

# **MRTD & eMRTD ISSUANCE & IDENTITY MANAGEMENT**

## **Evolution of the MRTD**

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De La Rue Identity Systems**



# Agenda

- Evolution of MRTD
- Intended benefits
- Market drivers
- Personalisation of MRTDs



# What is a MRTD?

Machine Readable Travel Document (MRTD):

“Official document issued by a State or organisation which is used by the holder for international travel and which contains mandatory visual (eye readable) data and a separate mandatory data summary in a format which is capable of being read by machine.” ICAO Doc 9303, II-2



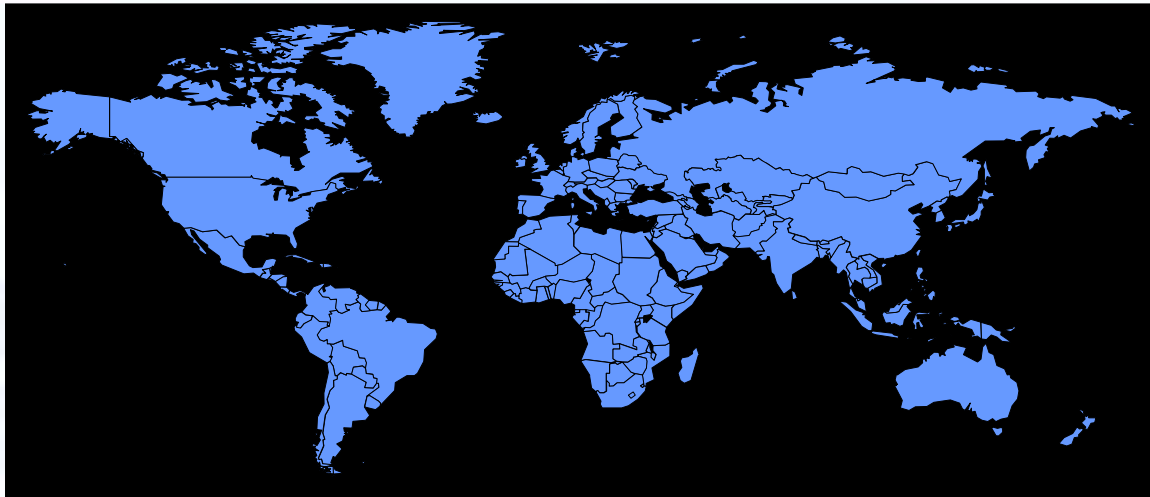
# International standards





# Intended benefits

- To facilitate and secure passenger processing at border control points
- To enable global interoperability



# Why interoperability?

- International travel document
- Border control – 189 member states
- Airlines – carriers' liability act
- Banks & other institutions



# Evolution of MRTD

- Annex 9 to the Chicago convention of 1944
- 1968 - ICAO start work on MRTD standards.
- 1980 – First edition of Doc 9303
- Standards evolved over nearly 3 decades
- Balance between facilitation and security
- Cultural considerations:
  - Transliteration
  - Truncation
  - Flexibility in VIZ



# MAJOR DEVELOPMENTS TRAVEL DOCUMENTS

- |                    |        |
|--------------------|--------|
| 1. Move to MRP     | 1980's |
| 2. Digital Imaging | 1990's |
| 3. Move to e-MRP   | 2000   |





# MRTD - Market Drivers

## ➤ ICAO requirement:

- MRP by April 2010
  - 50 countries still do not have MRPs
  - 19 of these have tender or contract in place
    - Leaving some 30 countries still to upgrade

## ➤ US Visa Waiver requirements:

- ePassports by Oct 2006
  - 2 countries failed to meet dead line

## ➤ EU Requirements:

- E-MRP (face) by 28<sup>th</sup> Aug 2006
  - A number of countries have failed to meet deadline
- E-MRP to include finger by May of 2009



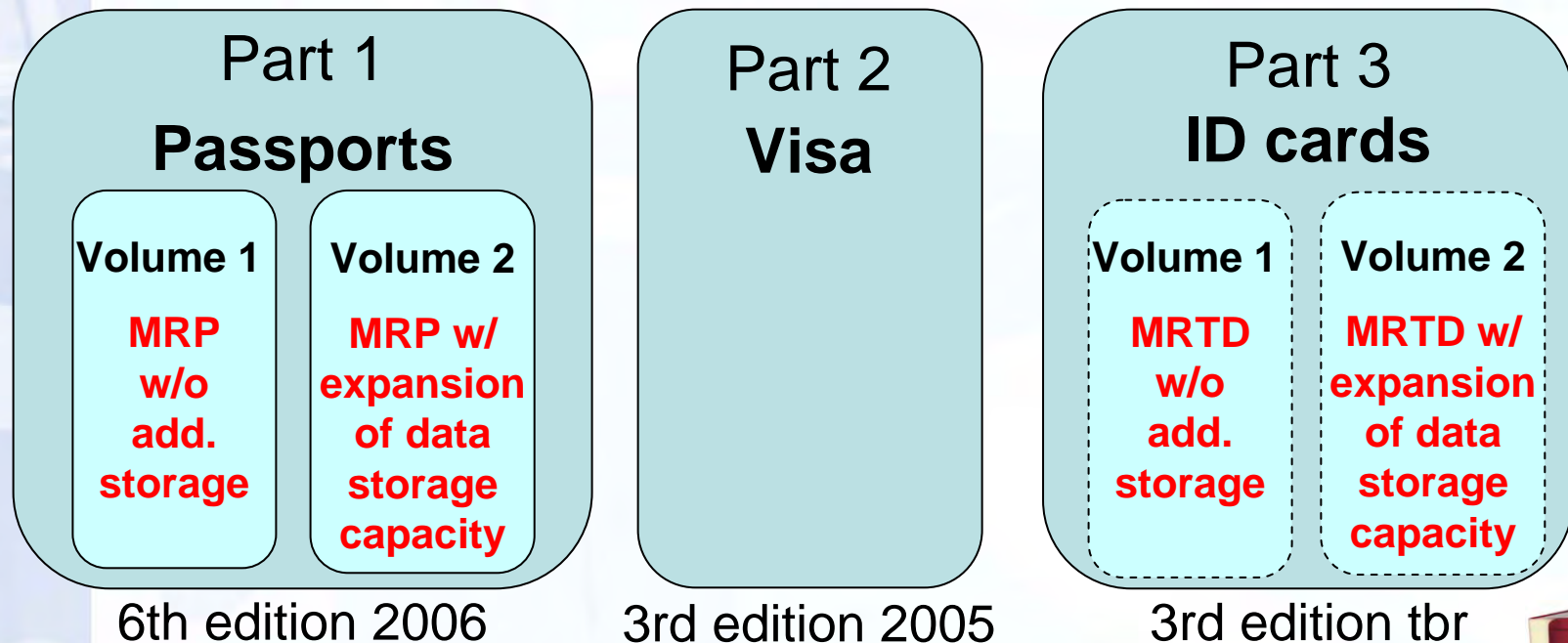
# ICAO Document 9303

- Family of travel documents
  - Part 1 - Machine readable passports
  - Part 2 – Machine readable visas
  - Part 2 – Official travel documents (cards)



# ICAO 9303 – Status

## Structure of Document





# Part 1 – MRPs

## Data page layout

The diagram illustrates the layout of a passport's data page. It features a central rectangular area representing the passport card, which is divided into several sections. On the left side of the card is a photograph of a woman. To the right of the photo are various personal details including name, date of birth, sex, place of birth, date of issue, date of expiry, nationality, passport number, and authority. Below these details is a signature. At the bottom of the card is a red box containing the Machine Readable Zone (MRZ) code. The entire card is set against a background of a blurred airport terminal.

photo ———

VIZ ———

MRZ ———

88mm

125mm





# Visual inspection zone (VIZ)

Top of the MRP data page

Code for issuing State or organization/  
Code de l'État émetteur ou de l'organisation émettrice

① (Name of issuing State or organization/Nom de l'État émetteur ou de l'organisation émettrice)			
② Passport/ Passeport	③ Type/ Type	④	⑤ Passport No./ N° de passeport
⑬ (Holder's portrait/ Portrait du titulaire)	⑥ Primary identifier/Nom		
	⑦ Secondary identifiers/Prénoms		
	⑧ Nationality/Nationalité		
	⑨ Date of birth/ Date de naissance		⑩ Personal No./ N° personnel
	⑪ Sex/ Sexe	⑫ Place of birth/Lieu de naissance	
	⑭ Date of issue/ Date de délivrance		⑮ Issuing authority or office/ Autorité ou bureau émetteur
⑯ Date of expiry/ Date d'expiration		⑰ Holder's signature/ Signature du titulaire	
(Machine readable zone/Zone de lecture automatique)			

Zone I

Zone II

Zone III

Zone IV

Zone V

header

personal data elements

document data elements

signature

identification feature

Not to scale



# VIZ – zone VI

Top  
of back

②① Optional data elements

Zone VI

Back of the MRP data page, or an adjacent page

Not to scale



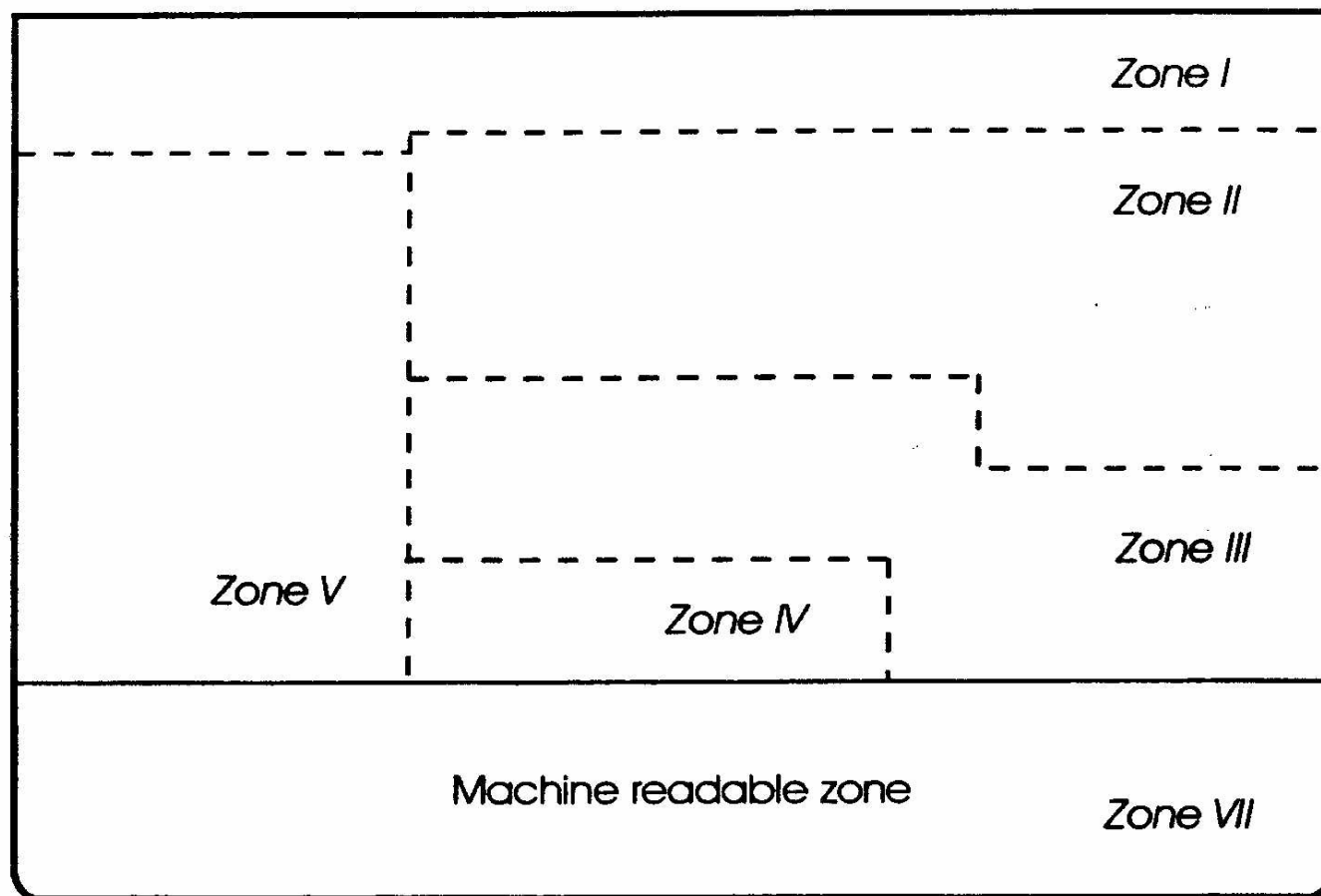


[illegible]

# VIZ – zone location options

**Diagram 2. Flexible positioning of Zones 1 to V**

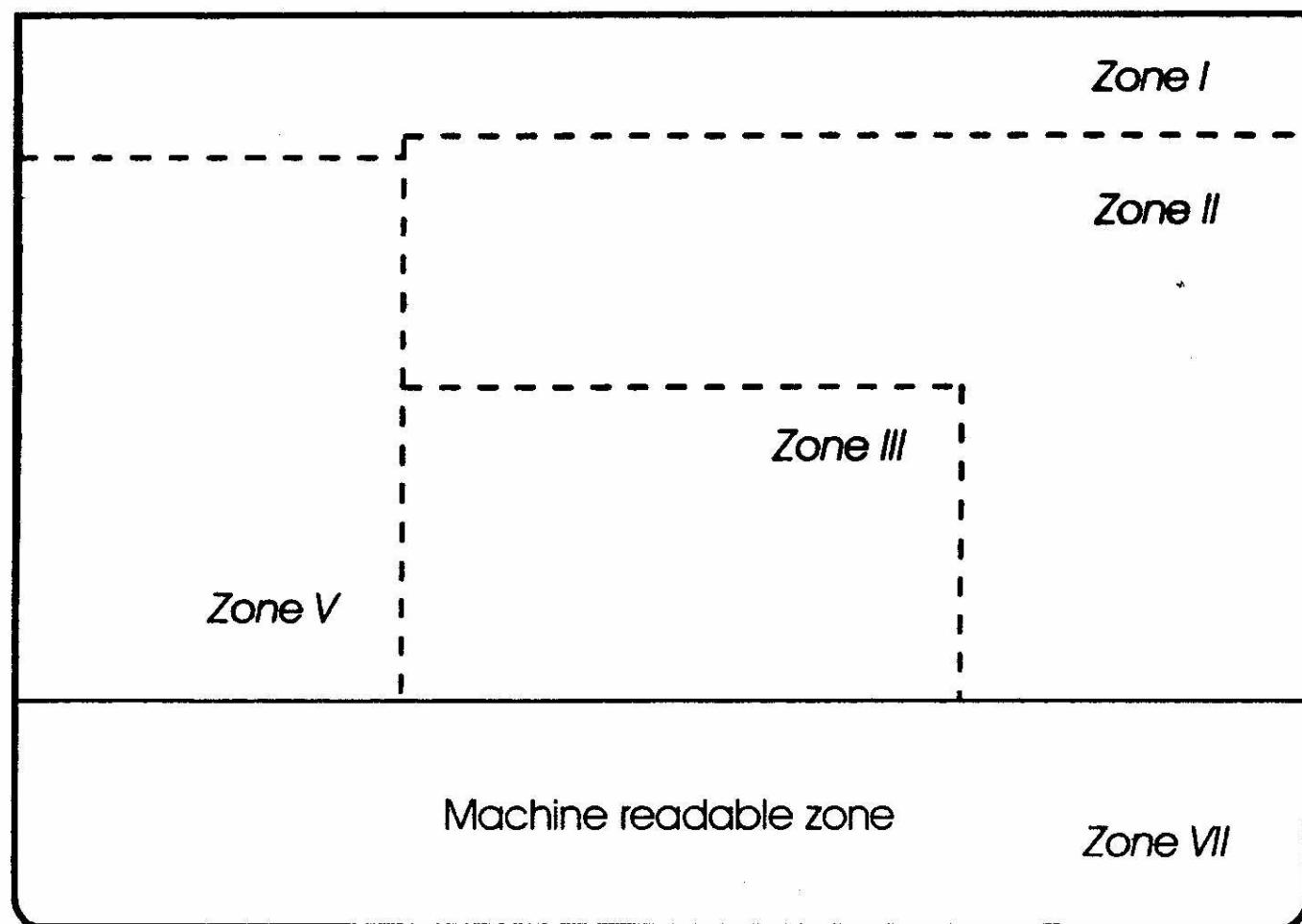
Example 1





# VIZ – zone location options

Example 2



# VIZ – zone location options

The passport card contains the following details:

- Type / Type: P
- Country code / Code de pays: ARC
- Passport No. / Passeport N°: 0000674
- Surname / Nom: GREY
- Given names / Prénoms: AMANDA CAROLINE
- Nationality / Nationalité: ARCADIAN CITIZEN
- Date of birth / Date de naissance: 11 NOV/NOV 1971
- Sex / Sexe: F
- Place of birth / Lieu de naissance: ARCADIA
- Date of issue / Date de délivrance: 23 JUL/JUIL 2004
- Date of expiry / Date d'expiration: 23 JUL/JUIL 2014
- Personal No. / N° personnel: 00001190
- Authority / Autorité: ARCADIA

Machine-readable zone (Field 13) containing optional personal data elements:  
P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<  
00000674<7ARC711114F140723700001190<<<<<<78



# VIZ – zone location options

The image displays a passport card titled "De La Rue MLIS Passport - Secure Sample". It features two photographs of a woman with dark hair. The text includes:

- Type / Type: P; Country code / Code de pays: ARC
- Surname / Nom: GREY
- Given names / Prénoms: AMANDA CAROLINE
- Nationality / Nationalité: ARCADIAN CITIZEN
- Date of birth / Date de naissance: 11 NOV/NOV 1971
- Sex / Sexe: F; Place of birth / Lieu de naissance: ARCADIA
- Date of issue / Date de délivrance: 23 JUL/JUIL 2004
- Date of expiry / Date d'expiration: 23 JUL/JUIL 2014
- Passport No. / Passeport N°: 0000674
- Personal No. / N° personnel: 00001190
- Authority / Autorité: ARCADIA

A red box highlights the "Holder's signature / Signature du titulaire" field, which contains a handwritten signature. A vertical red line extends from this box down towards the machine-readable zone at the bottom.

