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forensic science systems

Minsk, Belarus
www.regulaforensics.com

established in 1992

day Regula is a group of companies located

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Magnifiers



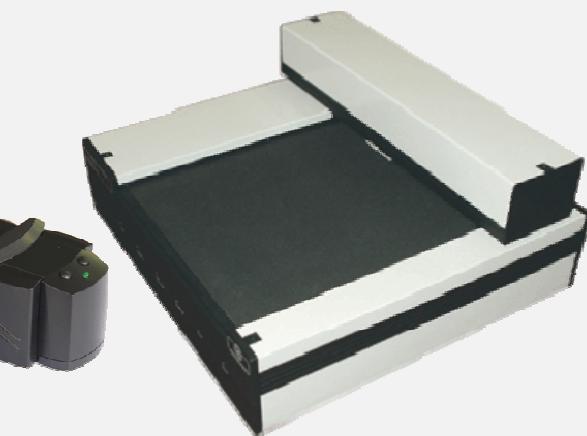
Compact devices



Video spectral magnifiers



Document readers



Visualizer of magnetic properties



Spectral Luminescent microscope



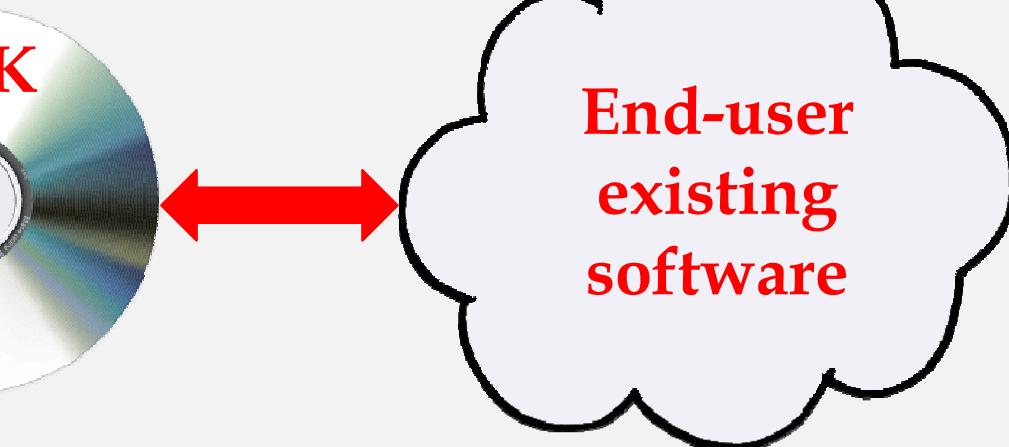
Video spectral comparators





Databases:

Passports: 1655 documents
Drivers Licenses: 475 documents
Banknotes: 2109 documents



Document Readers
Software Development Kit
(SDK)



Desk-top
O-1 size reader



Desk-top
ID-3 size reader



Mobile
ID-3 size reader



Mobile
MRZ reader



Mobile
laboratory



Mobile
high-resolution reader

Automatic Authentication & Forgeries

Forgeries

Blank & Laminate
Substitution

Photo
Substitution

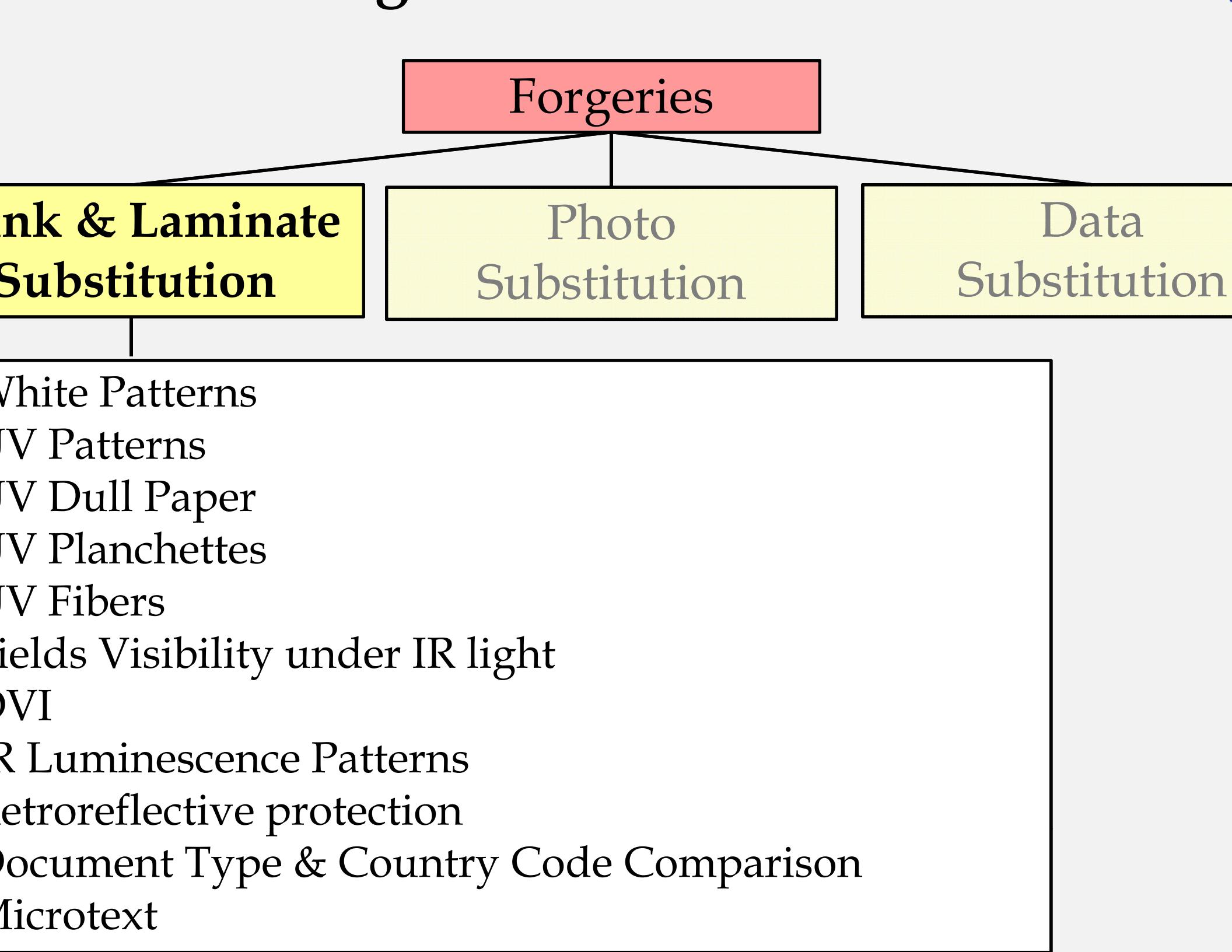
Data
Substitution

White Paper
UV Patterns
UV Dull Paper
UV Planarity
UV Fibers
Microtext
Visible Light
IR Luminescence
Retroreflective protection

- Text Data Comparison (MRZ, Visual Inspection Zone, Barcodes, RFID chip)
- Data under UV light
- UV Dull Paper
- MRZ Check Digits
- MRZ Visibility under IR light
- IR Luminescence
- Document Type & Country Code Comparison

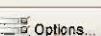
Document Type & Country Code Comparison

Microtext





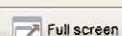
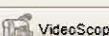
Connect



Options...



