

20.10.2021., Zagreb, Croatia



# **INFRAREDESIGN<sup>®</sup>**

**Security graphics on different printed materials,  
paper and textile**

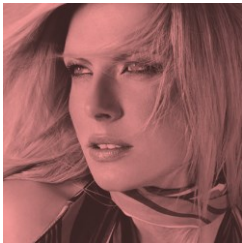
**Professor Dr. sc. Klaudio Pap**

FACULTY OF GRAPHIC ARTS ZAGREB UNIVERISTY, Croatia

# INFRAREDESIGN® team:



Prof. Vilko Žiljak, Ph.D.  
Faculty of Graphic Arts, Zagreb, Croatia



Associate prof. Ivana Žiljak Stanimirović, Ph.D.  
Faculty of Graphics Arts, Zagreb, Croatia



Prof. Klaudio Pap, Ph.D.  
Faculty of Graphic Arts, Zagreb, Croatia



Associate prof. Jana Žiljak Gršić, Ph.D.  
Polytechnic of Zagreb, Croatia



## **What is INFRAREDESIGN® ?**

**INFRAREDESIGN** is invention unique in the world, patent awarded with over 70 prizes from US across Europe (London, Geneve, Moscow) to Taiwan.



**DIAMOND AWARD & GOLD MEDAL**

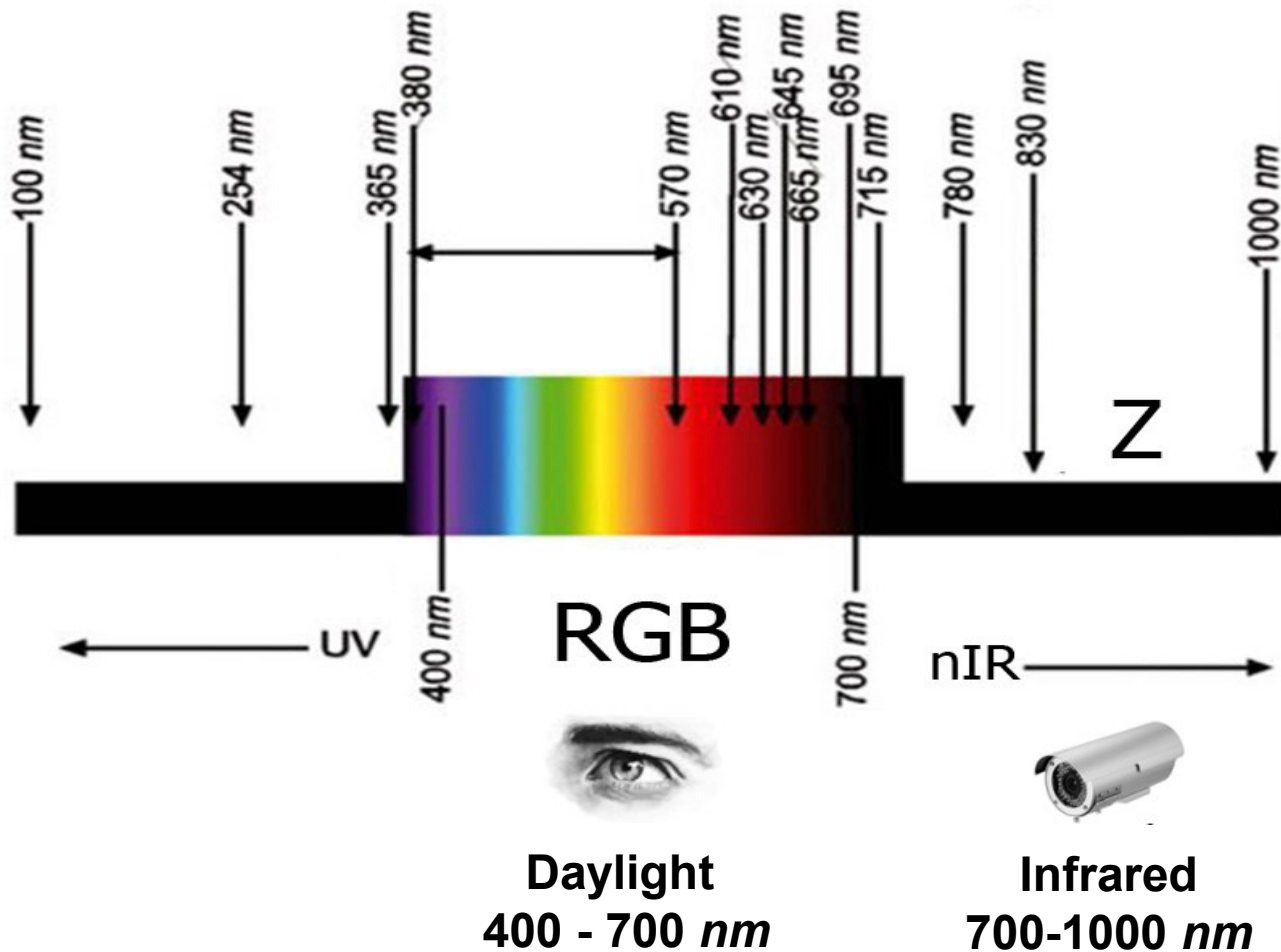
The 10th British Invention Show & Awards,  
British Innovation & Technology Show,  
**13-16 October 2010, London, UK**