P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<  
0000674<7ARC711114F140723700001190<<<<<78

# VIZ – zone location options









# Machine readable zone (MRZ)

The passport displays the following information:

- Type / Type: P
- Country code / Code de pays: ARC
- Passport No. / Passeport N°: 0000674
- Surname / Nom: GREY
- Given names / Prénoms: AMANDA CAROLINE
- Nationality / Nationalité: ARCADIAN CITIZEN
- Date of birth / Date de naissance: 11 NOV/NOV 1971
- Sex / Sexe: F
- Place of birth / Lieu de naissance: ARCADIA
- Date of issue / Date de délivrance: 23 JUL/JUIL 2004
- Date of expiry / Date d'expiration: 23 JUL/JUIL 2014
- Personal No. / N° personnel: 00001190
- Authority / Autorité: ARCADIA
- Holder's signature / Signature du titulaire: [Signature]

The Machine Readable Zone (MRZ) at the bottom contains the following data:

```
P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<  
00000674<7ARC711114F140723700001190<<<<<<78
```

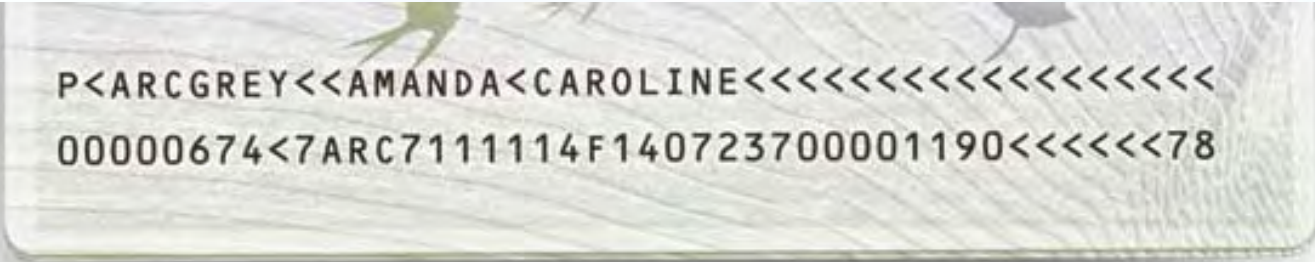
---

P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<<  
00000674<7ARC7111114F140723700001190<<<<<<78

# MRZ – OCR-B

- “Machine readable information is contained in two lines of OCR-B text, each with 44 characters”.

ICAO Doc 9303, II-2



The image shows a close-up of an identification card with a textured green background. At the bottom of the card, there are two lines of black machine-readable text (MRZ) in OCR-B format. The first line reads: P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<<<<. The second line reads: 00000674<7ARC7111114F140723700001190<<<<<<78.

ICAO Doc 9303, II-2

P<ARCGREY<<AMANDA<CAROLINE<<<<<<<<<<<<<<<<<<  
00000674<7ARC7111114F140723700001190<<<<<<78





[illegible]



# Chapter 3. of Annex 9

## ➤ Contracting States:

- Shall not extend the validity of their MRTDs
- Shall issue a separate passport to each person, regardless of age
- Shall begin issuing only MRPs no later than 1 April 2010
- Shall make provision for encoded data to be revealed to the holder of the document
- Non MR passports issued after 24 Nov 2005 shall ensure that the expiration date falls before 24 Nov 2015. After 2015 all passports in circulation must be MRP



[illegible]

- Interoperability a must? Airlines!
- 3 eVisa possibilities
  - in visa label (chip in label not currently permitted)
  - in database (also supporting label)
  - in ePassport chip (future possibility)

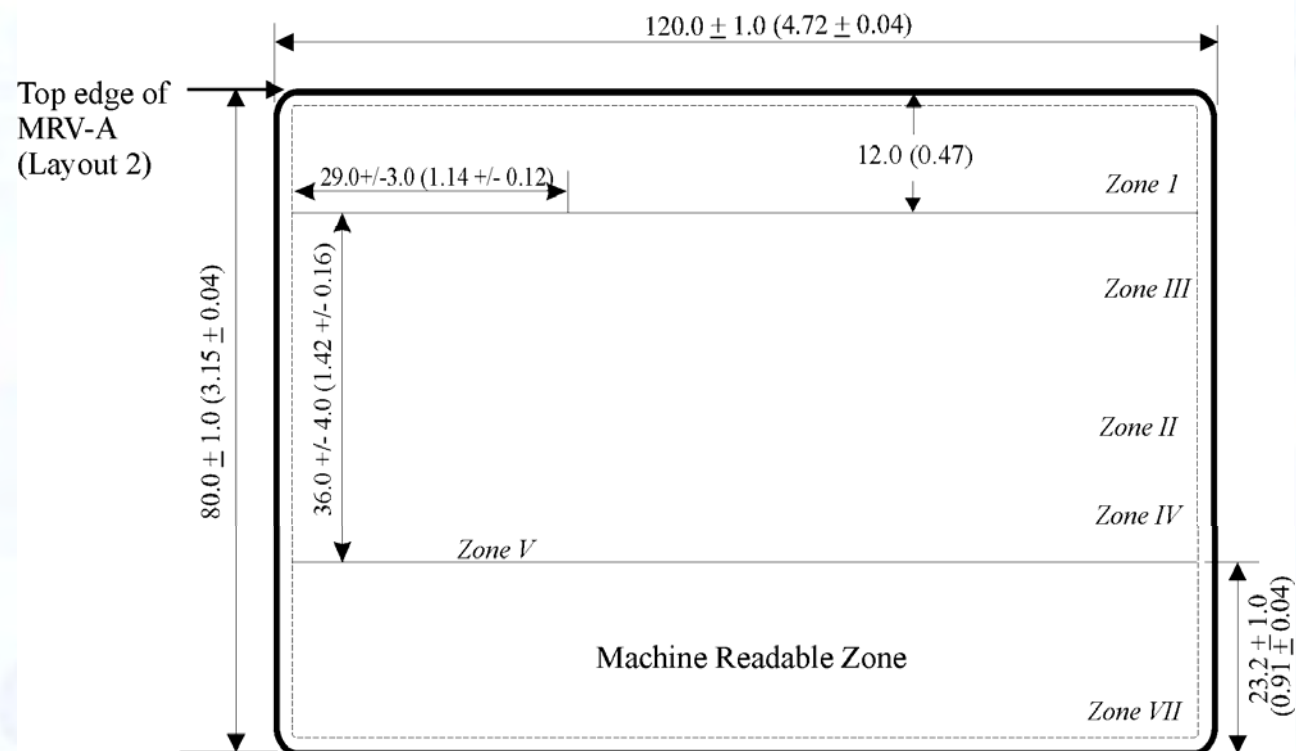


The image displays a sample MRV-A visa card for UTOPIA. At the top left, "UTOPIA" is printed in bold black letters. At the top right, "VISA" is printed in bold black letters. On the left side of the card is a color photograph of a middle-aged man with short brown hair and black-rimmed glasses, wearing a dark suit, white shirt, and red tie. To the right of the photo, the following information is provided:  
**Place of Issue/Lieu de délivrance:** ZENITH  
**Valid from/Valde a partir de:** 10DEC 91  
**Valid until/Valide jusqu'au:** 10DEC 96  
**No. of Entries/Nombre d'entrees:** MULTIPLE  
**Document No./Numero de document:** M123889546  
**Type/Type:** BUSINESS MULTIPLE  
**Surname, Given names/Nom. Prenoms:** ERIKSSON JOHN ARTHUR  
**Passport Number:** L8988901C  
**Sex:** M /M  
**Date of Birth:** 07SEP 40  
**Nationality:** XXX  
**Signature of Issuing Officer:** John Doe  
At the bottom of the card is a two-line machine-readable code:  
V<UTOERIKSSON<<JOHN<ARTHUR<<<<<<<<<<<<<<<<<<  
L8988901COXXX4009072M96121096ZE184226B<<<<<<<  
To the right of the card, a vertical double-headed arrow indicates a height of 80mm. Below the card, a horizontal double-headed arrow indicates a width of 120mm.

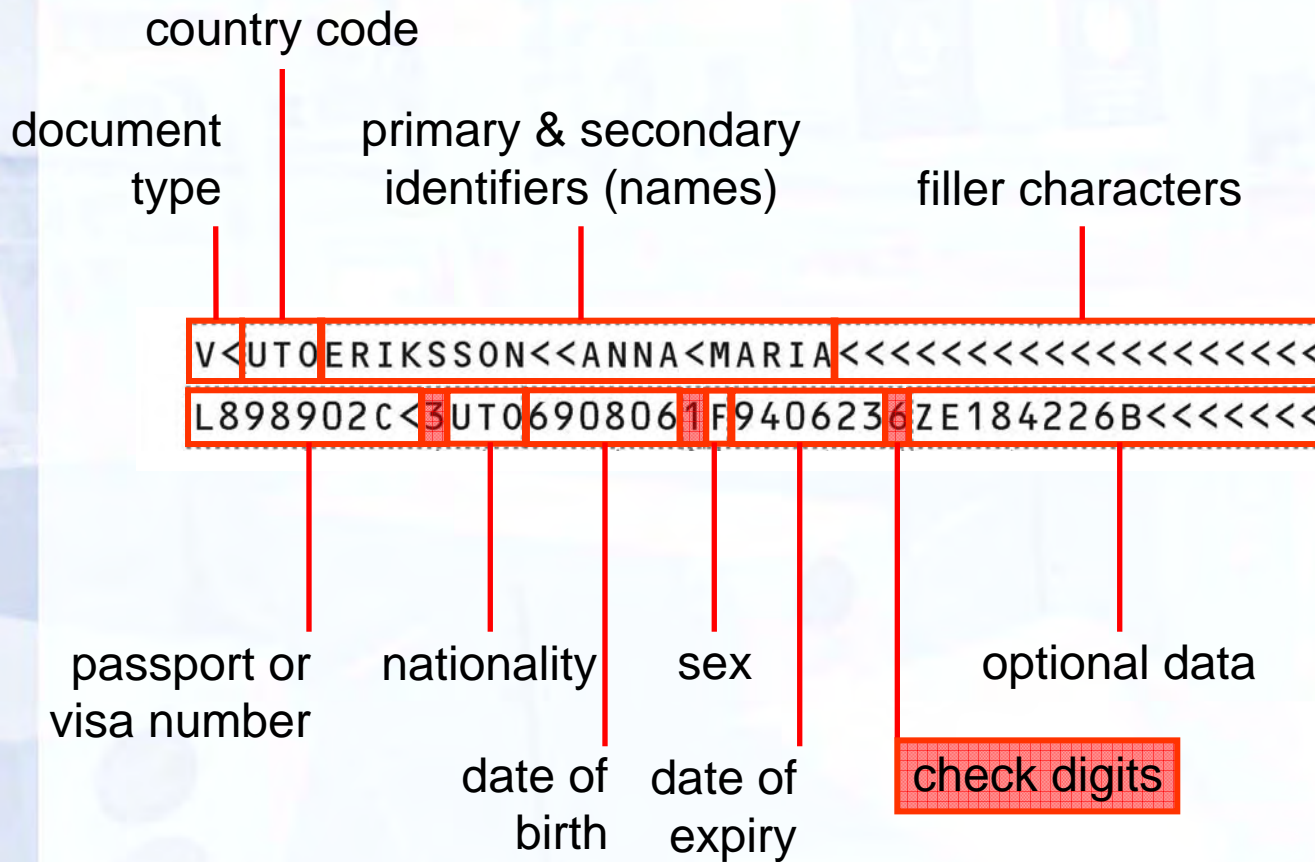




# Zone boundaries: MRV-A



## Machine-readable zone: MRV-A

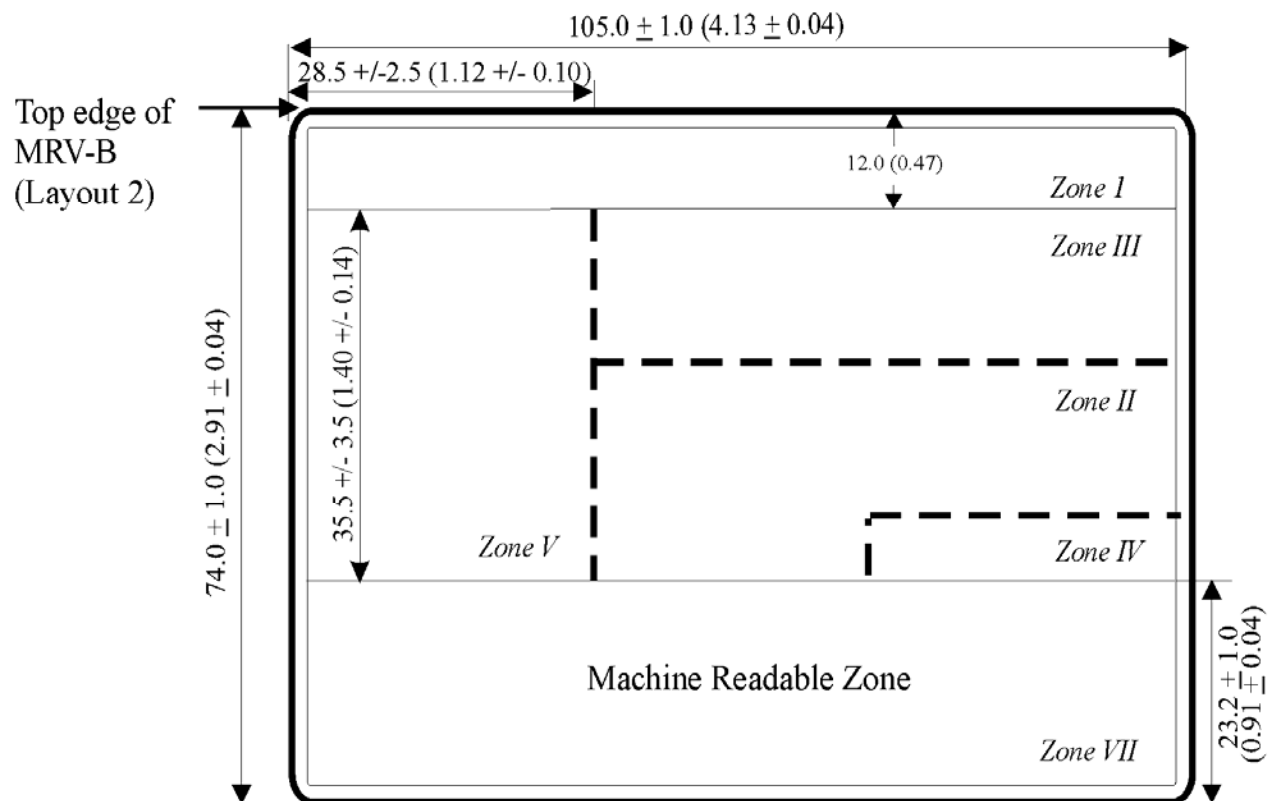


The image shows a sample MRV-B visa card for a country named "UTOPIA". On the left side of the card is a black and white portrait of a middle-aged man with short dark hair and thick-rimmed glasses, wearing a suit and tie. To the right of the photo, the word "UTOPIA" is printed in large bold letters at the top. Below it, there's a section for "Place of Issue / Lieu de délivrance" with the value "ZENITH". Next to that is "Valid from / Valable à partir de" with the date "10DEC 91". Further right is "Valid until / Valable jusqu'à" with the date "10DEC 96". Below the place of issue, it says "No. of Entries / Nombre d'entrées" with the value "MULTIPLE". To the right of that is "Document No. / Numéro de document" with the value "M123889546". Underneath, it specifies the "Type / Type" as "BUSINESS MULTIPLE". The next row contains "Surname / Nom" as "ERIKSSON" and "Given names / Prénoms" as "JOHN ARTHUR". The final row of personal data includes "Passport Number" as "L898901C", "Sex" as "M/M", "Date of Birth" as "07SEP 40", and "Nationality" as "XXX". At the bottom right, the "Issuing Officer" is listed as "John Doe". At the very bottom of the card, there are two lines of machine-readable text: "V<UTOERIKSSON<<JOHN<ARTHUR<<<<<<<<<<" and "L898901C<6XXX4009072.M9612109<<<<<<<<<<". A horizontal double-headed arrow below the card indicates a width of "105mm". A vertical double-headed arrow to the right of the card indicates a height of "74mm". The entire slide has a light blue background with faint architectural elements.