Documents DB



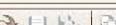
Results

%

100



Rotate images



Details

Visual zone **Text data comparison** **Graphical data comparison** **Security Features** **Messages log**

UV dull paper check ✓
 Blank element ✓
 IR Visibility ✓
 Field #1 (Fill element): Visible ✓
 Field #2 (Fill element): Visible ✓
 Field #3 (Blank element): Visible ✓
 Field #4 (Blank element): Visible ✓

Image patterns
 Element #1
 Similarity 94%
 Etalon image

Image

Element #2
 Element #3



Identified document type: Hong Kong Special Administrative Region of China - Id Card #1

Document #: C668668E

Sex: F Date of birth: 01.01.1968



MAN

Type P	State OMN	Passport No. 02144844	رقم الجواز
السلطنة عمان سلطنة عمان			
الاسم عبدالرؤوف بن عبدالله بن حمود			
اسم العائلة			
القبيلة التوبى			
Surname AL TUBI Family Name			
Given Names ABDULRAUF ABDULLAH HAMOOD			
Sex M	جنس الجنس	Place of Birth Amtee	مكان الميلاد
Date of Birth 21-05-1975		ID No. 2627987	رقم الهوية تاريخ الميلاد
Date of Expiry 06-07-2018	Date of Issue 07-07-2008	تاريخ الإنتهاء تاريخ إصدار	
Issuing Authority Muscat		جهة الإصدار	
Muscat		مسقط	

I<<ABDULRAUF<ABDULLAH<HAMOON<<<<<<
<50MN7505216M18070662627987<<<<<<70



Disconnect Process Read RFID Options... Documents DB

Rotate images

Check	Status
IR B900 ink	✓
UV dull paper check	✓
MRZ	✓
Photo element	✓
Blank element	✓
UV protection fibers	✓
Color	✓
Color	✓
IR Visibility	✓
Field #0 (Blank element): Visible	✓
Field #1 (Blank element): Not visible	✓
Field #2 (Blank element): Visible	✓
Field #3 (Fill element): Visible	✓
Image patterns	✗
Element #1	✗
Verified	
Similarity	
Etolon image	
Image	

Identified document type: Belarus - Passport #2

Document Class: P | Issuing State: BLR | Document #: MP444444

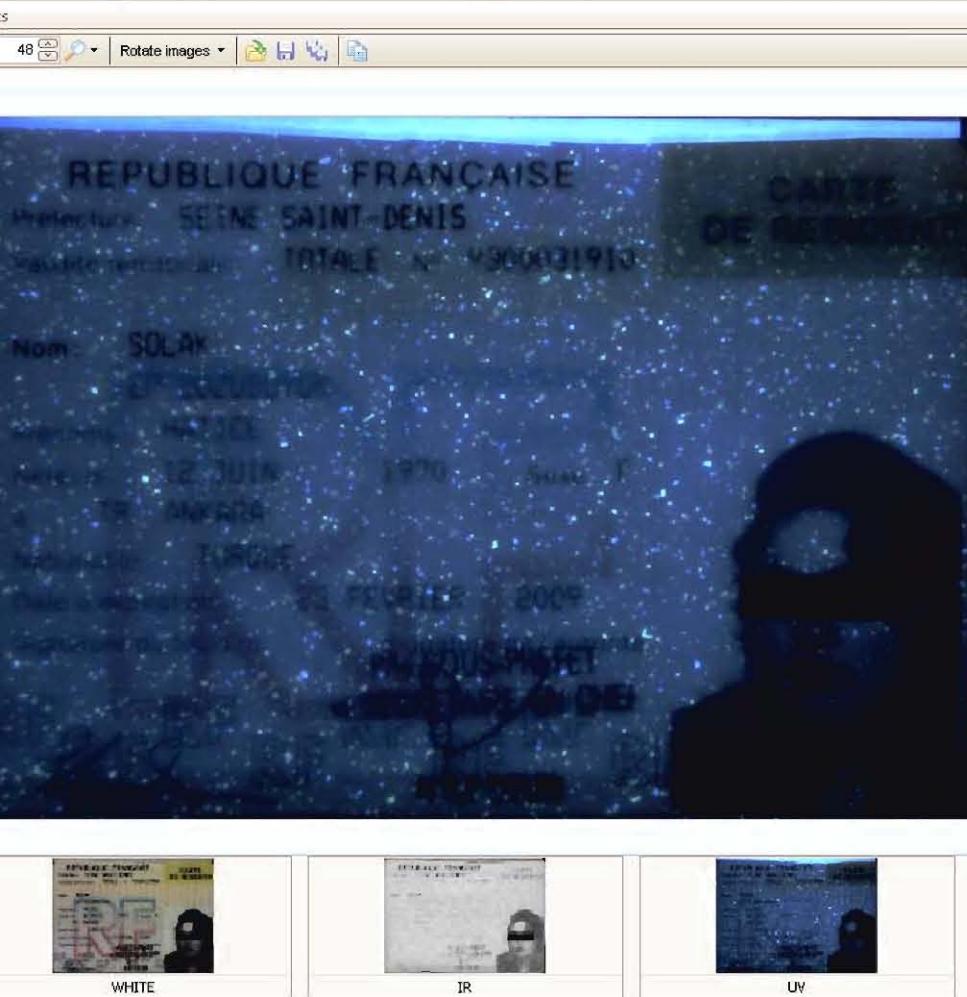
Surname: ABDULASHVIDZE | Given names: EMANUIL

Sex: M | Date of birth: 17.02.1996 | Date of expiry: 17.02.2012

Data comparison Security Features

This screenshot shows a digital forensic analysis interface for a Belarusian passport. The interface includes several windows and panels:

- Top Bar:** Includes "Process", "Read RFID", "Options...", and "Documents DB".
- Left Panel:** Displays the physical passport image with several red circles highlighting specific features for examination.
- Central Analysis Window:**
 - Details Tab:** Shows a table of security features with status indicators (green checkmarks or red X's). A red circle highlights two X's under the "Blank element" row for MRZ.
 - Image Patterns Tab:** Compares the passport's image patterns against an etalon image, showing a 94% similarity score.
- Bottom Left Panel:** Shows three preview images: WHITE, IR, and UV.
- Bottom Right Panel:** Shows another view of the passport with a large red circle highlighting the bottom serial number area.
- Bottom Center Panel:** Displays the document's metadata and a preview image.
- Right Side:** Shows the "Documents Database (FDS)" interface with a search result for "Общегражданский паспорт" (General Passport).



Identified document type France - Id Card #2 (Carte de Resident)

