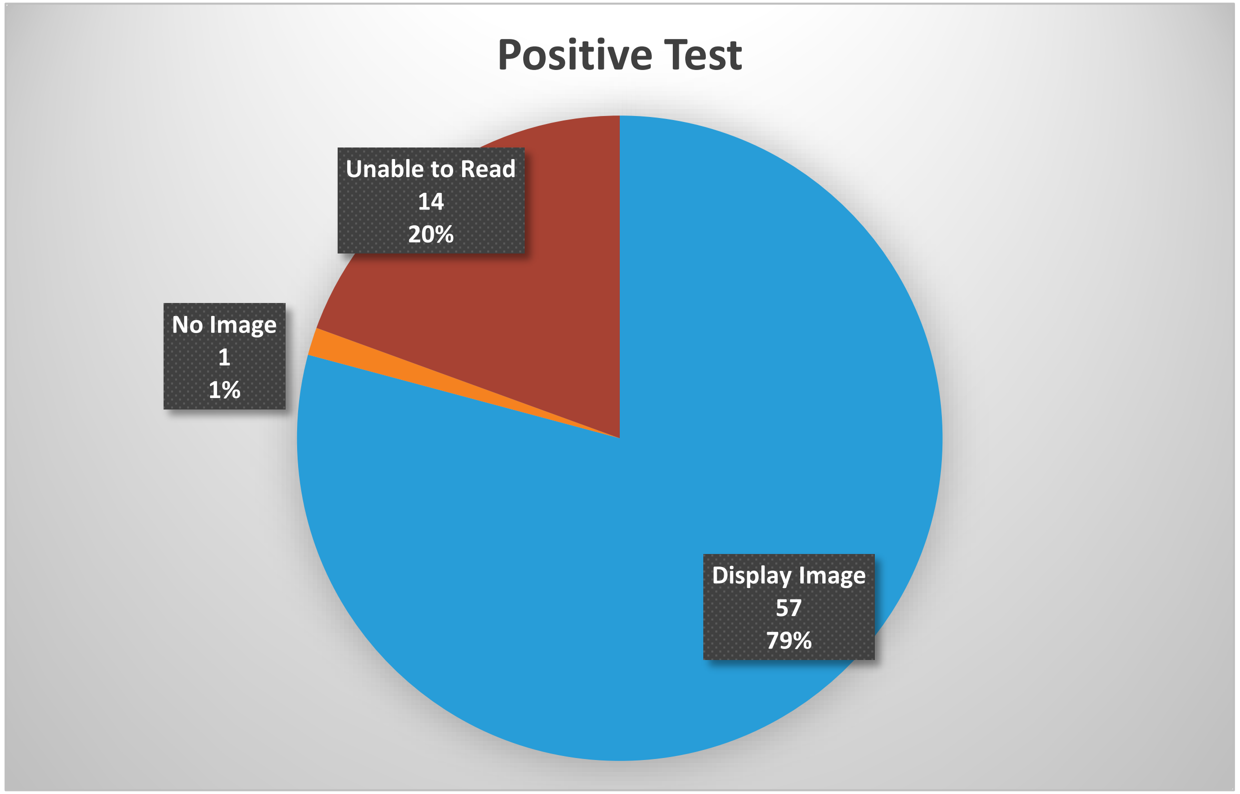
eMRTDs – Failed specimens

- 47% of failed specimens used an incorrect encoding of the metadata
- 53% of failed specimens had incorrect encoding in the header of DG2