# Zone boundaries: MRV-B



# Machine-readable zone: MRV-B

The diagram illustrates the Machine-Readable Zone (MRV-B) for a passport or visa. It consists of two rows of data, each enclosed in a red dashed border. Red vertical lines connect specific fields in the data to their corresponding labels.

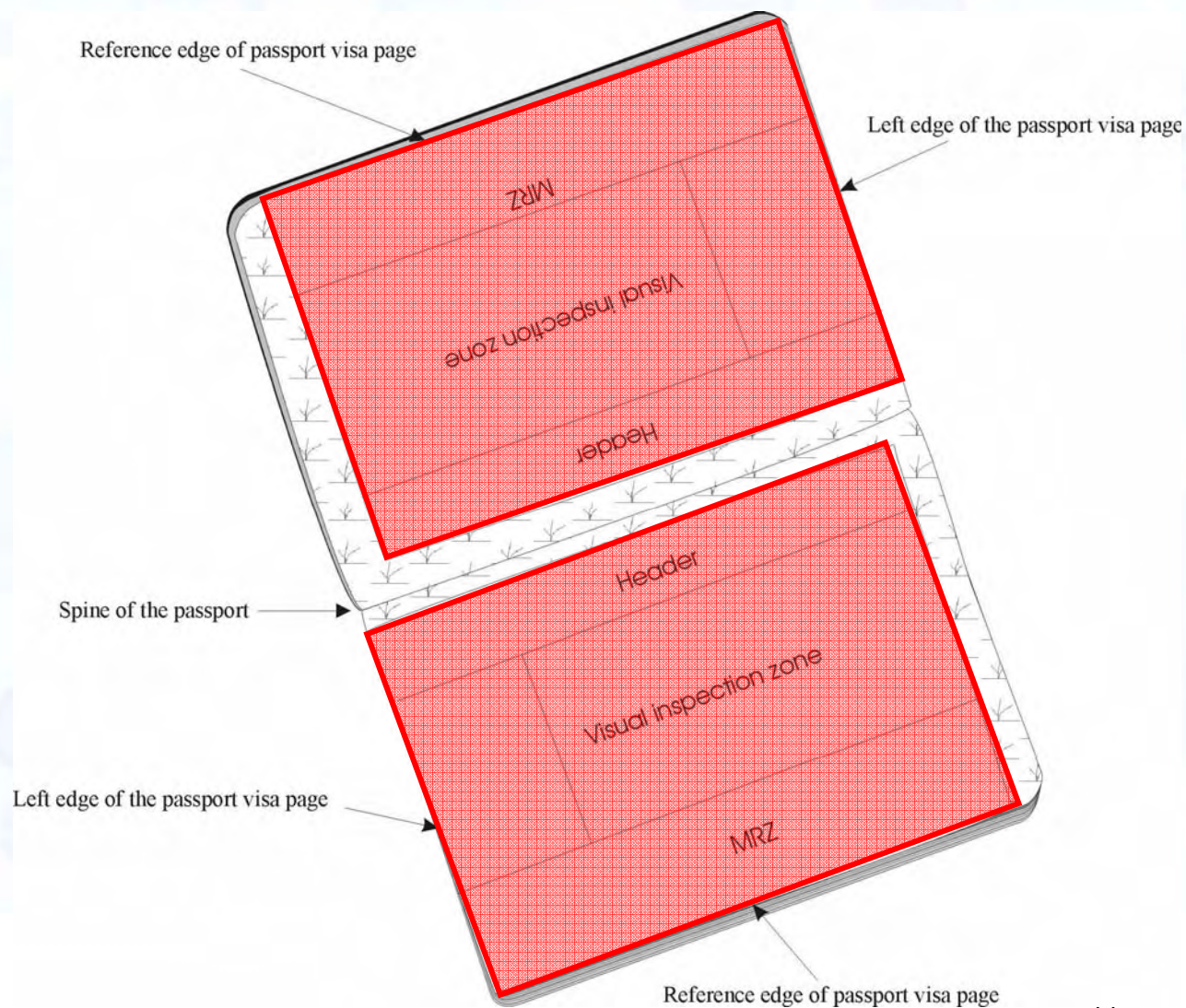
**Row 1 Data:** V<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<

**Row 2 Data:** L898902C<3UT06908061F9406236ZE184226

**Labels and Fields:**

- country code:** Points to the first character 'V'.
- document type:** Points to the second character '<'.
- primary & secondary identifiers (names):** Points to the entire name string 'UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<'.
- filler characters:** Points to the last eight characters '<<<<<<<<<<'.
- passport or visa number:** Points to the first seven characters of the second row 'L898902C'.
- nationality:** Points to the eighth character '3'.
- date of birth:** Points to the next six characters 'UT0690806'.
- sex:** Points to the seventh character '1'.
- date of expiry:** Points to the next five characters 'F940623'.
- optional data:** Points to the final three characters '6ZE184226'.
- check digits:** A red box highlights the last four characters '6ZE184226'.

# Visa positioning in passport





# European MRV



**European MRV**

**MULVISUM** A000000000

**GÜLTIG FÜR**  
**VALID FOR** SCHENGENER STAATEN

**VOM** 01-01-04 **BIS** 01-01-14  
**DU** **FROM** **UNTIL**

**ART DES VISUMS**  
**TYPE OF VISA** B **ANZAHL DER EINREISEN**  
**NUMBER OF ENTRIES** MUL **DAUER DES AUFTHALTS**  
**DURÉE DE SEJOUR** 30 **TAGE**  
**DURATION OF STAY** **JOURS**  
**DAYS**

**AUSGESTELLT IN**  
**DELIVRE A** VIENNA  
**ISSUED IN**

**AM** 01-01-04 **NUMMER DES REISEPASSES**  
**LE** **NUMERO DE PASSEPORT** 123456789  
**ON**

**NAME, VORNAME**  
**NOM, PRENOM** MUSTERFRAU BARBARA  
**SURNAME, NAME**

**ANMERKUNGEN**  
**REMARKS**

**SPECIMEN**

**AUT<<MUSTERFRAU<<BARBARA<<**

**1234567892AUT<<8405032F1401017<<<<<<**

00000000 00000000



# Part 3 – Official Travel Documents (cards)

- Interoperability needed
- National ID card / DL used for travel
- Standards as for ePassports
- Part 3 currently under revision in TAG/MRTD secretariat, DCFWG finished work





# Part 3 – Official Travel Documents (cards)

Currently many variations





# Example of td1 (ID1-sized card)

53.98mm

Front

UTOPIA

UTO-MRTD



Name/*Nom*

STEVENSON, PETER


Sex/ Nationality/ Date of Birth/

*Sexe Nationalité Date de naissance*

M/M UTO 12 JUL/JUIL 34

Doc No/*N° du Doc* Expiry/*Expiration*

D23145890 12 JUL/JUIL 95




85.60mm

Rear

CIUTOD231458907A123X5328434D23

3407127M9507122UTO<<<<<<<<<<6

STEVENSON<<PETER<<<<<<<<<<<<<<





[illegible]

# Example of td2 (ID2-sized card)

The diagram illustrates an ID2-sized card (td2) with a width of 105mm and a height of 74mm. The card contains the following information:

- COUNTRY:** UTOPIA
- TITLE:** OFFICIAL TRAVEL DOCUMENT / Document Officiel de Voyage
- PHOTO:** A portrait photo of a man.
- SURNAME/Nom:** STEVENSON
- GIVEN NAMES/Prenoms:** PETER
- NATIONALITY/Nationalité:** UTO
- DATE OF BIRTH/Date de naissance:** 12 JUL/JUIL 34
- SEX/Sexe:** M/M
- DOCUMENT NO./Numéro de document:** D23145890
- VALID UNTIL/Valable jusqu'au:** 12 JUL/JUIL 95
- SIGNATURE:** A handwritten signature.

The card also features a machine-readable format at the bottom:

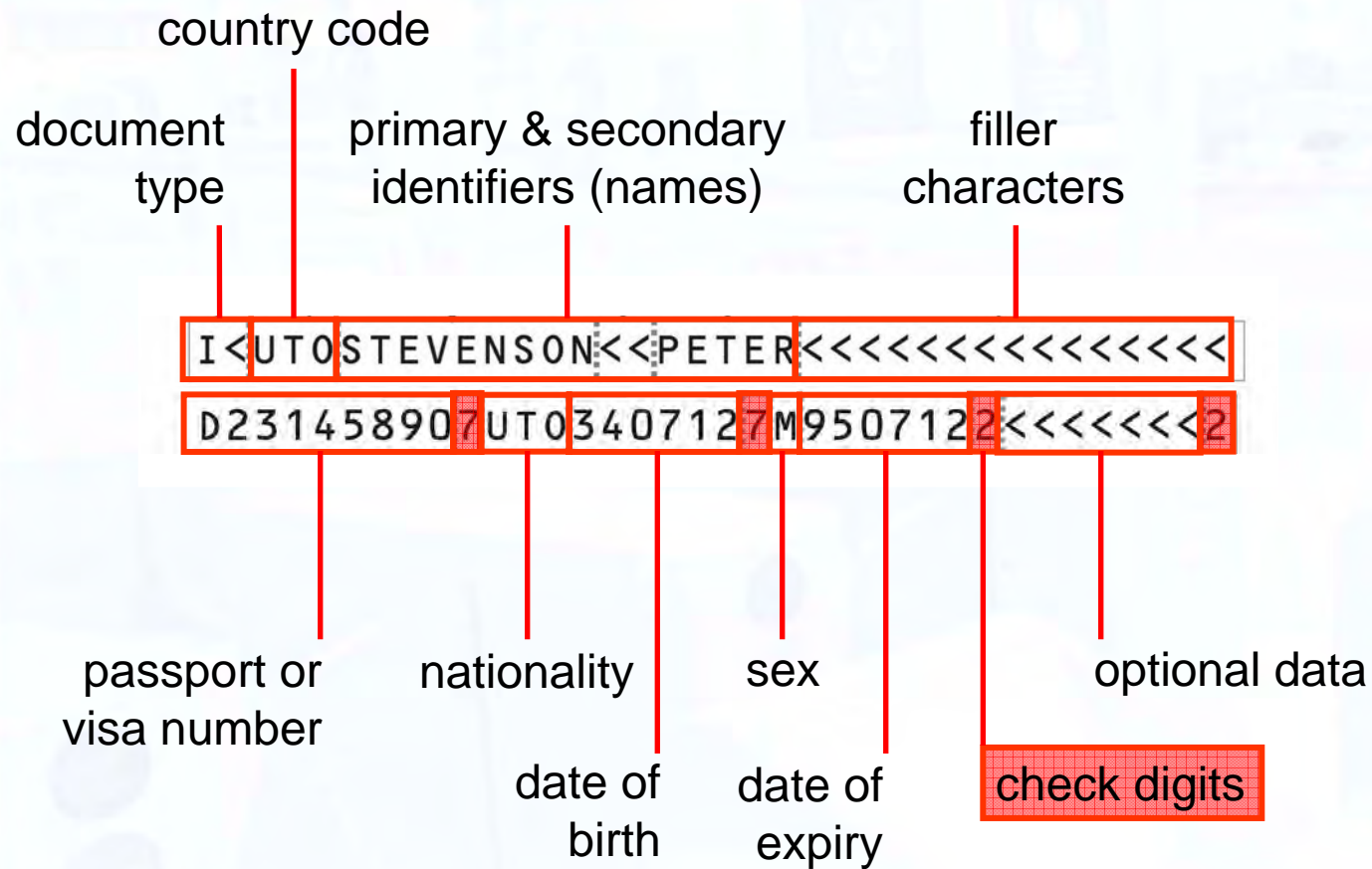
I<UTOSTEVENSON<<PETER<<<<<<<<<<<<<<  
D231458907UT03407127M9507122<<<<<<<2







# Machine-readable zone: td2



# Current 9303 Part 3

- Options for expansion of machine-readable data storage:
  - Bar codes
  - Magnetic stripes
  - Integrated circuit with contacts
  - Contactless integrated circuits
  - Optical memory



## Third Edition 9303 Part 3:

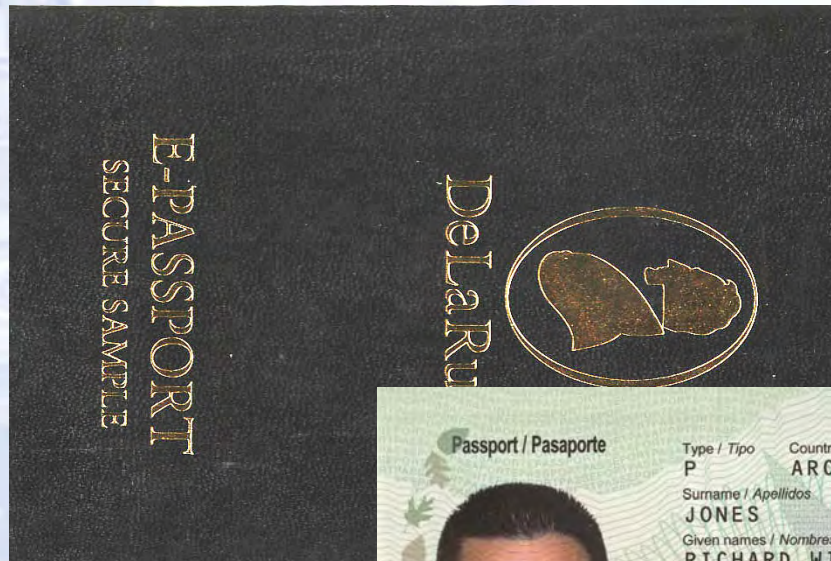
### ➤ Options for expansion of machine-readable data storage:

- ~~– Bar codes~~
- ~~– Magnetic stripes~~
- ~~– Integrated circuit with contacts~~
- Contactless integrated circuits
- ~~– Optical memory~~