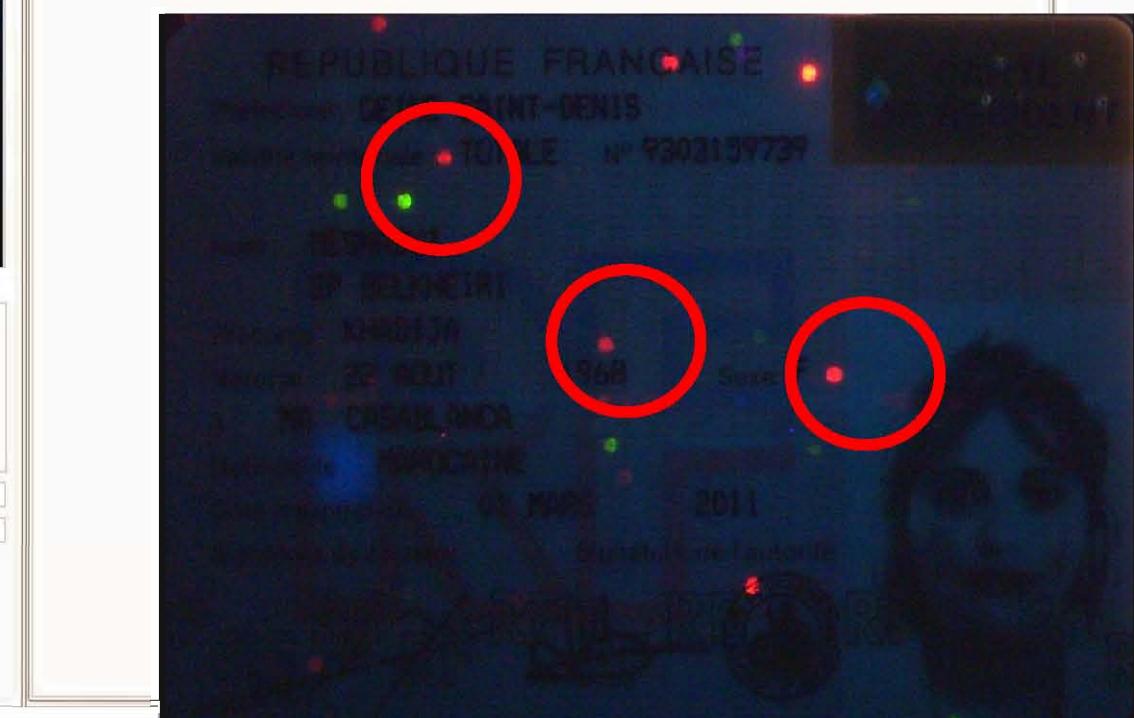
Document # 1060431910

Sex F



Security Features

Details	
Visual zone	
Text data comparison	
Graphical data comparison	
Security Features	
Messages log	
IR 8900 ink	
<input checked="" type="checkbox"/> UV dull paper check	✓
MRZ	—
Photo element	✓
Blank element	✓
<input checked="" type="checkbox"/> UV protection fibers	✗
Color	
<input checked="" type="checkbox"/> IR Visibility	✓
Field #0 (Blank element): Visible	✓
Field #1 (Blank element): Visible	✓
Field #2 (Blank element): Not visible	✓
Field #3 (Fill element): Visible	✓



Results

% 37 Rotate images


Details

Details MRZ Visual zone Security Features Messages log

IR 8900 ink

 UV dull paper check

MRZ

Photo element

Blank element

 UV protection fibers

Color Found(Expected)

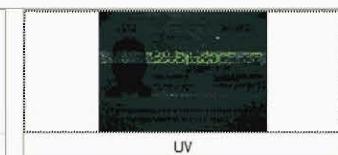
Color Found(Expected)

13(30)

4(30)

✓

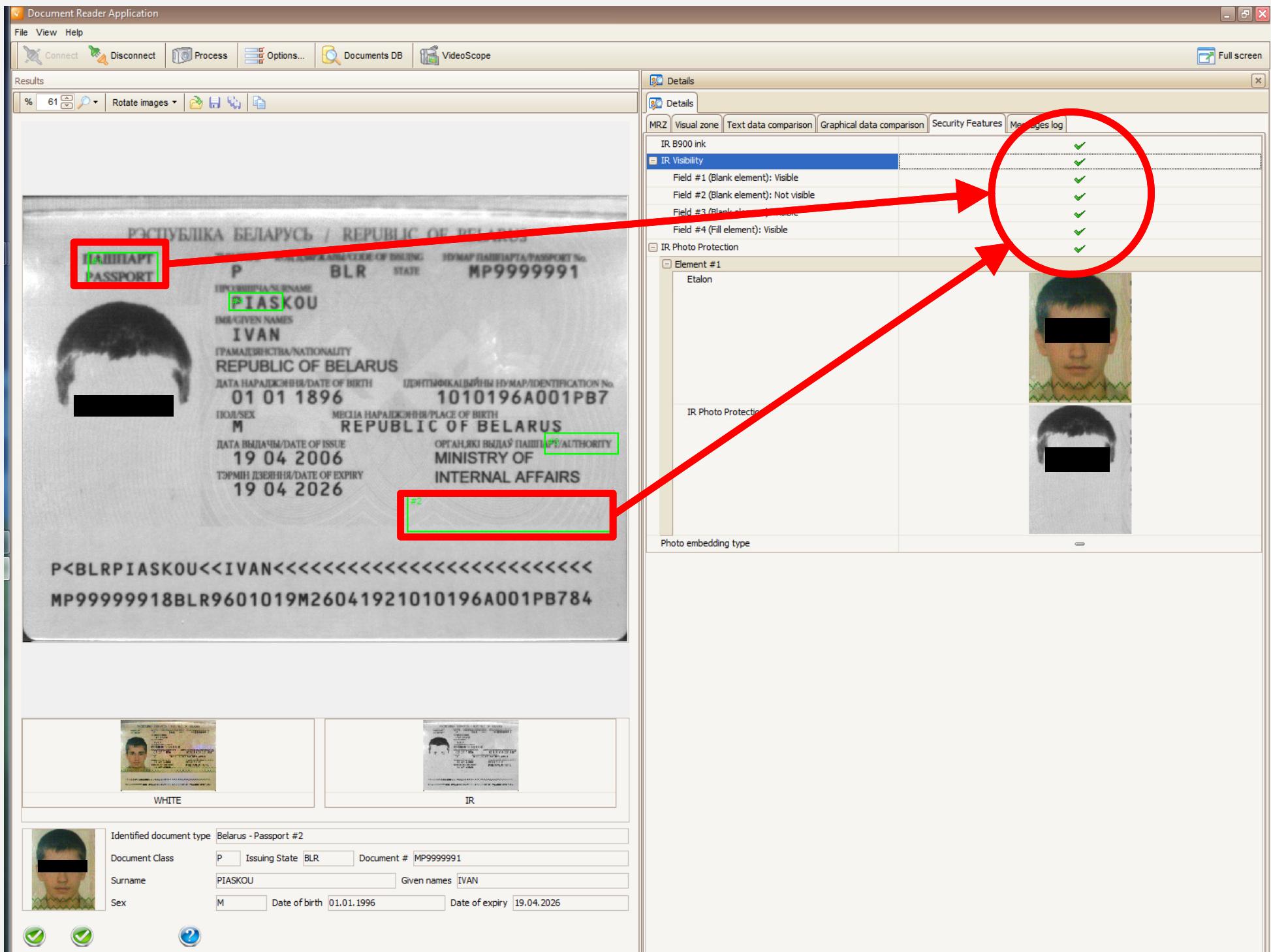
✓



Identified document type Belarus - Passport #2



under IR light



Results

% \$4 Rotate images



Details

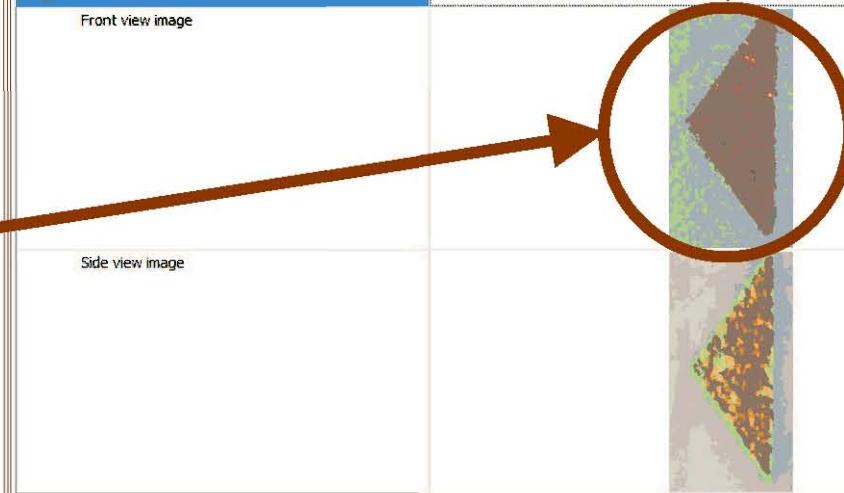
Documents Database (FDS) Details

Visual zone Graphical data comparison Security Features Messages log

 OVI check Element #1

Front view image

Side view image



WHITE

IR

UV



Identified document type: Hong Kong Special Administrative Region of China - Id Card #1