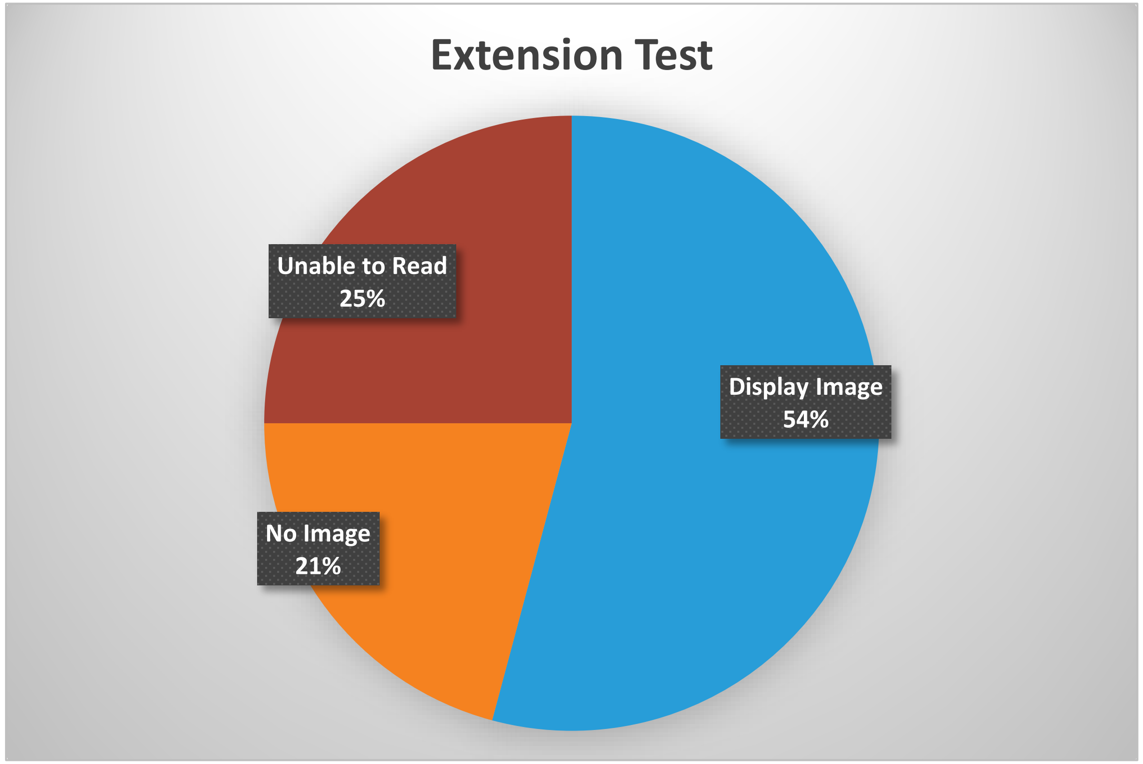
Inspection Systems – Positive Test

- Sample eMRTDS that are fully compliant to 39794-5 Application Profile
- Expectation is that Inspection system should be able to read DG2 and display the image



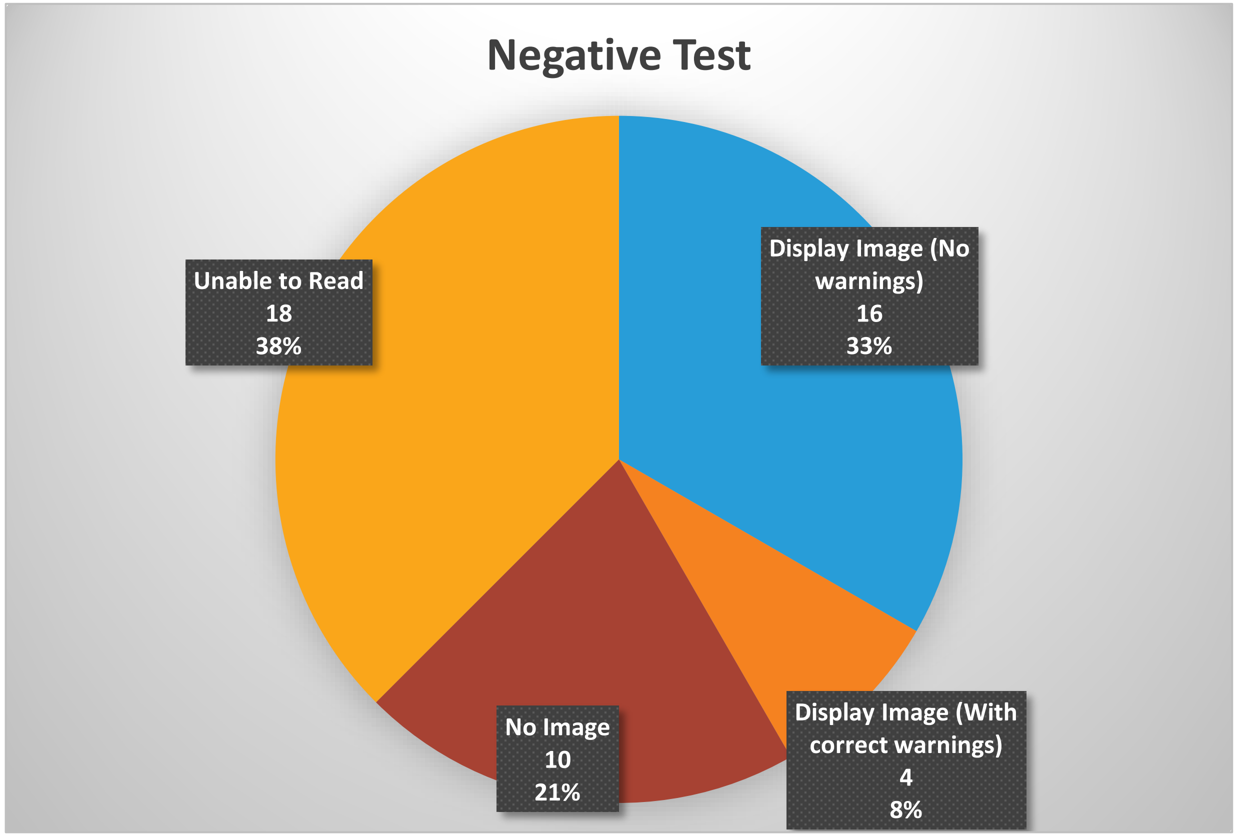
Inspection Systems – additional Extensions