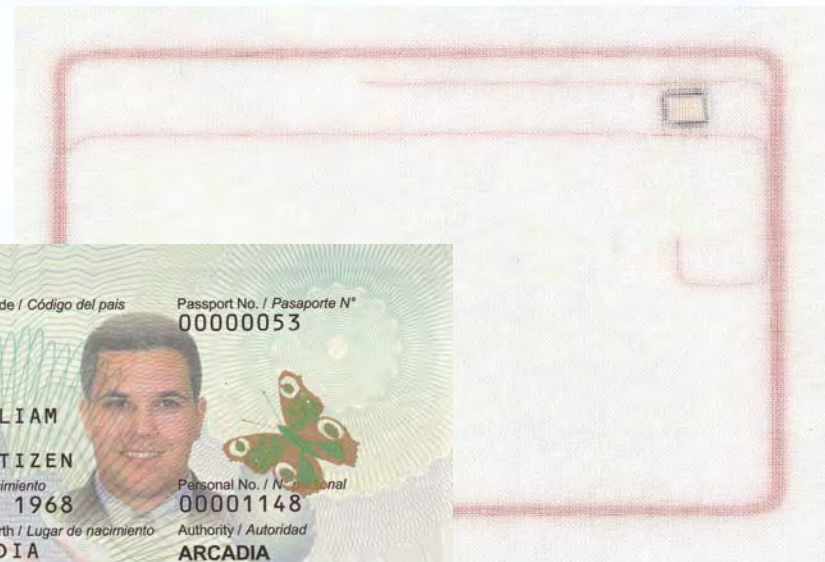


# Next generation MRP: smart, with biometrics & chip



Arial

Chip



# ICAO Blueprint

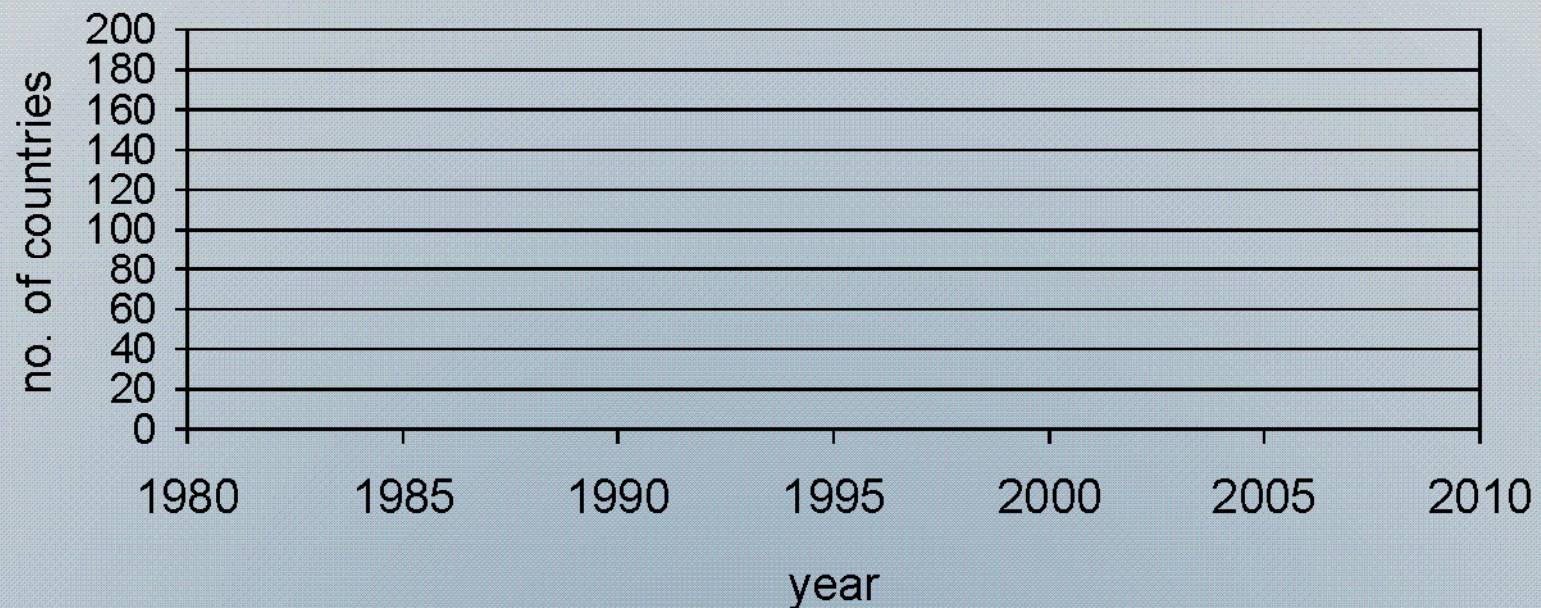


- Facial image
  - Finger Print
  - Iris
- RF Chip (min 32K)
- LDS
- PKI





# Growth (no. of countries)



MRP

Digital Imaging

eMRP

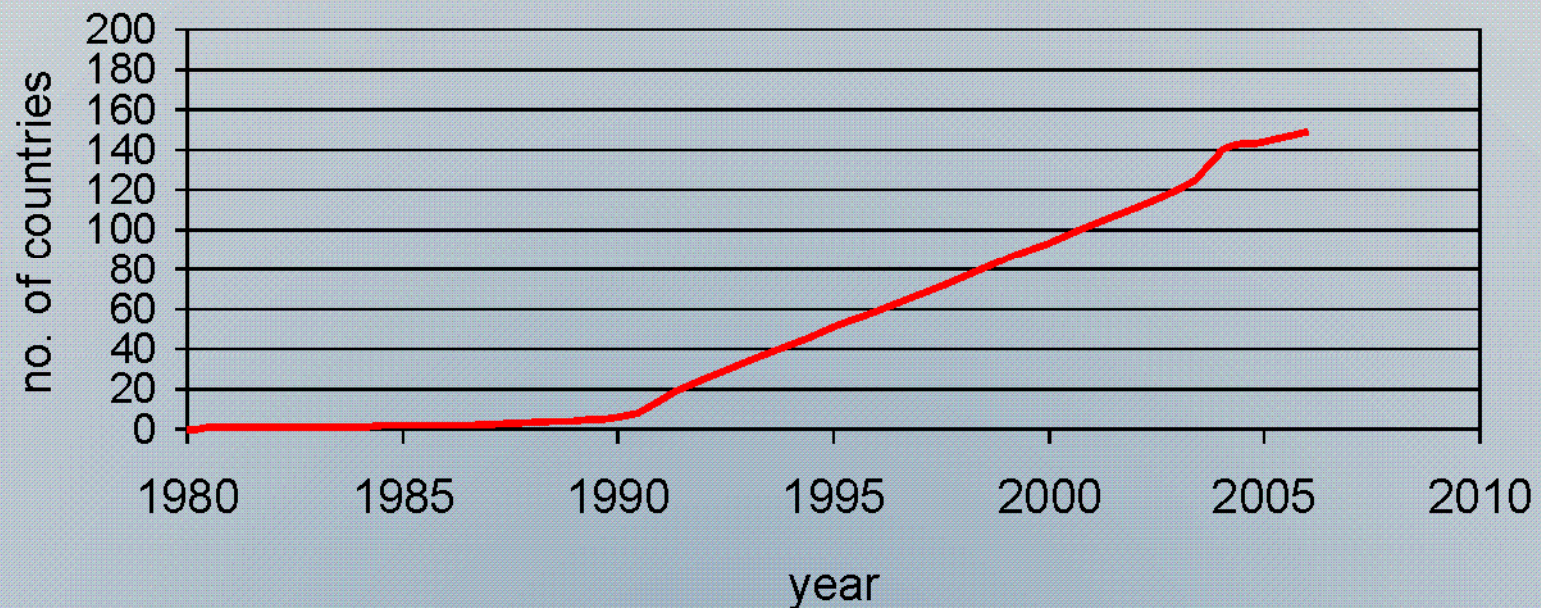
MRP est

Digital Imaging est

eMRP est



# Growth (no. of countries)



MRP

Digital Imaging

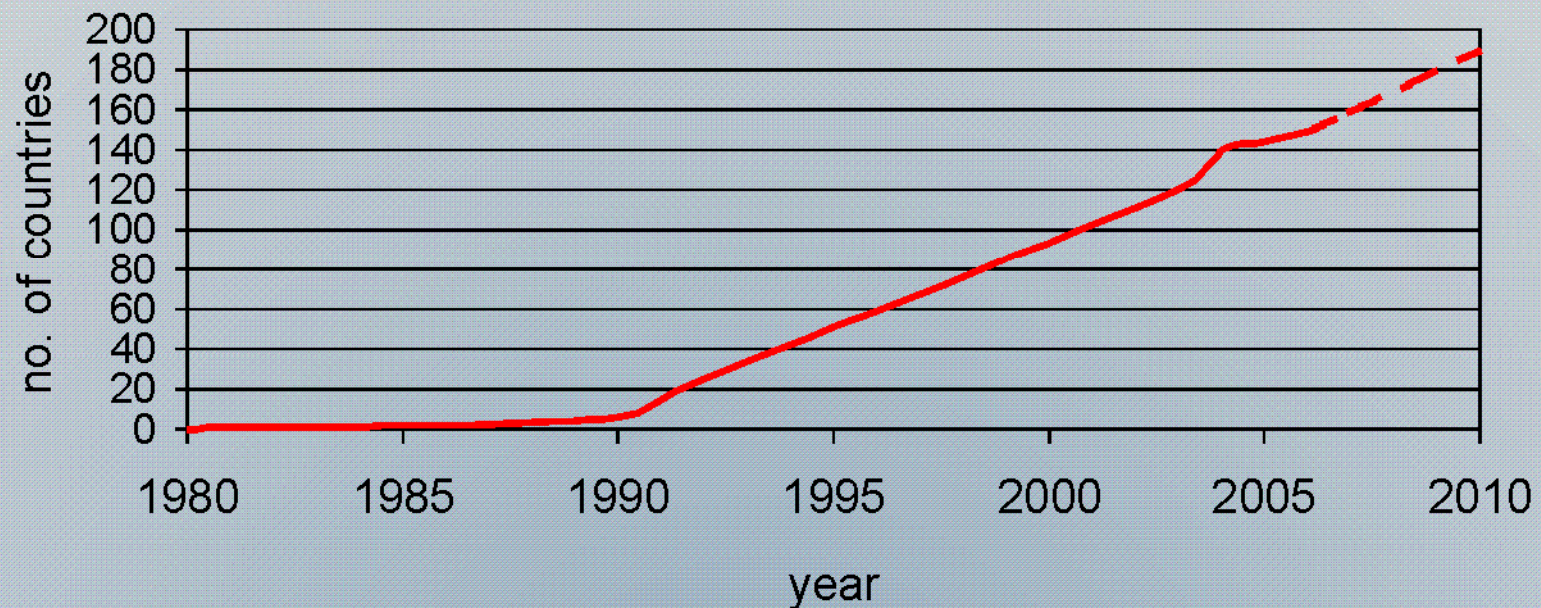
eMRP

MRP est

Digital Imaging est

eMRP est

# Growth (no. of countries)



MRP

Digital Imaging

eMRP

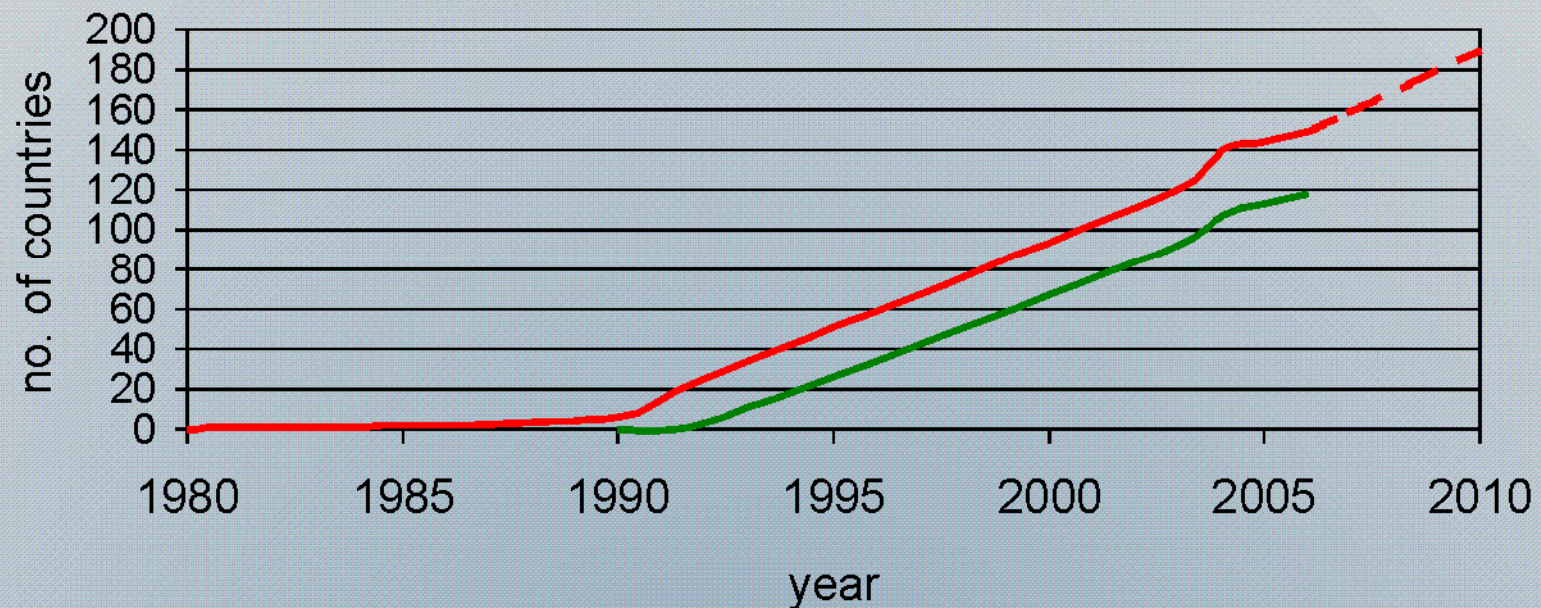
MRP est

Digital Imaging est

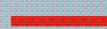
eMRP est



# Growth (no. of countries)



MRP



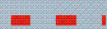
Digital Imaging



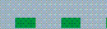
eMRP



MRP est



Digital Imaging est

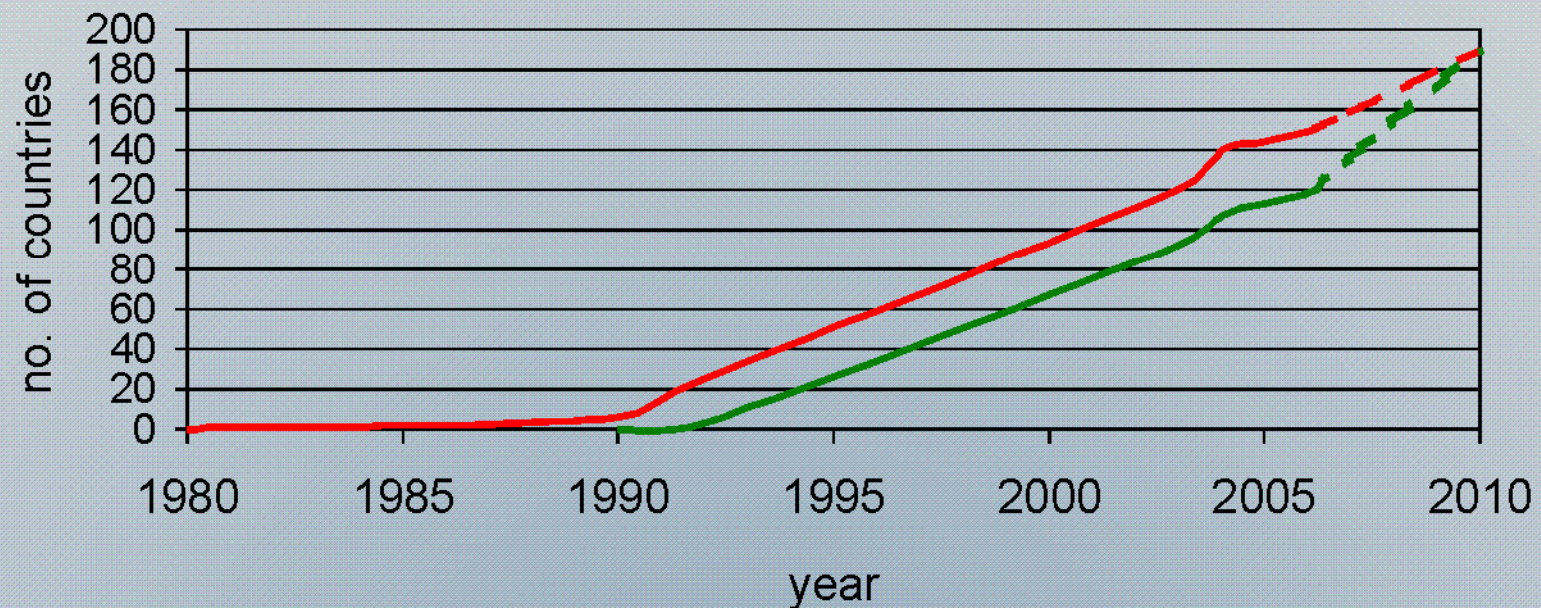


eMRP est





# Growth (no. of countries)



MRP

Digital Imaging

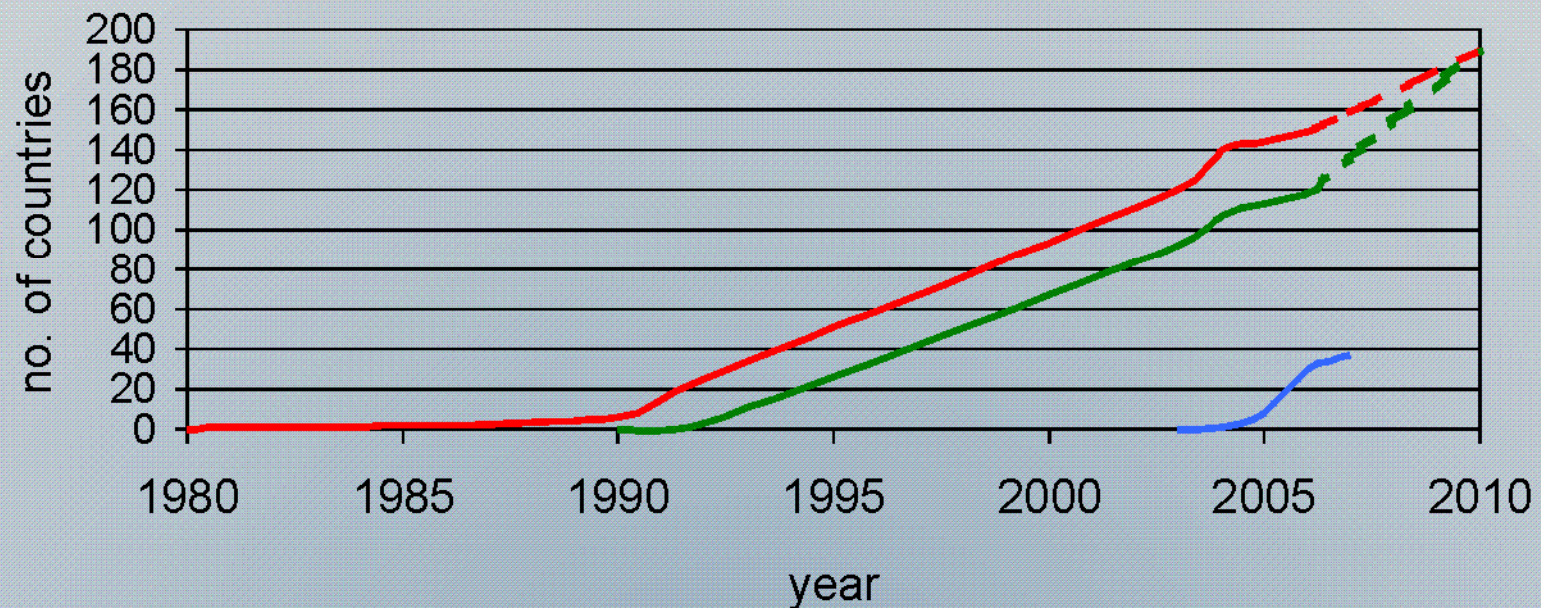
eMRP

MRP est

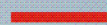
Digital Imaging est

eMRP est

# Growth (no. of countries)



MRP



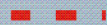
Digital Imaging



eMRP



MRP est



Digital Imaging est

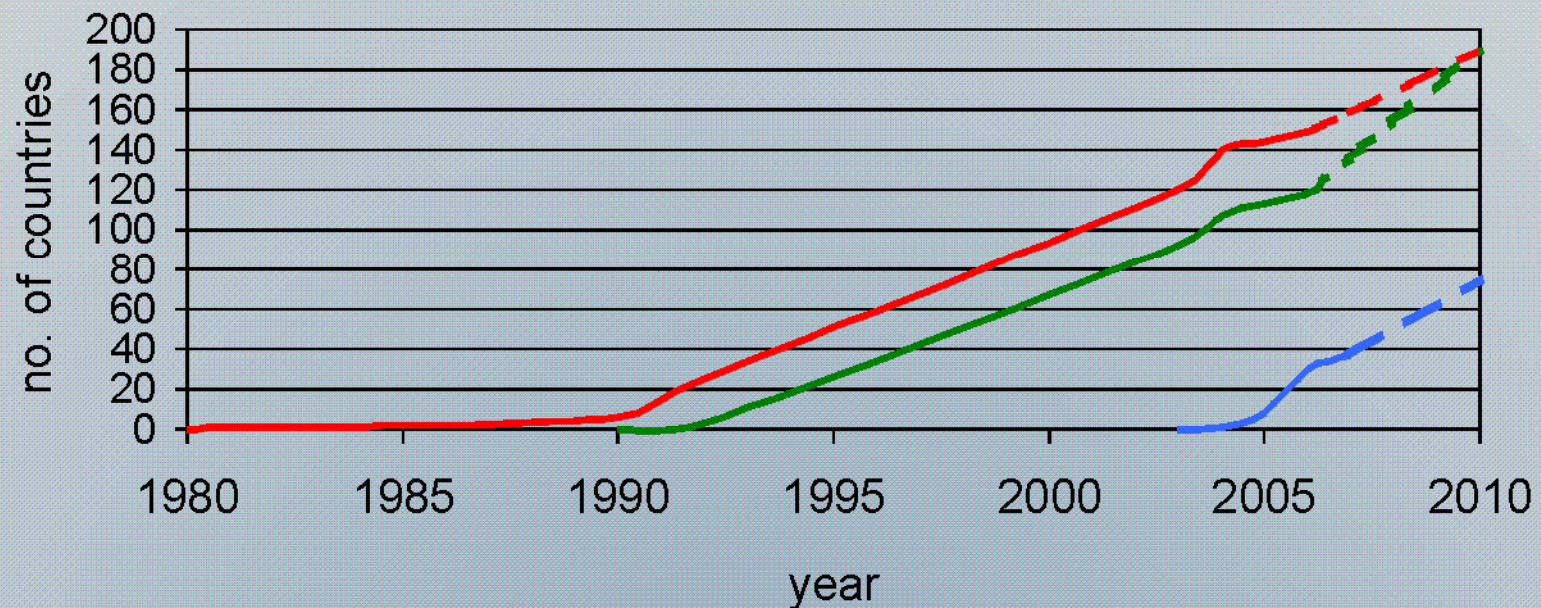


eMRP est





# Growth (no. of countries)



MRP

Digital Imaging

eMRP

MRP est

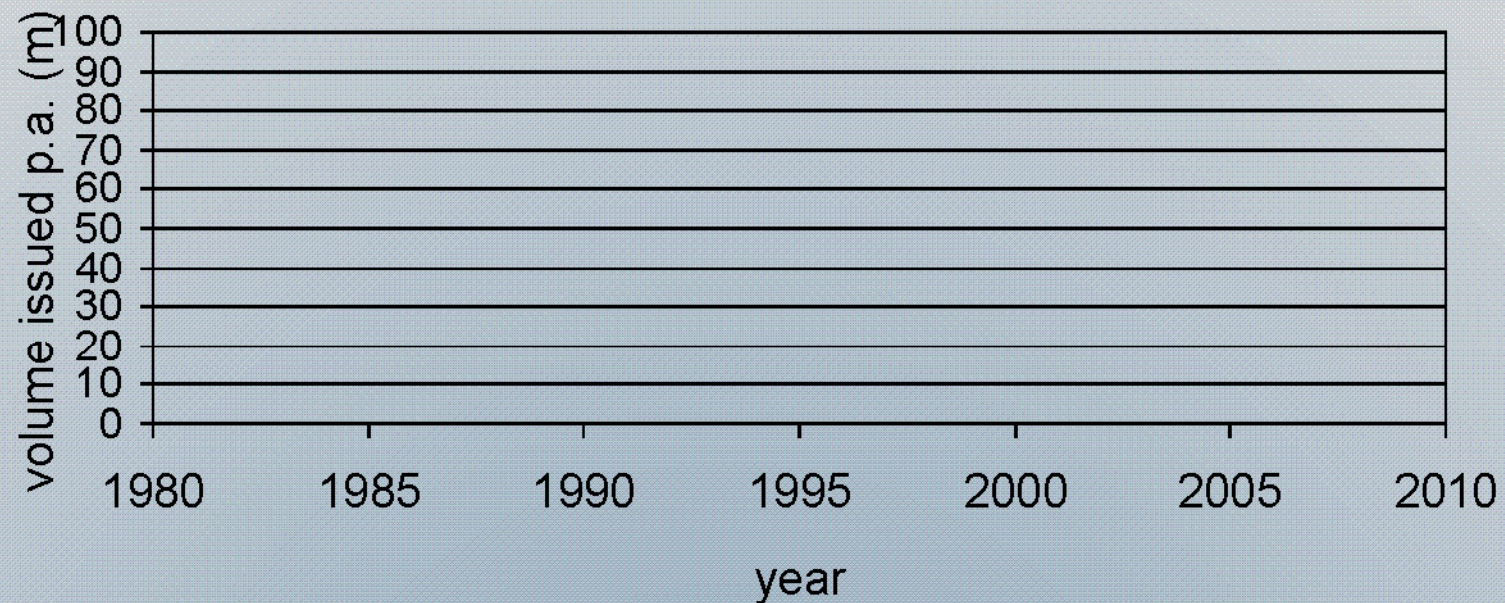
Digital Imaging est

eMRP est





# Growth (Volume issued p.a.)



MRP



Digital Imaging



eMRP



MRP est



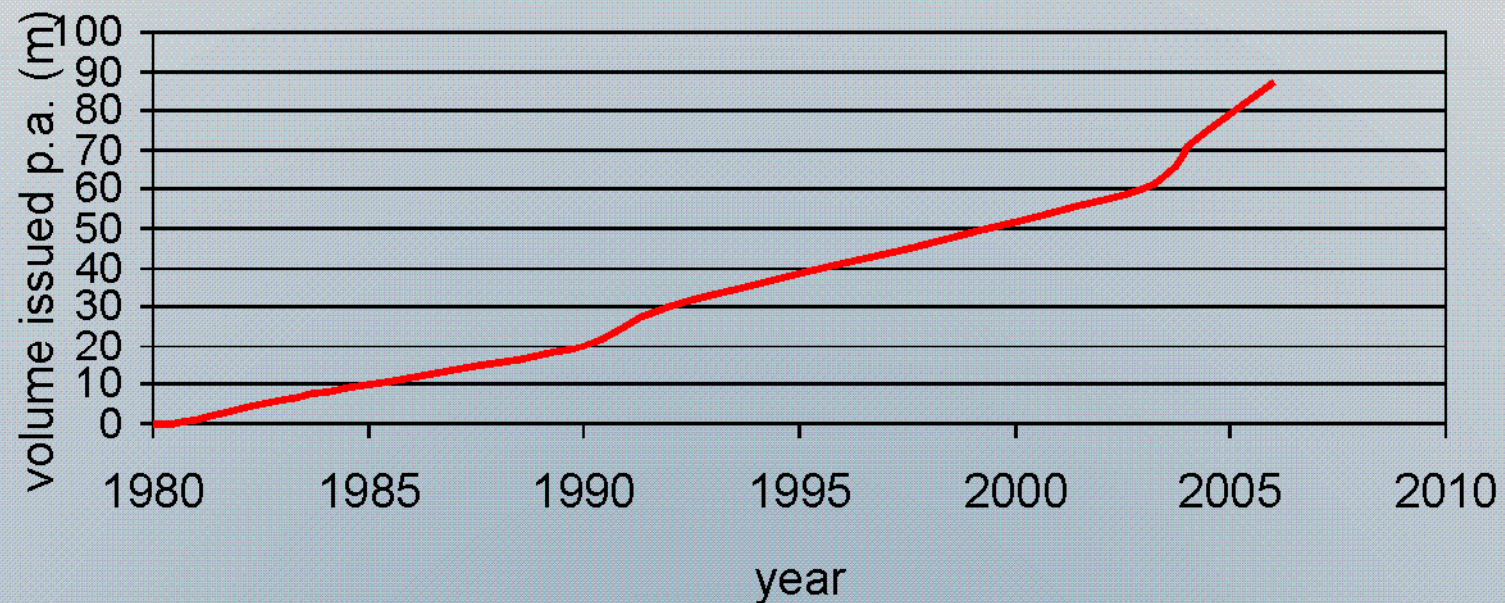
Digital Imaging est



eMRP est



# Growth (Volume issued p.a.)



MRP



Digital Imaging



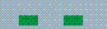
eMRP



MRP est