Security Features



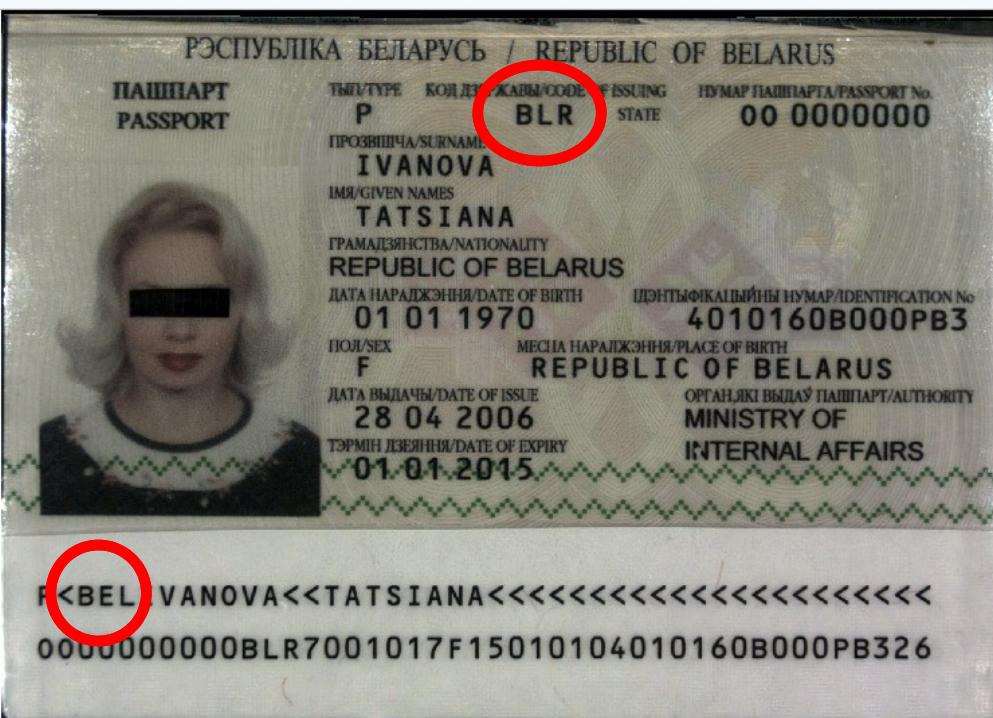
Comparison

File View Help

Connect Disconnect Process Options... Documents DB Full screen

Results

% 38 Rotate images



Details

MRZ Visual zone Text data comparison Graphical data comparison Security Features Messages log

Field type	MRZ	Visual OCR	MRZ <-> Visual	Valid
MRZ Strings	P<BELIVANOVA<<TATSIANA<<<<<<<<<<<<<<<<		-	-
Document Class Code	P	P	✓ ✓	✓ ✓
Issuing State Code	BEL	BLR	✗ ✗	✗ ✗
Surname And Given Names	IVANOVA TATSIANA			
Surname	IVANOVA	IVANOVA	✓ ✓	✓ ✓
Given names	TATSIANA	TATSIANA	✓ ✓	✓ ✓
Nationality Code	BLR		-	✓
Sex	F	F	✓ ✓	✓ ✓
Date of birth	01.01.1970	01.01.1970	✓ ✓	✓ ✓
Date of birth CheckDigit	7		-	✓
Date of expiry	01.01.2015	01.01.2015	✓ ✓	✓ ✓
Date of expiry CheckDigit	0		-	✓
Document #	00000000	00000000	✓ ✓	✓ ✓
Document Number CheckDigit	0		-	✓
Personal #	4010160B000PB3	4010160B000PB3	✓ ✓	✓ ✓
Personal # CheckDigit	2		-	✓
Final CheckDigit	6		-	✓
Date of issue		28.04.2006	-	-
Place of Birth		REPUBLIC OF BELARUS	-	-



WHITE IR UV

Identified document type: Belarus - Passport #2

Document Class: P Issuing State: BEL Document #: 00000000

Surname: IVANOVA Given names: TATSIANA

Sex: F Date of birth: 01.01.1970 Date of expiry: 01.01.2015

MRZ Text data comparison Security Features



Minimum resolution for Microtext OCR is 1000 dpi

Forgeries

ink & Laminate
Substitution

**Photo
Substitution**

Data
Substitution

- UV Dull Paper
- Photo Visibility under IR light
- Ghost Photo Visibility under IR light
- Hidden Image
- Photo Type

File View Help

Connect Disconnect Process Options... Documents DB Full screen

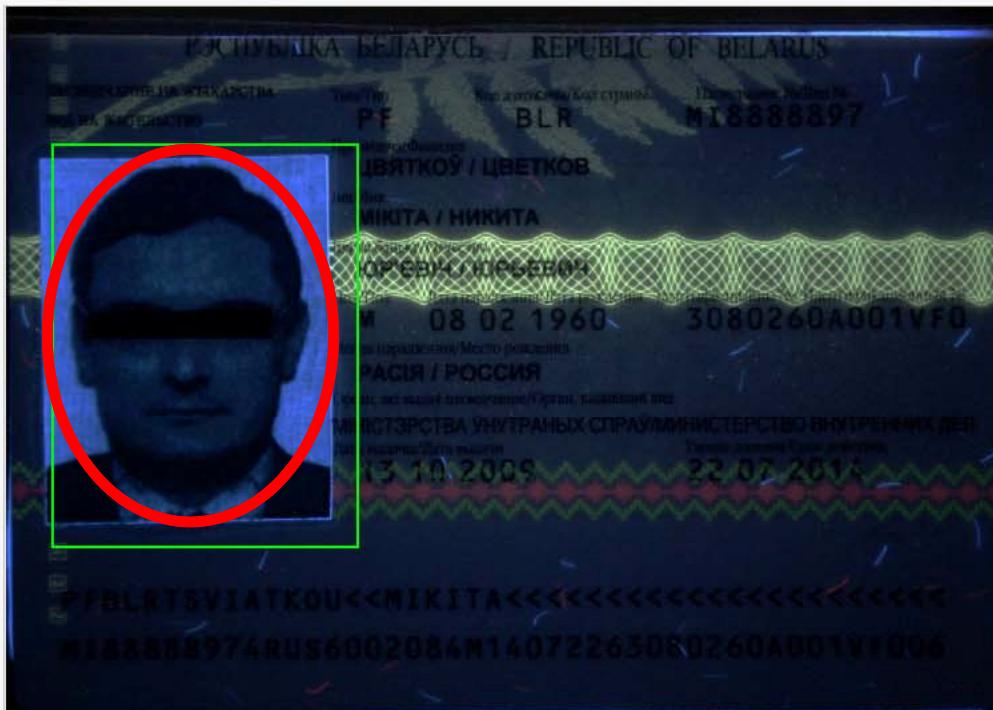
Results % 38 Rotate images

Details

MRZ Visual zone Text data comparison Graphical data comparison Security Features Messages log

IR 8900 ink

- UV dull paper check ✓ ✗
- MRZ ✓ ✗
- Photo element ✗ ✗
- Blank element ✓ ✓
- IR Visibility ✓ ✓
- Field #0 (Fill element): Visible ✓ ✓
- Field #1 (Blank element): Visible ✓ ✓