- Extensions added to simulate future additions by SC37
- Expectation is that extensions are detected and image is displayed



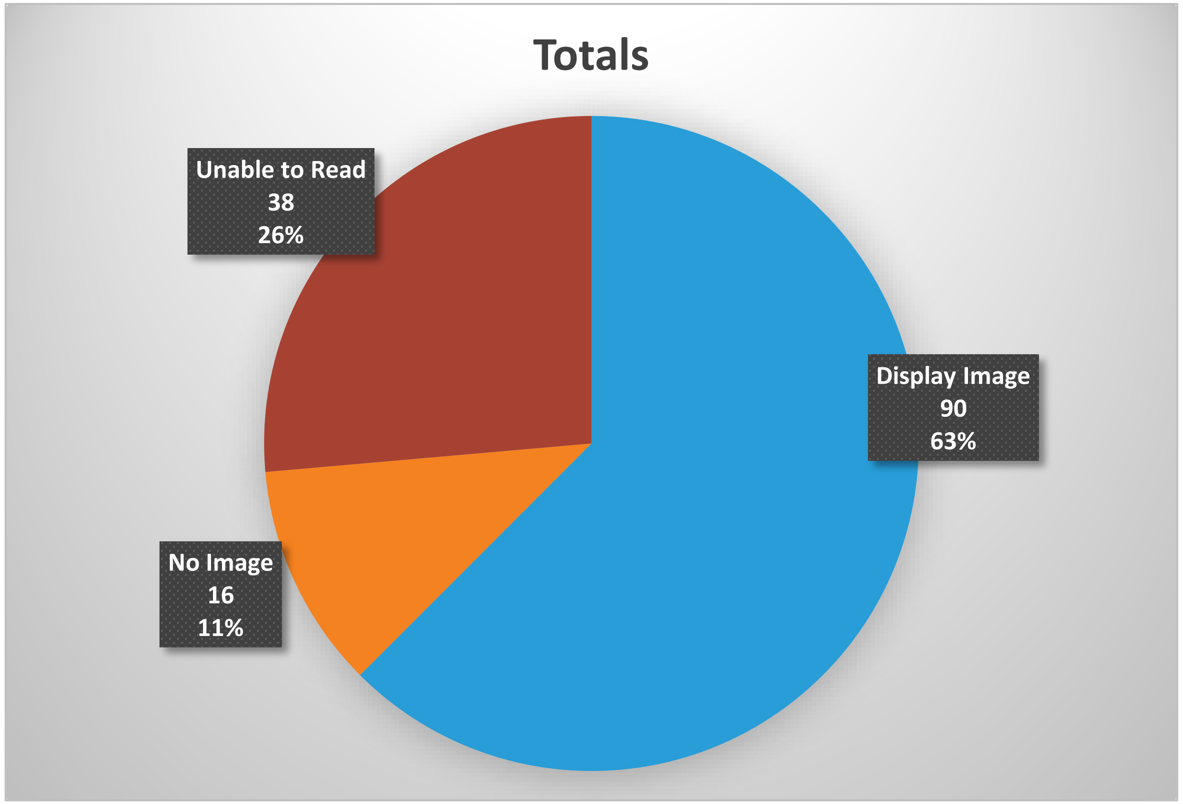
Inspection Systems – Negative Test

- Errors introduced in encoding to simulate real life scenarios
- Expectation is that errors are detected and reported, but image is displayed



Inspection System - Overall

- Some interesting results
  - Not consistent with different extensions – Can read DG2 with Hair color extension, but not with Eye color extension
  - One Inspection System displayed all images – but found errors with even correct data
  - Some Inspection Systems could not detect chip!!!!!



Results

- Only 25% of the eMRTD specimens tried to create DG2 from scratch and succeeded – raises a question on whether issuers are ready for the switch
- 79% of inspection systems managed to read correctly formatted DG2
- When extension is added (as will happen in future) 54% of inspection systems managed to display image from DG2
- With slight encoding errors (which can happen) only 41% managed to display the image

Appreciations

- Andy Hing – Auctorizium
  - Creating the silver datasets/negative test cases and the reference implementation of the Inspection system
- Ralph Lessmann – Hid Global
  - Helping verify the silver dataset
- Jeen de Swart – JustID, NL
  - Creating the eMRTD samples based on the silver datasets and negative test cases

- Stephane Jobard (iCube Test Centre) and Holger Funke (Secunet)
  - Lending their expertise in doing interop testing
- Kenichi Nakamura (Panasonic Japan)
  - Excellent co-ordination and conduct of the event
- Andreas Wolf (Bundesdruckerei)
  - Excellent support and co-ordination between SC17/WG3 and SC37

Next steps

- MORE TESTING IS REQUIRED !!!!!!
- Next interop event planned for February 14 in Singapore – watch out for the formal announcement
- Inspection system test procedures will be published for comments before the event – will be used for conducting the tests
- Will not be anonymous

Thank You

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