Digital Imaging est

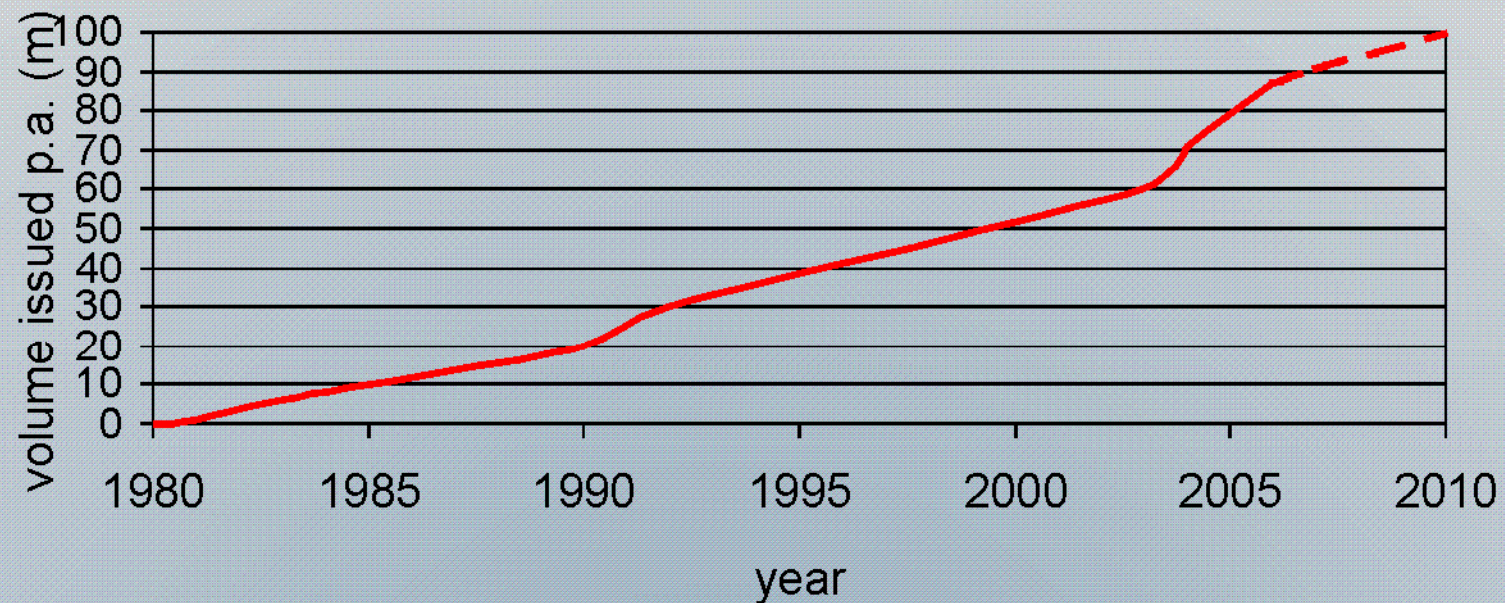


eMRP est





# Growth (Volume issued p.a.)



MRP



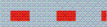
Digital Imaging



eMRP



MRP est



Digital Imaging est

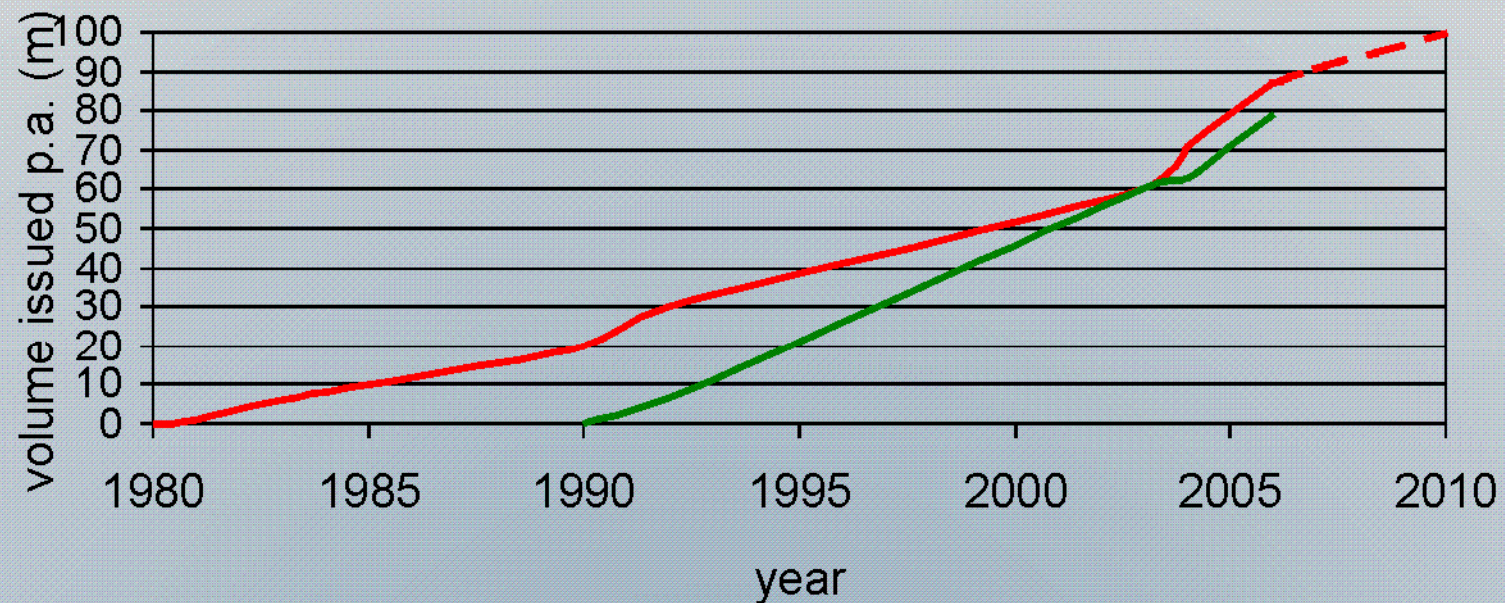


eMRP est





# Growth (Volume issued p.a.)



MRP

Digital Imaging

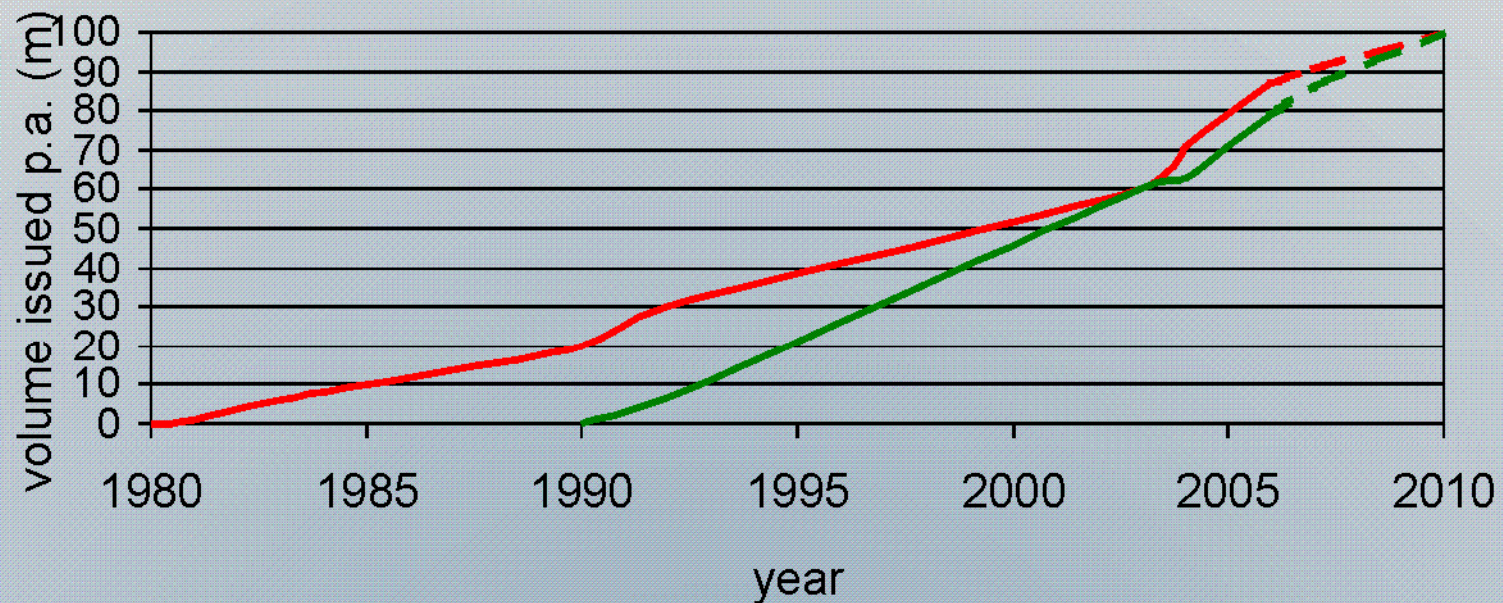
eMRP

MRP est

Digital Imaging est

eMRP est

# Growth (Volume issued p.a.)



MRP

Digital Imaging

eMRP

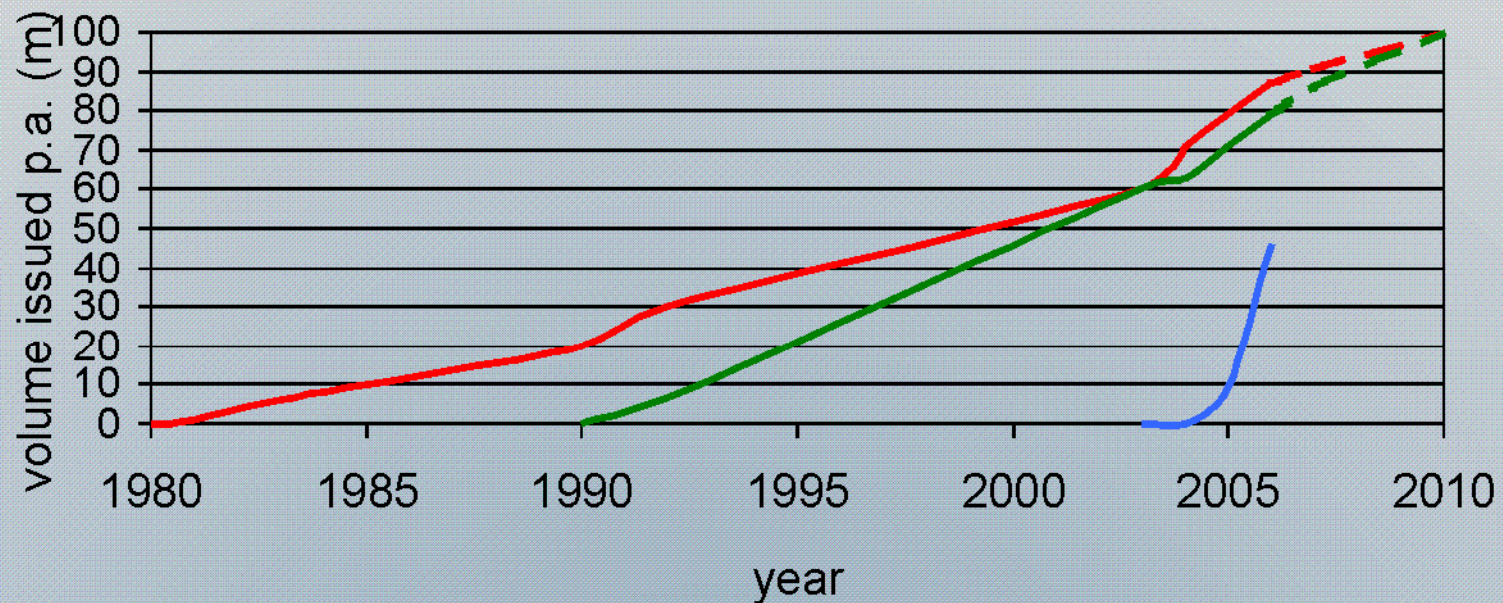
MRP est

Digital Imaging est

eMRP est



# Growth (Volume issued p.a.)



MRP



Digital Imaging



eMRP



MRP est



Digital Imaging est

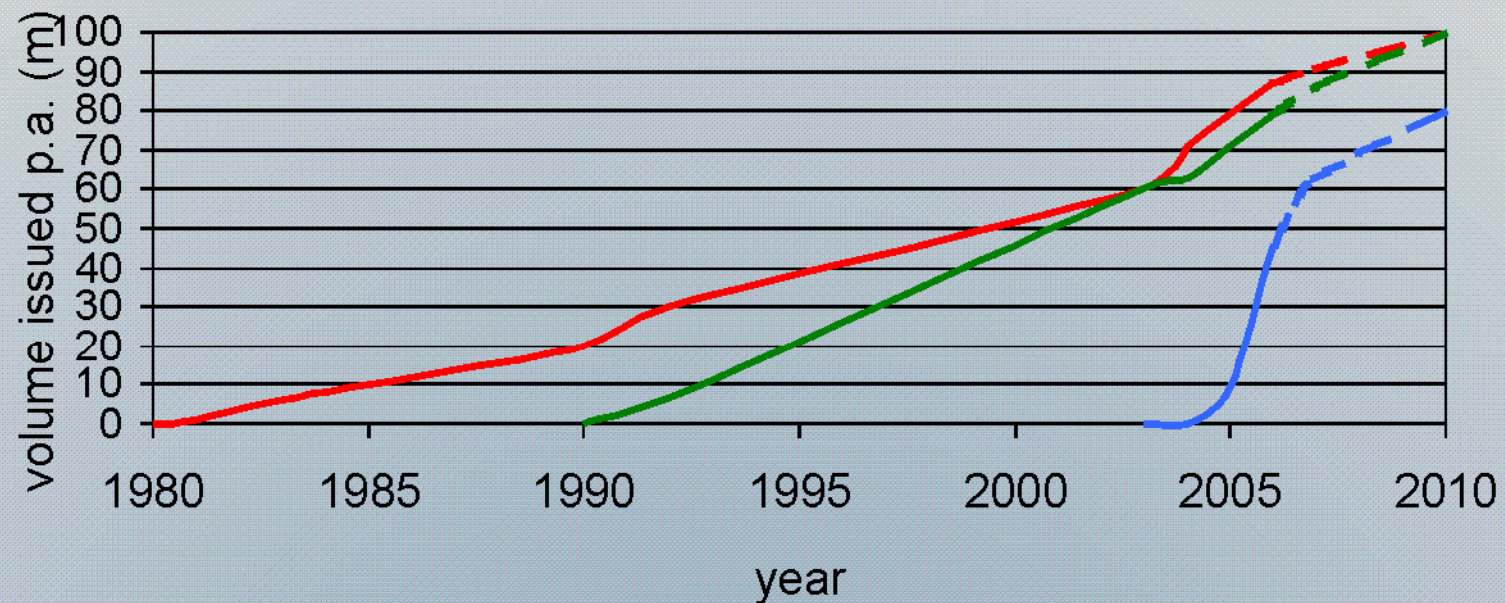


eMRP est





# Growth (Volume issued p.a.)



MRP

Digital Imaging

eMRP

MRP est

Digital Imaging est

eMRP est

# MRP Summary

- 139 out of 189 countries issuing MRPs
- 50 countries still not issuing MRPs
  - 19 of these 50 countries have tenders or contracts in place
- 31 countries still to upgrade to MRP by 2010
- No non MRPs after 2015





# ePassport Summary

- 2007 - 38 countries now issuing ePassports
  - Volume 56 million p.a. out of total of 101 million
- 2008 - An additional 15 countries with an additional volume of 23 million ePassports being issued by the end of 2008
- **Total of 53 countries out of 189**
- **Total Annual volume 79 million out of 101 million**



# Planning for Introduction of MRTD & ePassports

- Central or decentralised issuing
- Personalisation technology – location of chip
- Embassy issue - repatriation
- Emergency issue - ETDs
- Validity of ePassports – 5 or 10 years
- Image capture - Live
- Second biometric - EU
- Waste levels – cost
- Level of security





# Centralised v Decentralised Considerations

## ➤ Centralised

- Good security