РУССКАЯ ФЕДЕРАЦИЯ REPUBLIC OF BELARUS
ПАССАЖИРСКИЙ ДОКУМЕНТ
ДЛЯ ПРОВЕРКИ
RF BLR MI8888897
ЦВЯТКОУ / ЦВЕТКОВ
МИКІТА / НІКІТА
08.02.1960 3080260A001VFO
РОСІЯ / РОССІЯ
22.07.2014
MI88888974RUS6002084M14072263080260A001VFO06

WHITE IR UV

Identified document type: Belarus - Identity Card for Residence #2 (Testing)

Document Class: PF Issuing State: BLR Document #: MI8888897
 Surname: TSVIATKOU Given names: MIKITA
 Sex: M Date of birth: 08.02.1960 Date of expiry: 22.07.2014

MRZ Text data comparison Security Features

File View Help

Connect Disconnect Process Options... Documents DB Full screen

Results % 39 Rotate images

REPUBLICA DE ANGOLA

PASSAPORTE / PASSPORT PN AGO N0066601

Name / Nome: JOAO BRITO DOS SANTOS

Nationality / Nacionalidade: ANGOLANA

Date of birth / Data de nascimento: M 03 SEP / SEPT 1961

Place of birth / Lugar de nascimento: LUANDA

Category / Categória: ENGº ELECTRONICO

Passport number / Passaporte Nº: 0034899/N10/01

Issue date / Data of issue: 03 APR / AVR 2001

Expiry date / Data of expiry: 03 APR / AVR 2011

Signature: 

PNAGOFORTUNA <<JOAO<BRITO<DOS<SANTOS<<<<<<

N0066601<0AG06109031M11040310034899<N10<0102

REPUBLICA DE ANGOLA

PASSAPORTE / PASSPORT PD AGO

Name / Nome: SACRAMENTO

Nationality / Nacionalidade: ANGOLANA

Date of birth / Data de nascimento / Date of birth: M XX XXX XX

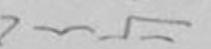
Place of birth / Lugar de nascimento / Place of birth: CABINDA

Category / Categória: ENGENHEIRO

Passport number / Passaporte Nº: 0000058/P10/00

Issue date / Data of issue: 24 APR / AVR 2000

Expiry date / Data of expiry: 24 APR / AVR 2003

Signature: 

PDAGOSACRAMENTO <<E <<<<<<<<<<<<<<<<<<<

D0000077<1AGO<<<<0M03042470000058<D10<0018

WHITE IR UV

		
-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------

Identified document type: Angola - Passport #2

Document Class: PN Issuing State: AGO Document #: N0066601

Surname: FORTUNA Given names: JOAO BRITO DOS SANTOS

Sex: M Date of birth: 03.09.1961 Date of expiry: 03.04.2011

MRZ Text data comparison Security Features

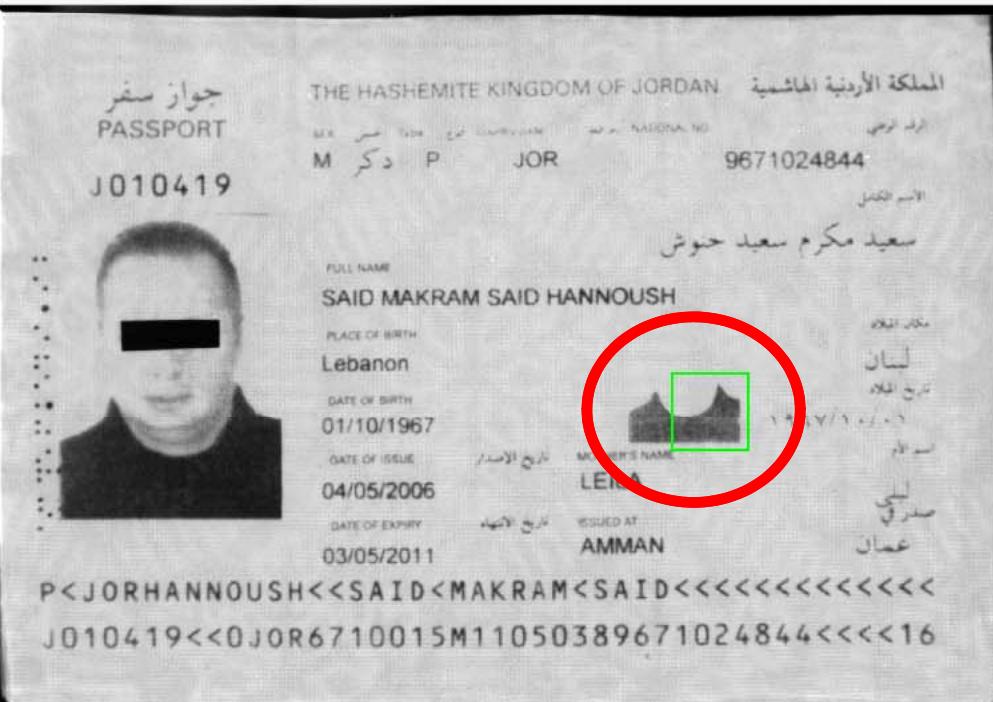
365nm 254nm IR

File View Help

Connect Disconnect Process Options... Documents DB Full screen

Results

% 38 Rotate Images



Details

Documents Database (FDS) Details

MRZ Visual zone Text data comparison Graphical data comparison Security Features Messages log

IR B900 ink: ✓

UV dull paper check: ✓

MRZ: ✓

Blank element: ✓

UV protection fibers: ✓

Color: ✓

IR Visibility:

- Field #0 (Blank element): Visible ✓
- Field #1 (Fill element): Visible ✓
- Field #2 (Photo element): Not visible ✗

Place of birth: Lebanon

Date of birth: 01/10/1967

Date of issue: 04/05/2006

Date of expiry: 03/05/2011

Issued at: AMMAN

MRZ: P<JORHANNOUSH<<SAID<MAKRAM<SAID<<<<<<<<<

J010419<<0JOR6710015M11050389671024844<<<16



Identified document type: Jordan - Passport #3

Document Class: P Issuing State: JOR Document #: J010419

Surname: HANNOUSH Given names: SAID MAKRAM SAID

Sex: M Date of birth: 01.10.1967 Date of expiry: 03.05.2011

MRZ Text data comparison Security Features

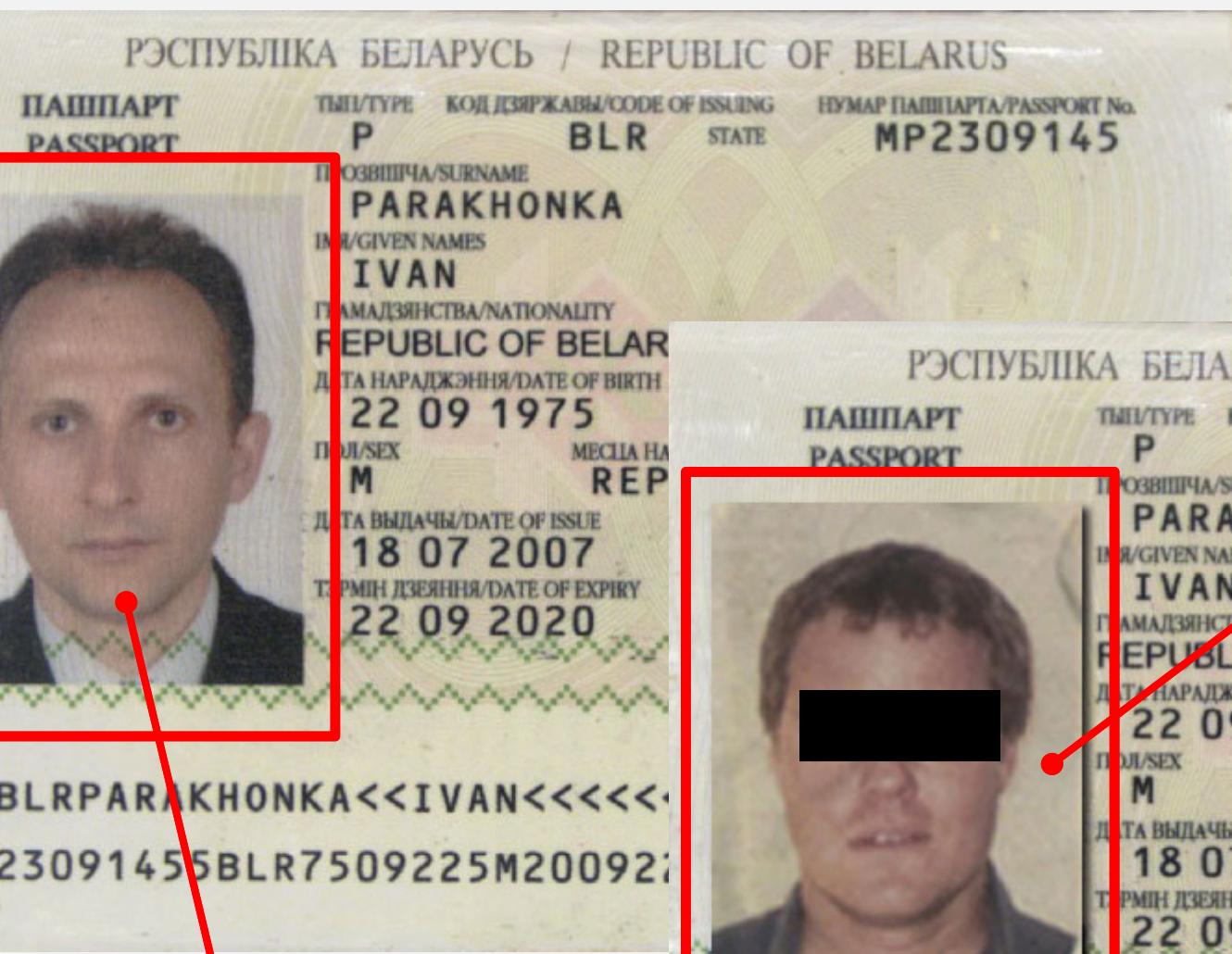


The image displays three side-by-side panels of a passport page. The first panel, labeled 'WHITE', shows the original document with a clear photo of a man, a name, and several lines of text. The second panel, labeled 'TR', shows the same document with the photo and some text completely obscured by a solid red color. The third panel, labeled 'UV', shows the same document under ultraviolet light, where the photo and text appear in a bright green color against a dark background.

	Identified document type	New Zealand - Passport #2 Service (Testing)		
	Document Class	P	Issuing State	NZL
	Surname	CITIZEN		Given names
	Sex	M	Date of birth	01.11.1963
			Date of expiry	15.09.2011

A green circular icon containing a white checkmark.

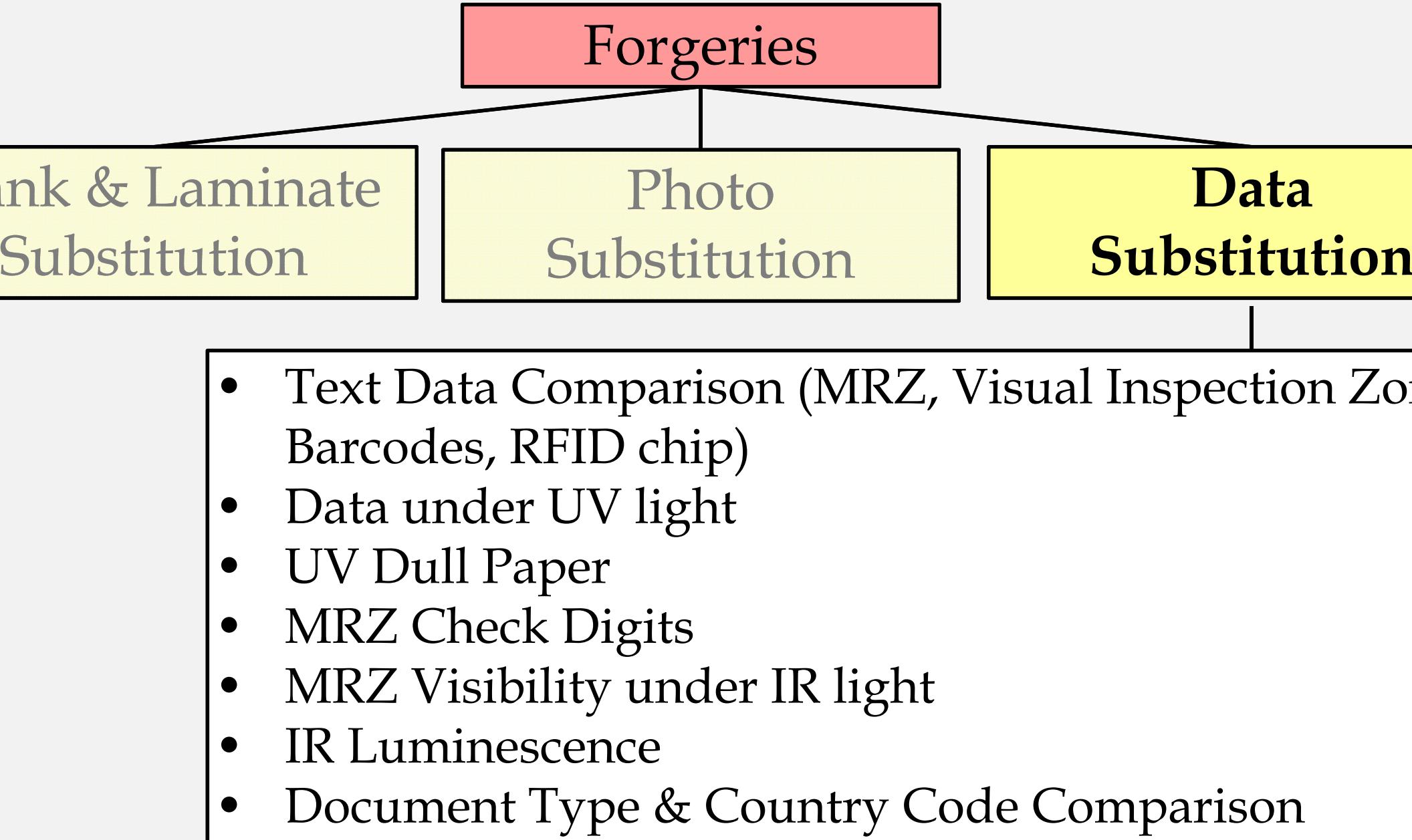
Details	
Documents Database (FDS)	
MRZ	Visual zone
IR B900 ink	✓
<input type="checkbox"/> UV dull paper check	✓
MRZ	✓
Photo element	✓
Blank element	✓
<input type="checkbox"/> Image patterns	✓
+ Element #1	✓
<input type="checkbox"/> Invisible image	✓
<input checked="" type="checkbox"/> Element #1	✓
Invisible image	
Invisible image	
Invisible image	
Photo embedding type	✓