- Less expensive
  - Less capital equipment
- Poor customer service
- Embassy issue
- Emergency issue
- Possible political constraints

## ➤ Decentralised

- Security issues
  - Movement of blanks
  - More difficult audit trail
  - Monitoring staff
- Cost
  - equipment cost
  - staff cost
  - accommodation costs
- Good customer service



# Personalisation

- Dependant on central or decentralised issue
- Options:
  - Laser engraving
  - D2T2
  - Ink jet
  - Laser toner





# Emergency Passports

- To enable continuation of journey
  - Comparable security
  - Validity - more than 6 months less than 12
  - Normally - 8 or 12 pages
  - Colour of cover material



# ICAO Standards for Security

- Informative appendix 1 to section 3
  - document security
  - includes glossary of terms
- Informative appendix 2 to sect 3
  - Machine-assisted document security verification. Location of features
- Informative appendix 3 to sect 3:
  - Security of the issue process





# Data page – importance

- Data page is the most important page in a passport
  - the most examined
  - contains all the personal data
  - requires the most protection against counterfeit and fraudulent alteration



# Data page – under pressure

- It must provide protection against counterfeit and fraud, especially from desk-top publishing
- It must meet the needs of immigration – easily and quickly verifying the holder
- It must be machine readable - OCR & chip





# Security features

- Security must be multi-layer and the most important are the level 1 features
- The security features need to protect the holder's photograph
- Important not to obstruct the MRZ
- Security features can be included on the front and back