Original:
Printed Photo



Forgery:
Glued Photo



	MRZ	Visual zone	RFID-chip	Text data comparison	Security features	Messages log					
Field type	MRZ	Visual OCR	RFID-chip	MRZ <-> Visual	MRZ <-> RFID	RFID <-> Visual	Valid				
MRZ Strings	PVNORNORMANN<<KARI<<<<<< <<<<<<<<< <<<<< 00000000<DNOR75 05319F1510036419 7505311234588			—	—	—	✓				
MRZ Type	ID-3		ID-3	—	✓	—	✓				
Document Class Code	PV		PV	—	✓	—	✓				
Issuing State Code	NOR		NOR	—	✓	—	✓				
Surname And Given Names	NORMANN KARI		NORMANN KARI	—	✓	—	✓				
Surname	NORMANN	NORMANN	NORMANN	✓	✓	✓	✓				
Given names	KARI	KARI	KARI	✓	✓	✓	✓				
Nationality Code	NOR		NOR	—	✓	—	✓				
Sex	F	F	F	✓	✓	✓	✓				
Date of birth	31.05.75	31.05.75	31.05.75	✓	✓	✓	✓				
Date of birth CheckDigit	9		9	—	✓	—	✓				
Date of expiry	03.10.15	03.10.15	03.10.15	✓	✓	✓	✓				
Date of expiry CheckDigit	6		6	—	✓	—	✓				
Document #	00000000	00000000	00000000	✓	✓	✓	✓				
Document Number CheckDigit	0		0	—	✓	—	✓				
Personal #	41975053112345		41975053112345	—	✓	—	✓				
Personal # CheckDigit	8		8	—	✓	—	✓				

Document Reader Application

File View Help

Connect Disconnect Process Options... Documents DB VideoScope Full screen

Results % 60 Rotate images

Details	
Details	
MR2 Visual zone Security Features Messages log	
IR B900 ink	✓
UV dull paper check	✓
MRZ	✓
Photo element	-
Blank element	✓
IR Visibility	✓
Field #1 (Blank element): Visible	✓
Field #2 (Blank element): Visible	✓
Field #3 (Photo element): Not visible	✓
Field #4 (Fill element): Visible	✓
Image patterns	✓
Element #1	✓
Element #2	✓
Element #3	✓
SELONIANT	✓
Place of birth state	✓
Etalon type	Visual OCR
Etalon	GRC
Result	GRC
Document #	✓
Etalon type	Visual OCR
Etalon	AE7119941
Result	AE7119941
Sex	✓
Etalon type	Visual OCR
Etalon	M
Result	M
Date of birth	✓
Etalon type	Visual OCR
Etalon	11 Dec 71
Result	11 Dec 71

WHITE IR UV

Identified document type: Greece - ePassport #3

Process Read RFID Options... Documents DB

Details

MR2 Visual zone Text data comparison Graphical data comparison Security Features Messages

IR 6900 Ink

- UV dull paper check
- MR2
- Photo element
- Blank element
- UV protection fibers
- Color
- Color
- IR Visibility
- Field #0 (Blank element): Visible
- Field #1 (Blank element): Not visible
- Field #2 (Blank element): Visible
- Field #3 (Fill element): Visible

Full screen

File View Help

Disconnect Process Options... Documents DB

Results

% 39 Rotate images

Documents Database (FDS)

Details

Беларусь

Общегражданский паспорт #1

РЭСПУБЛКА БЕЛАРУСЬ / REPUBLIC OF BELARUS

ПАСПОРТ PASSPORT

ТИП/TYPE КОД ДЛЯ ЗАЯВЫ/CODE OF ISSUING STATE BLR

НУМРА ПАСПОРТА/PASSPORT № 00 0000000

ПРОШЕВИЧ/СУРНАМЕ IVANOVA

ІМО/ГІВІ НАІМНІСТІ/GIVEN NAMES TATSIANA

ГРАМАДЗІНСТВА/NATIONALITY REPUBLIC OF BELARUS

ДАТА НАРАДЖЕННЯ/DATE OF BIRTH 01 01 1970

ЦЕНТРАЛІКАЛІЙИН ІДУМАР/IDENTIFICATION № 4010160B000PB3

ПОЛІСЕК F

МІСЦА НАРАДЖЕННЯ/PLACE OF BIRTH REPUBLIC OF BELARUS

ОРГАН/ІМЯ/ПАСПОРТ/АУТОРІТУ MINISTRY OF INTERNAL AFFAIRS

ДАТА ВЫДАЧІ/DATE OF ISSUE 28 04 2006

ТРУДНІ ДЛЯ ЗАЯВЫ/DATE OF EXPIRY 01 01 2015

IR UV

ент type Belarus - Passport #2

P Issuing State BLR Document # 00000000

IVANOVA Given names TATSIANA

F Date of birth 01.01.1970 Date of expiry 01.01.2015

Security Features

WHITE IR UV

Identified document type Oman - Passport #2

Document Class P Issuing State BLR Document # 00000000

Surname IVANOVA Given names TATSIANA

Sex F Date of birth 01.01.1970 Date of expiry 01.01.2015

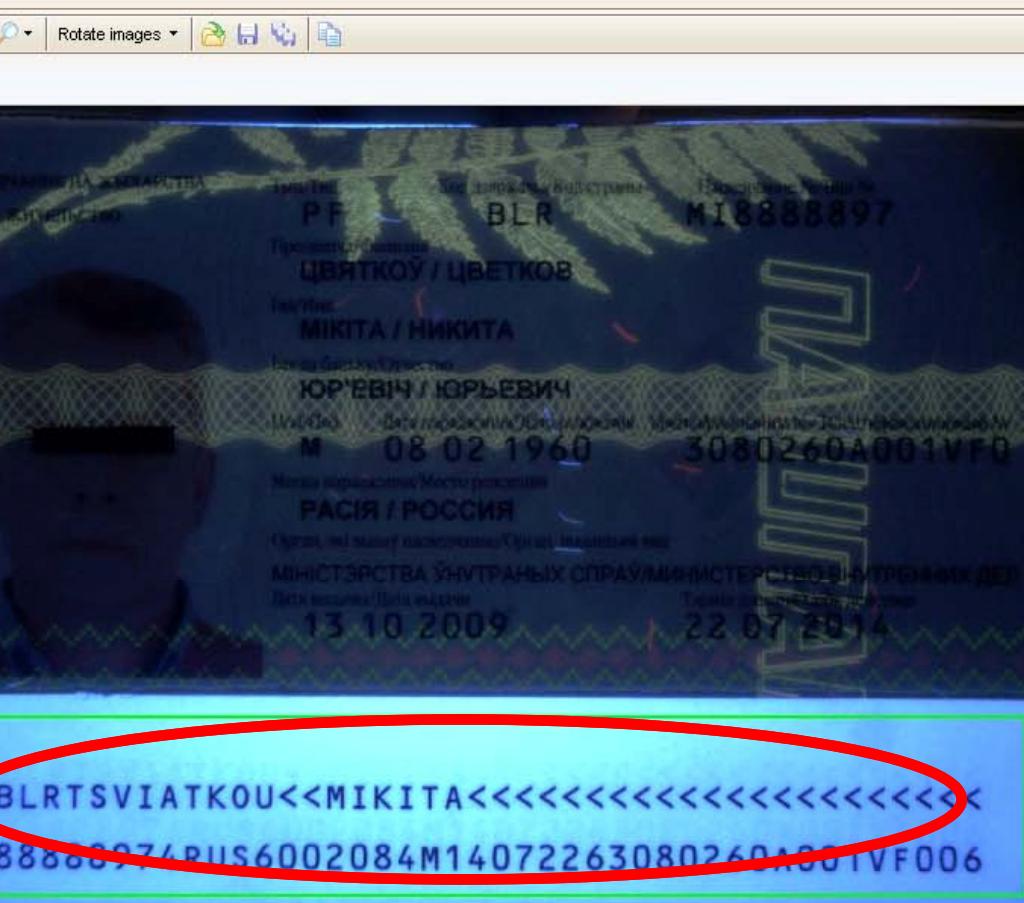
MRZ Text data comparison Security Features

365nm 254nm IR

P <BLRIVANOVA<<TATSIANA<<<<<<<<<

000000000BLR7001017F15010104010160B

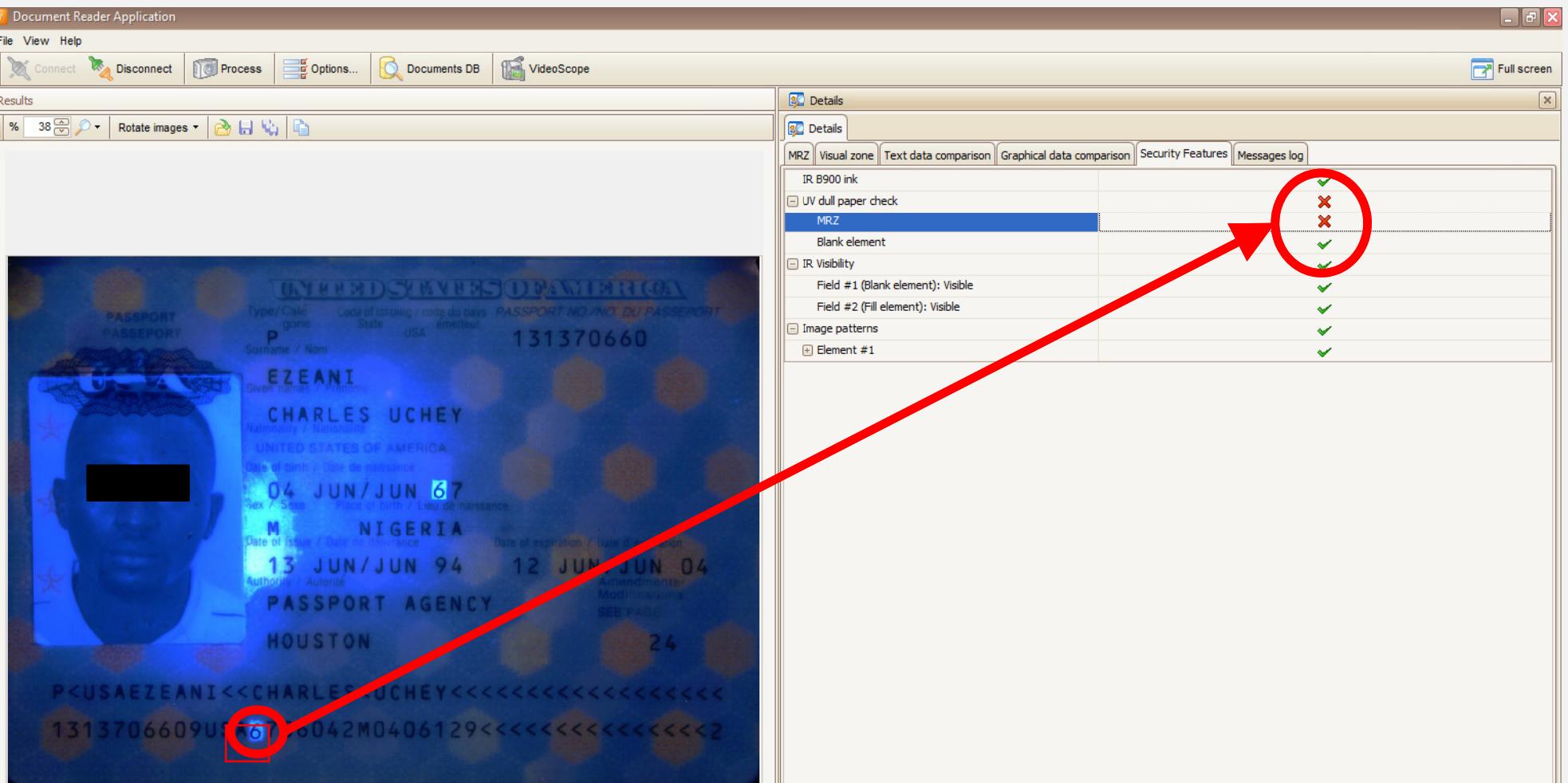
Rotate images



Identified document type	Belarus - Identity Card for Residence #2 (Testing)				
Document Class	PF	Issuing State	BLR		
Surname	ЦВЯТКОУ		Given names	НИКИТА	
Sex	M	Date of birth	08.02.1960	Date of expiry	22.07.2014

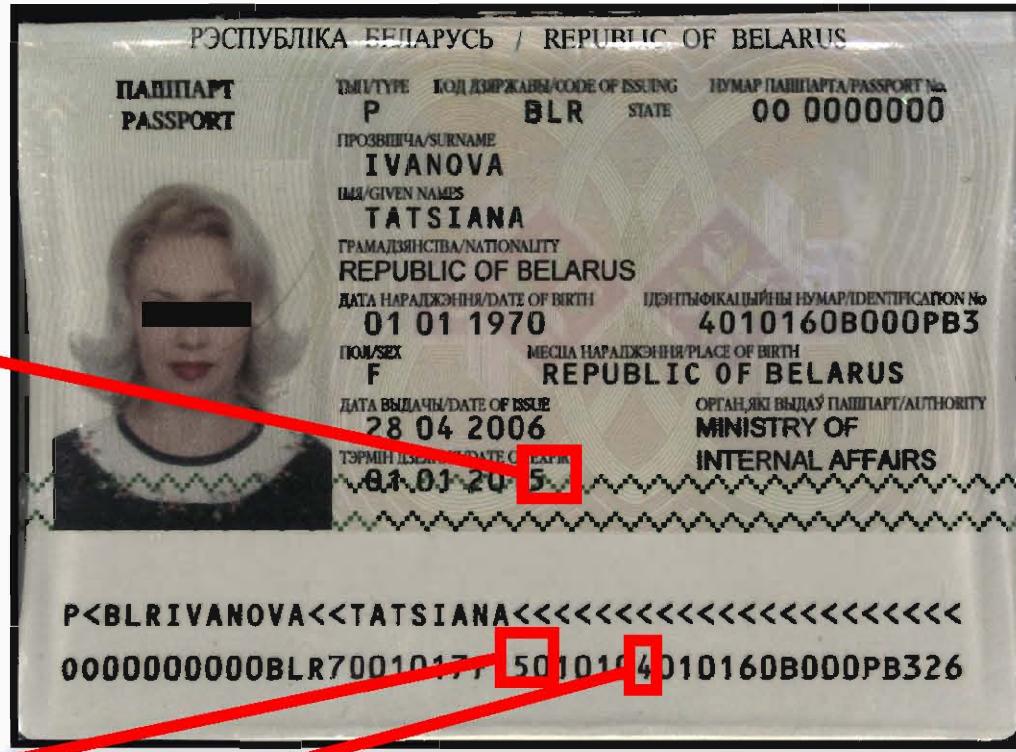
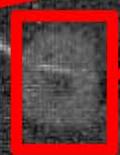
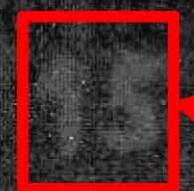
Details	
Details	
MRZ	
Visual zone	
Text data comparison	
Graphical data comparison	
Security Features	
Messages log	
IR 8900 ink	
UV dull paper check	
MRZ	X
Photo element	✓
Blank element	✓
IR Visibility	
Field #0 (Fill element): Visible	✓
Field #1 (Blank element): Visible	✓





	Identified document type	United States - Passport #2		
	Document Class	P	Issuing State	USA Document # 131370660
	Surname	EZEANI		Given names CHARLES UCHEAY
	Sex	M	Date of birth	04.06.1967 Date of expiry 12.06.2004





CONCLUSIONS

Cooperation between document developers/printers
and passport readers vendors is very important

Due to constantly increased number of travellers
accuracy, efficiency and speed of document
processing is vital

Universal travel documents database creation is
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