**Data page – inside page**



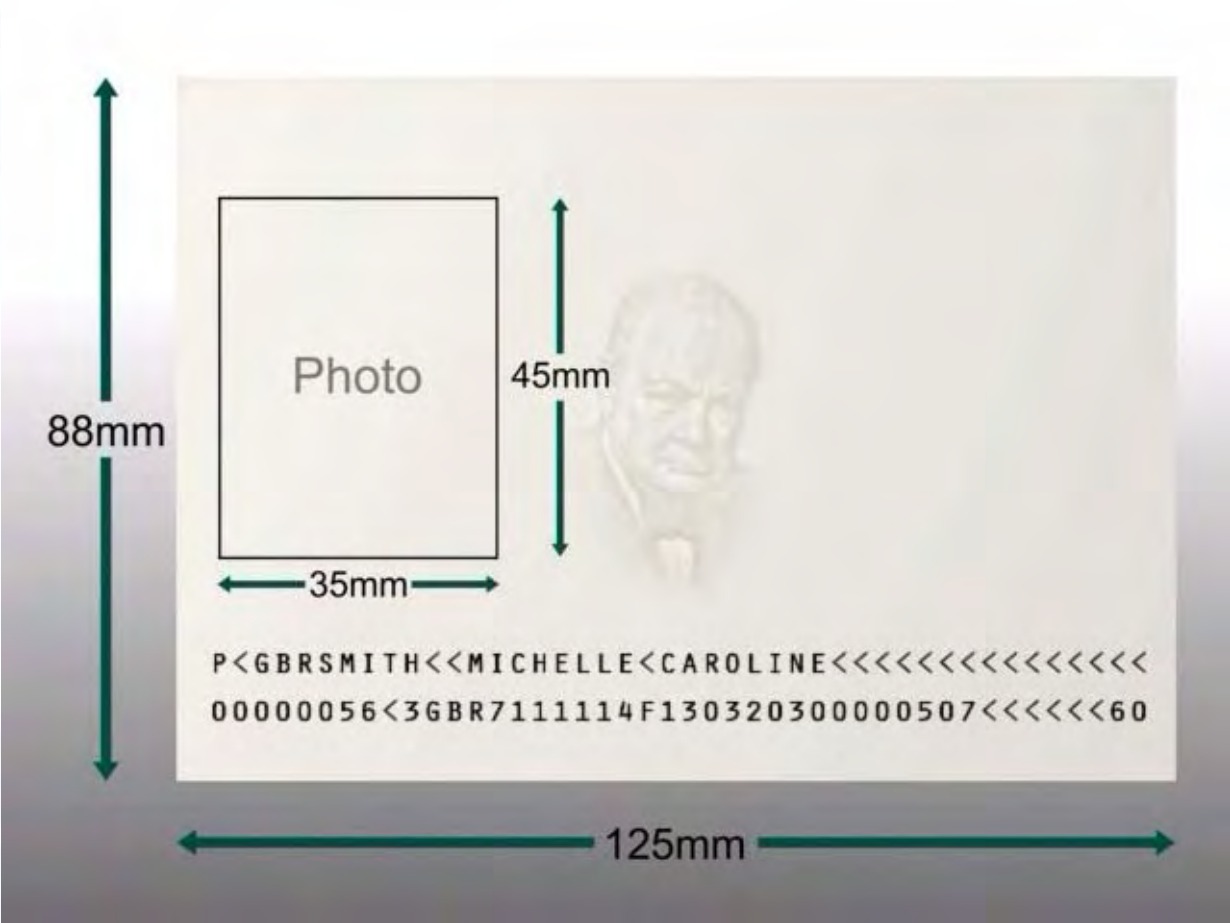
# Page layout & picture outline







# Layers



# Elements



# Elements

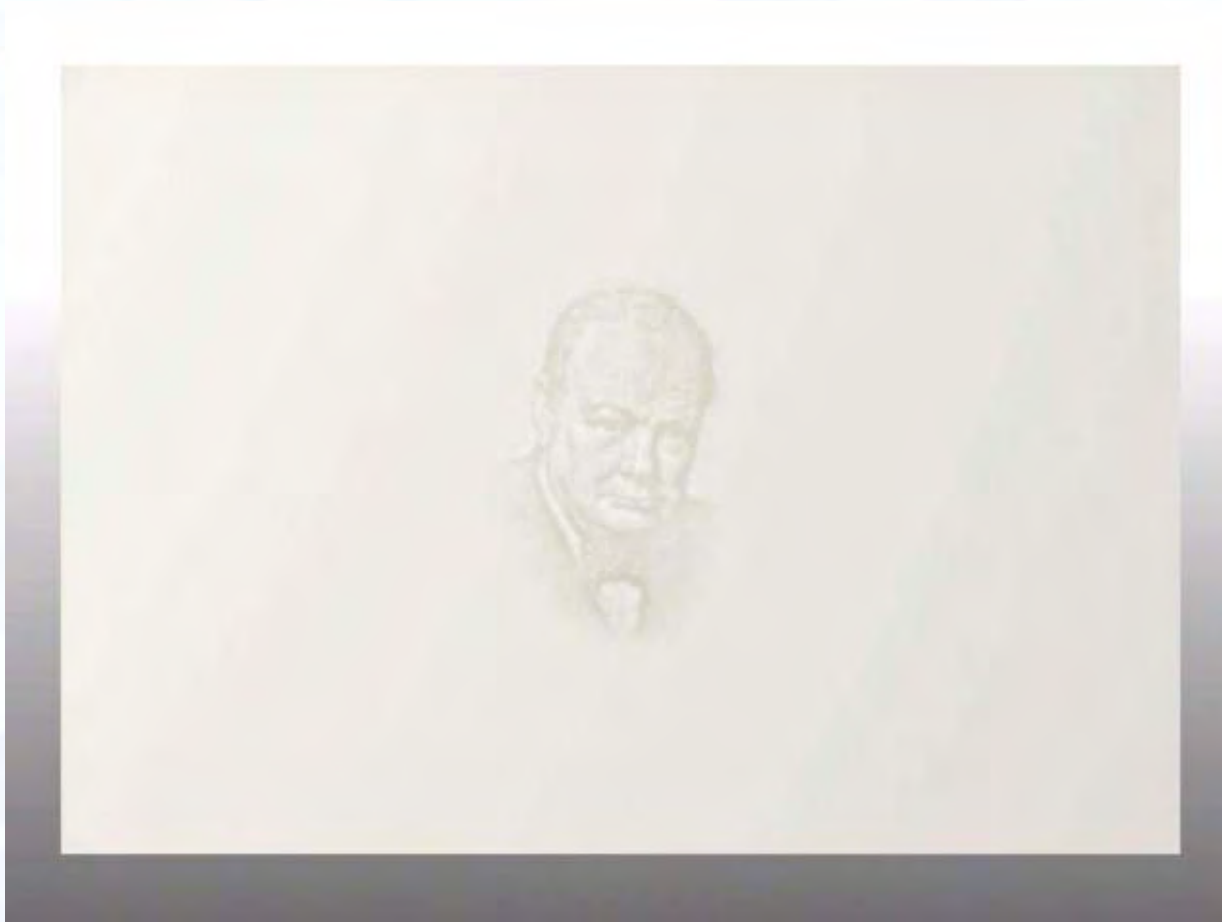




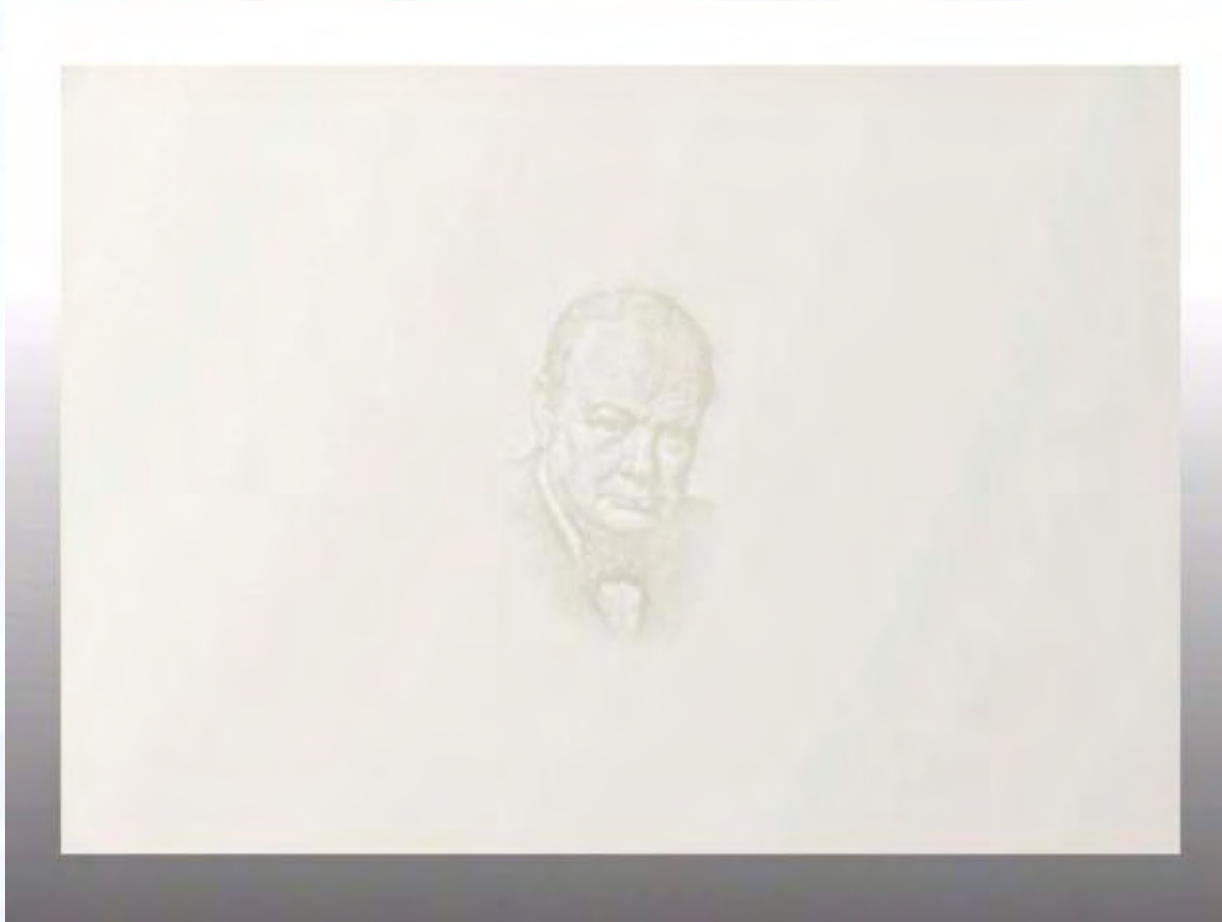
# Elements



# Paper substrate: UV dull

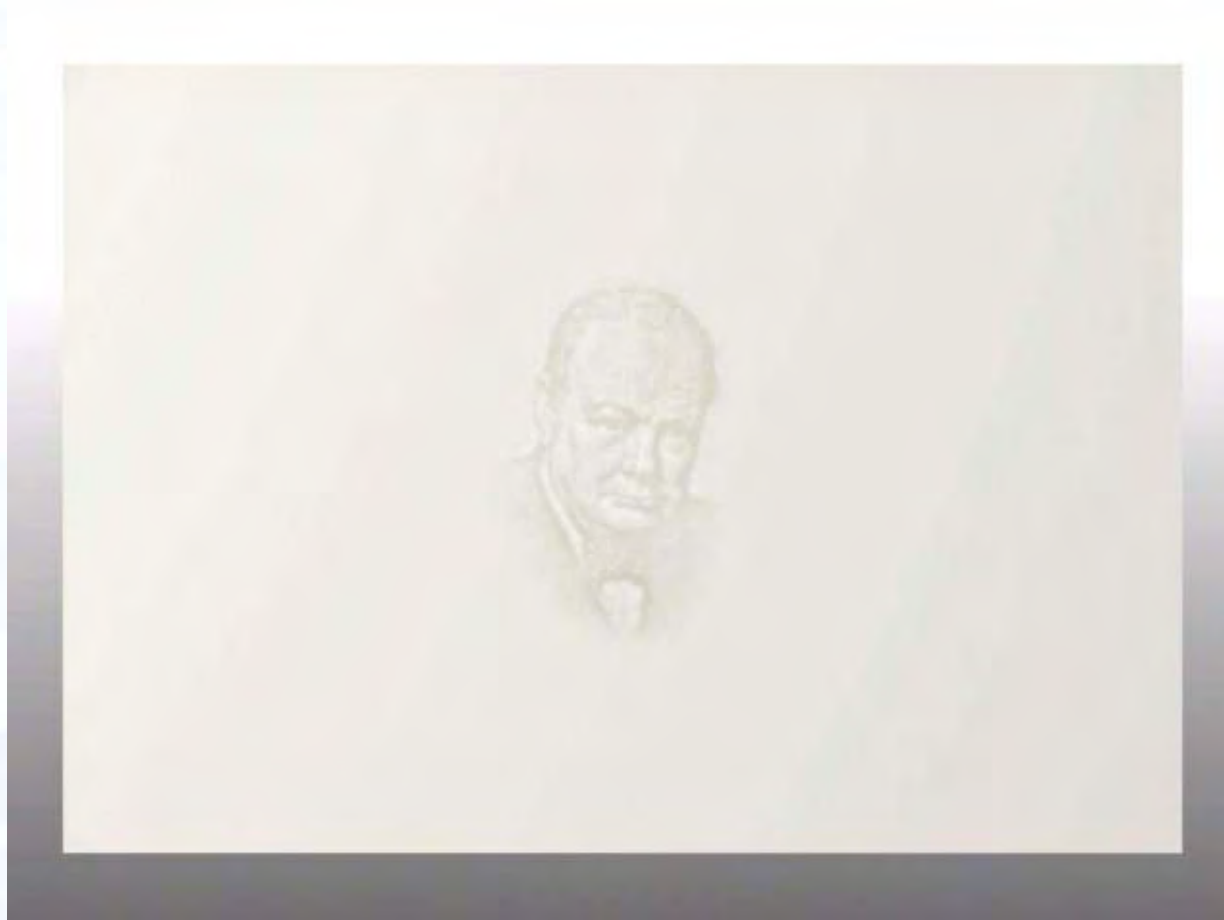


# Chemical sensitisation

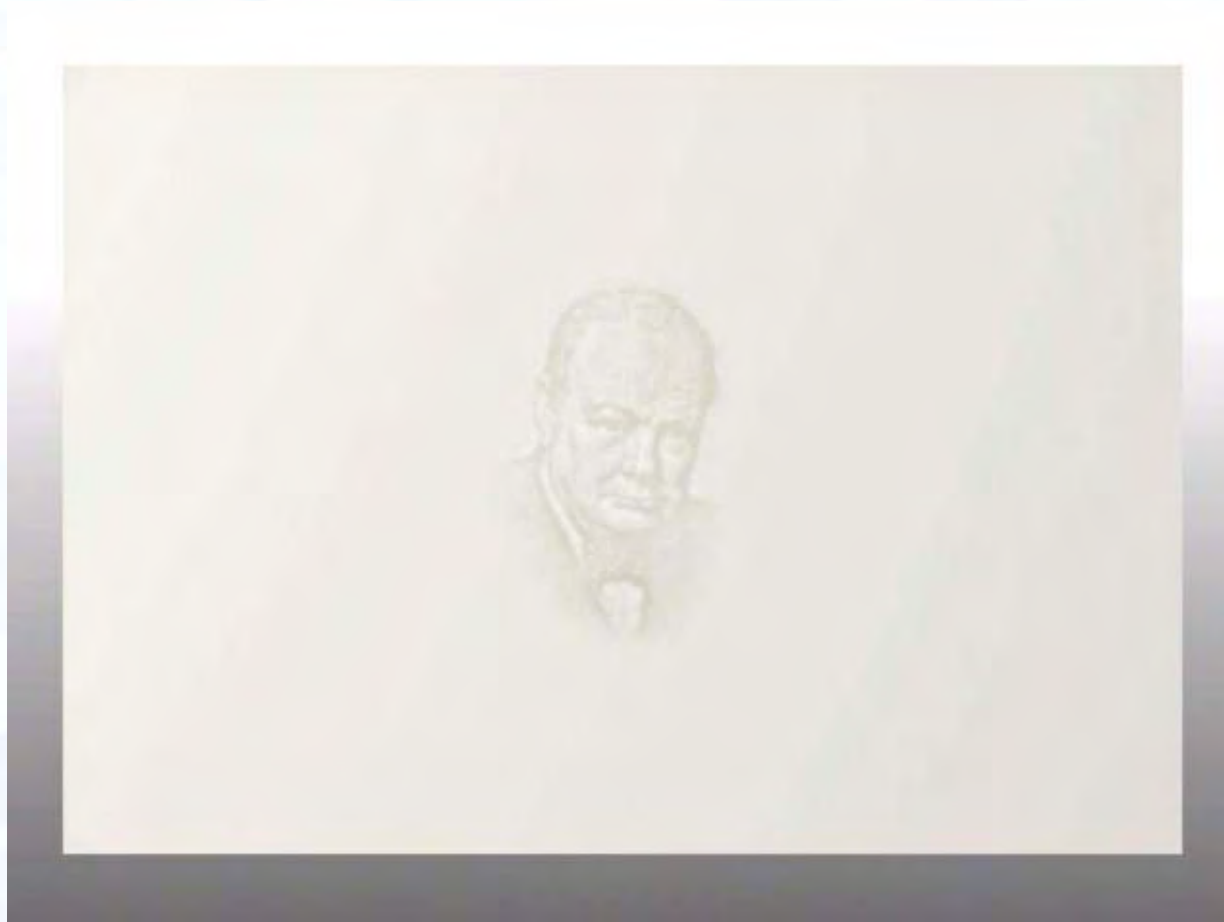




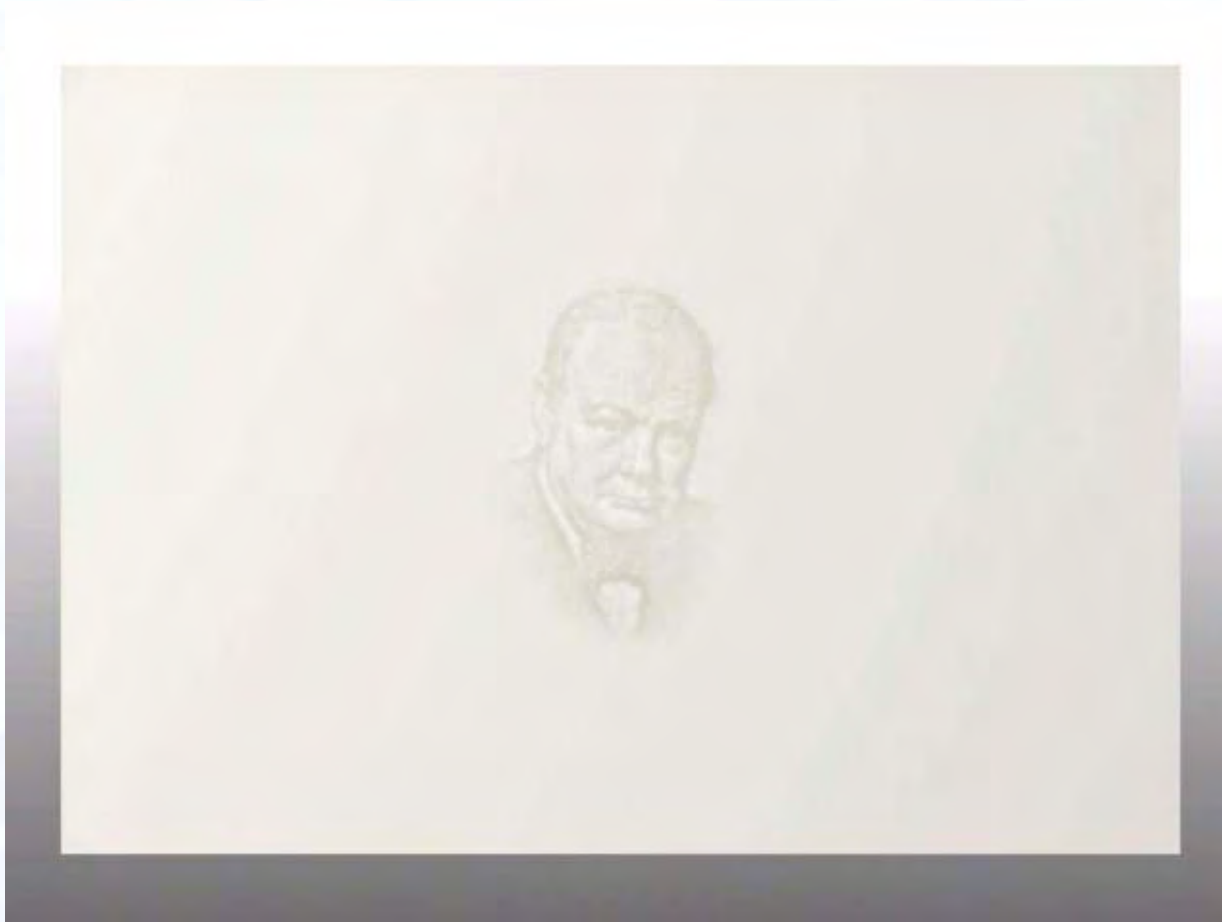
# Cylinder mould watermark



# Fibres & planchettes



# Thread

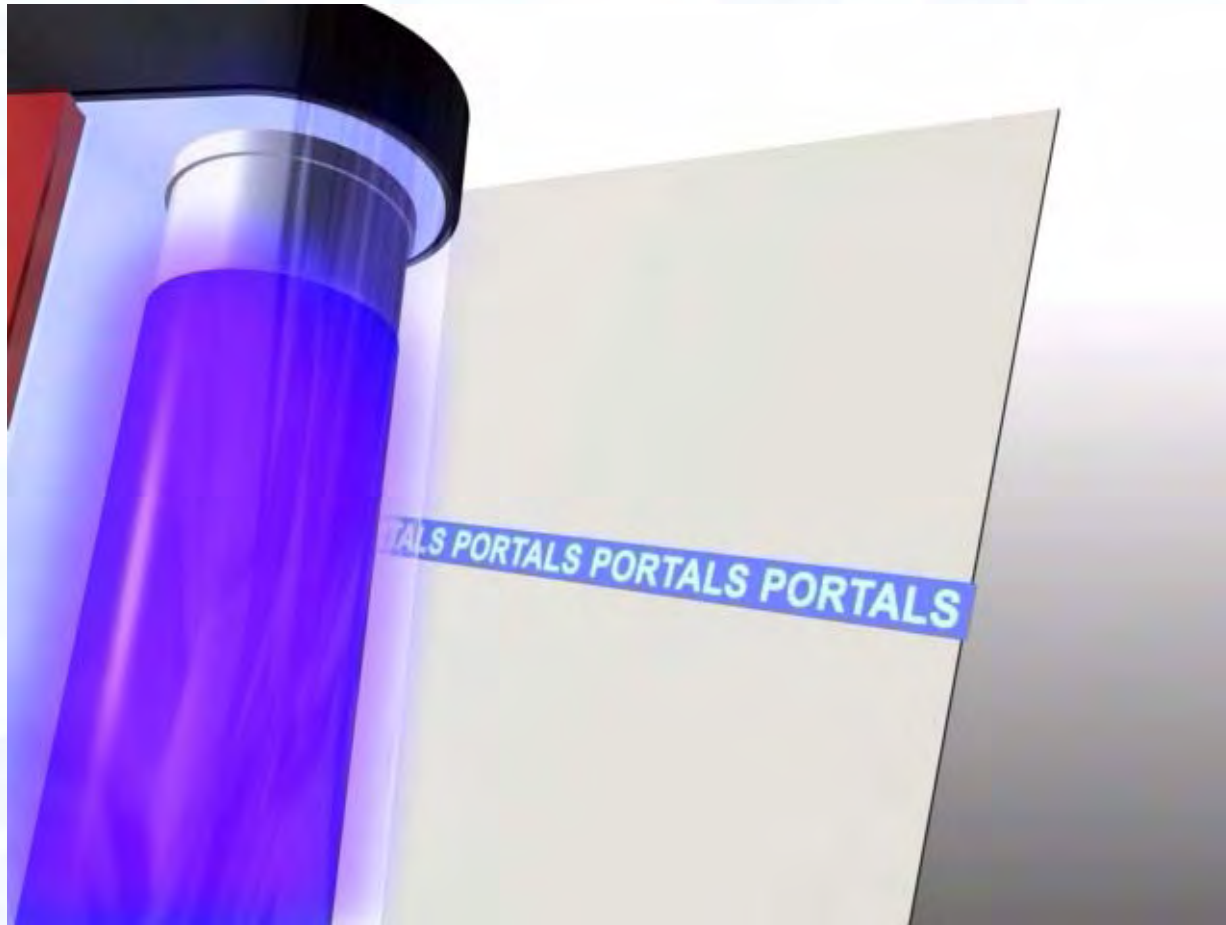




# Thread



# Thread



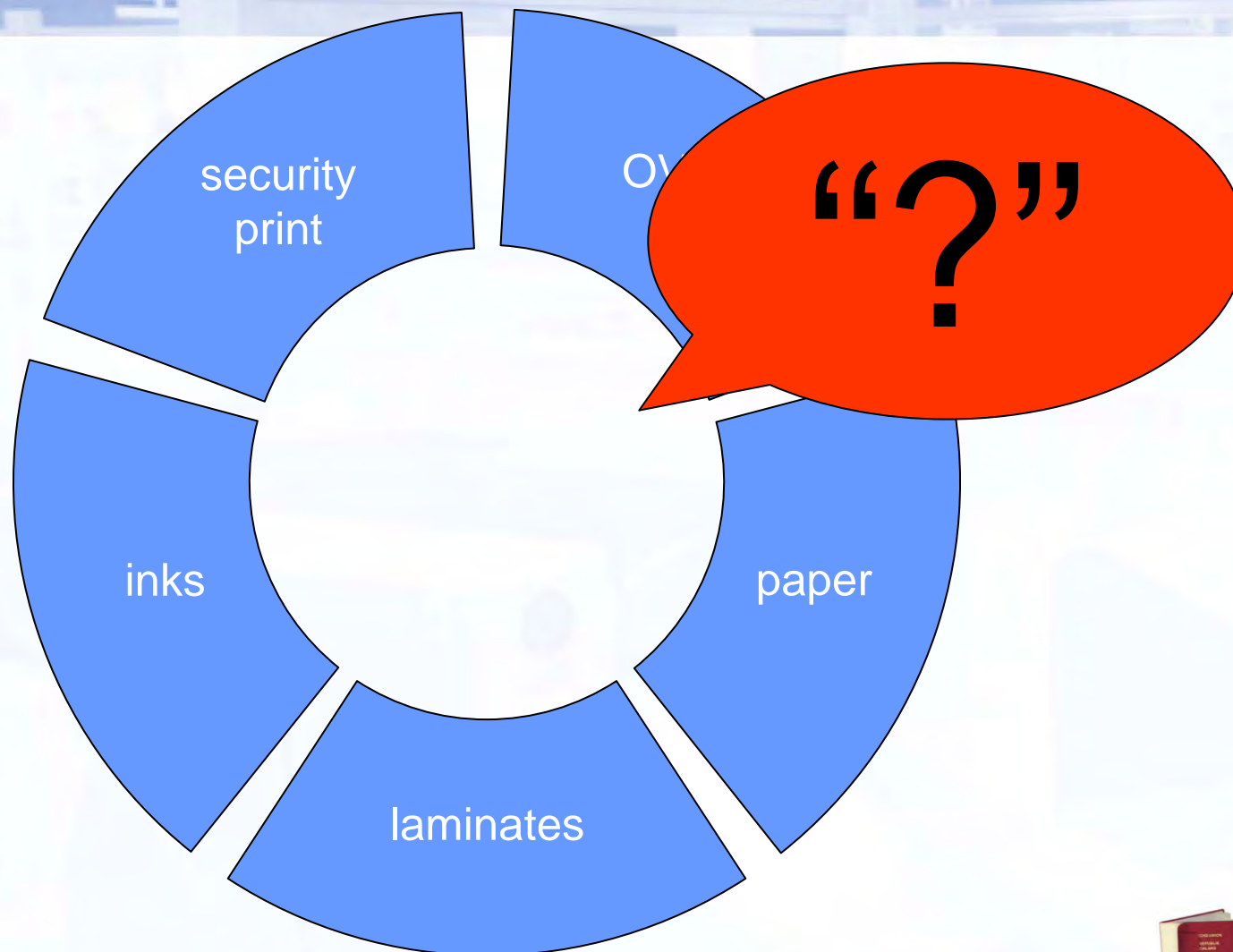
# Summary

- Understand all elements & interaction
- Bring them together in a controlled way
- Consider data-page as a whole

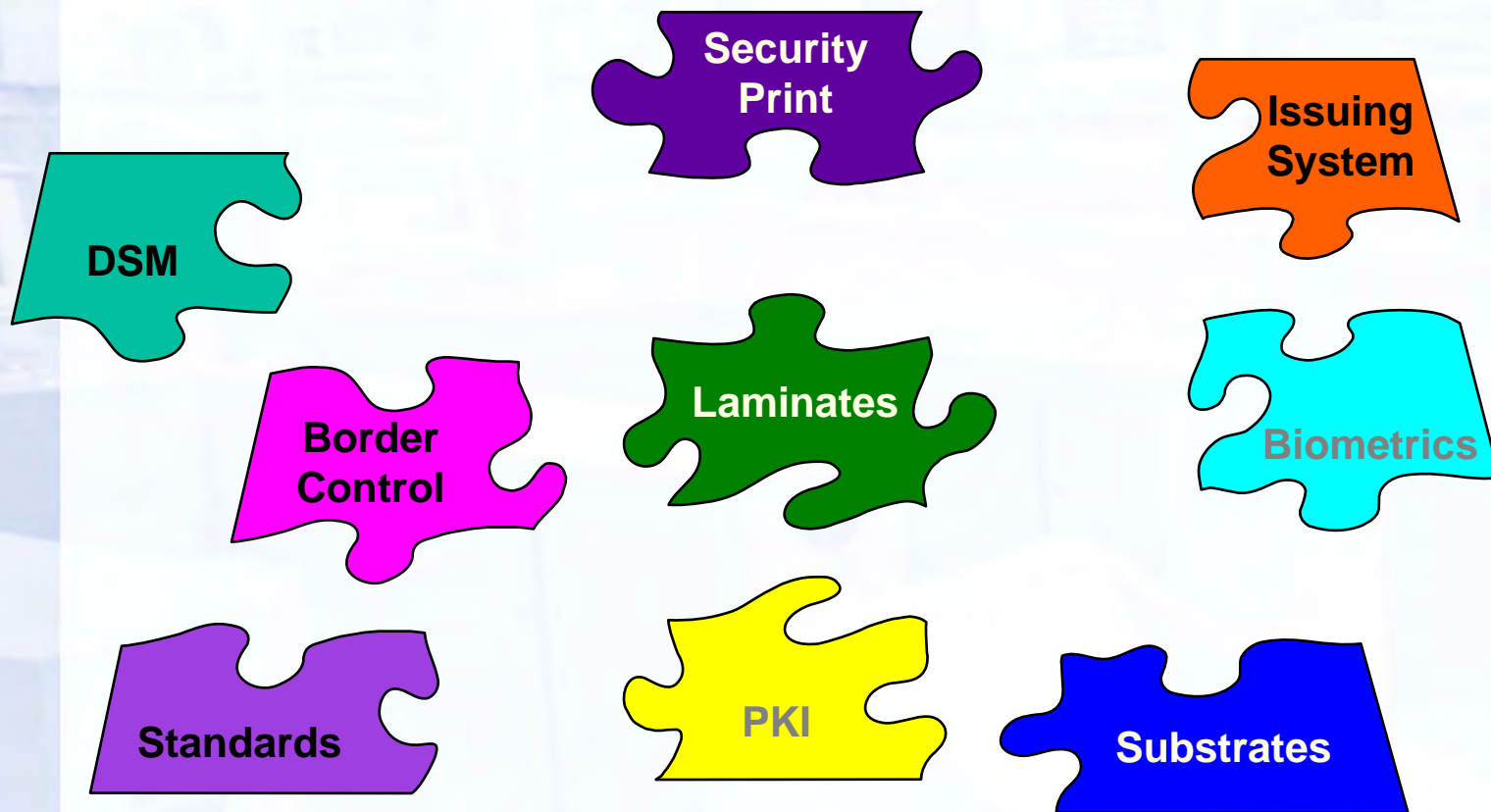




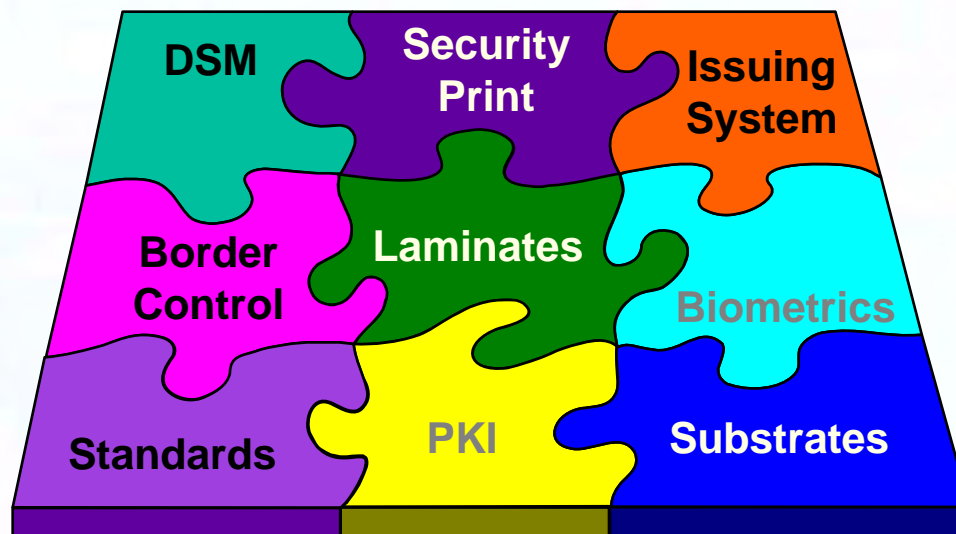
# Avoid Confusion



# All component parts must be mutually supporting



# The solution is normally a compromise





➤ Thank you for your attention

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