## INFRAREDESIGN® achievements & opportunities:

- **creation** of invisible security elements on any printed matter
- **control** of visible and invisible information
- **designing of double image** in the same picture:  
one visible in daylight (400-700 nm) and other independent hidden image visible in near infrared light (700-1000 nm)
- **design of hidden graphics** with the **unlimited** number of colors and hues
- **design of double image, double portrait, double text, security code**

# INFRADESIGN® daylight – infrared light

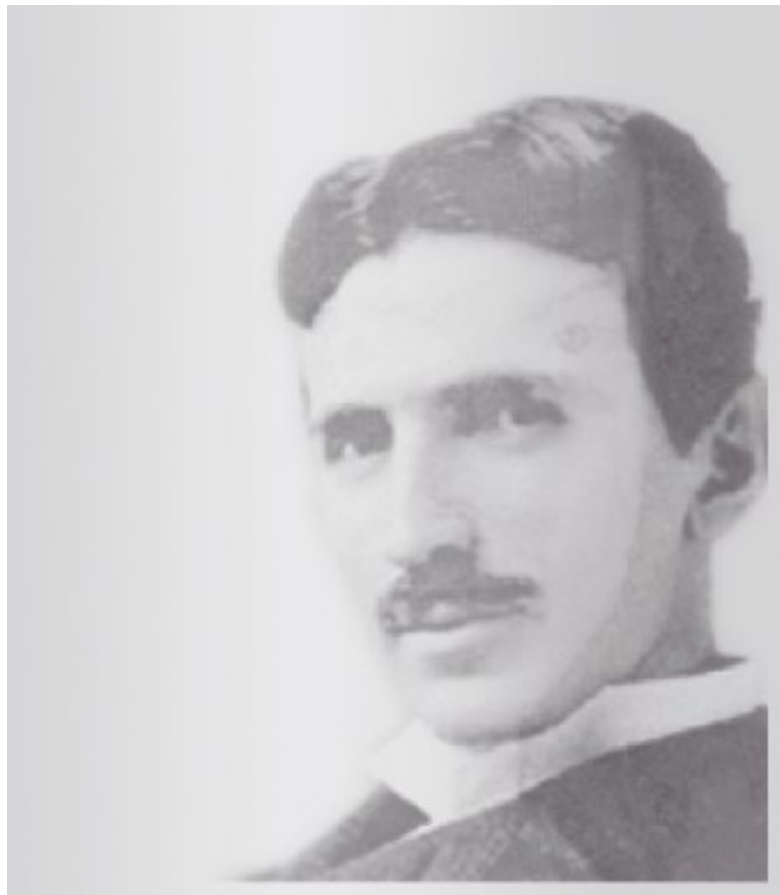
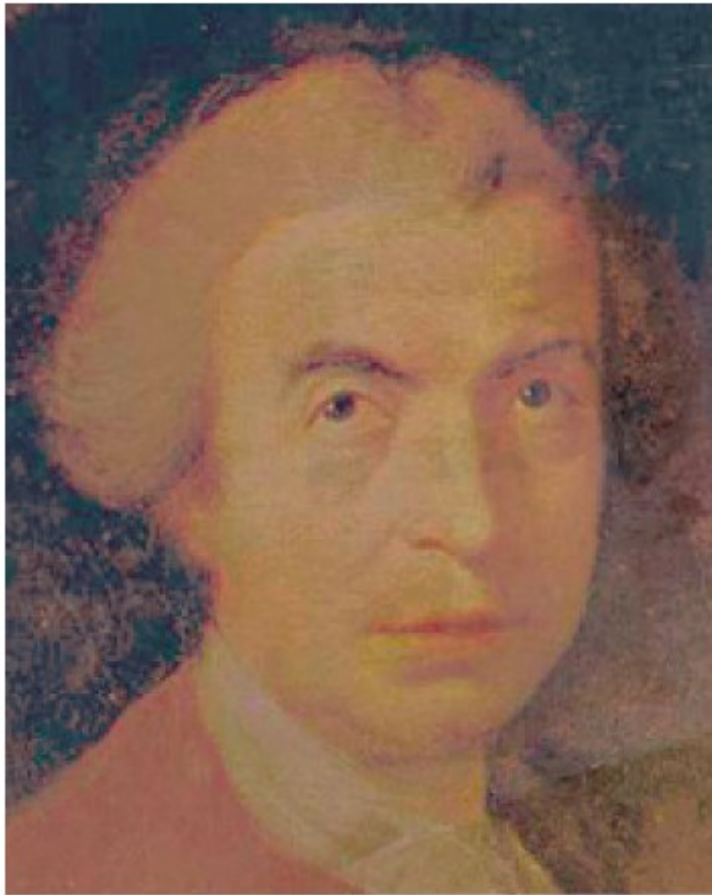




# **INFRADESIGN<sup>®</sup> EXAMPLES**

# INFRADESIGN® Double image

unlimited number of colors and hues



One image (Ruder Boskovic) visible in daylight (400-700 nm) and the other independent hidden image (Nikola Tesla) visible in near infrared light (700-1000 nm)

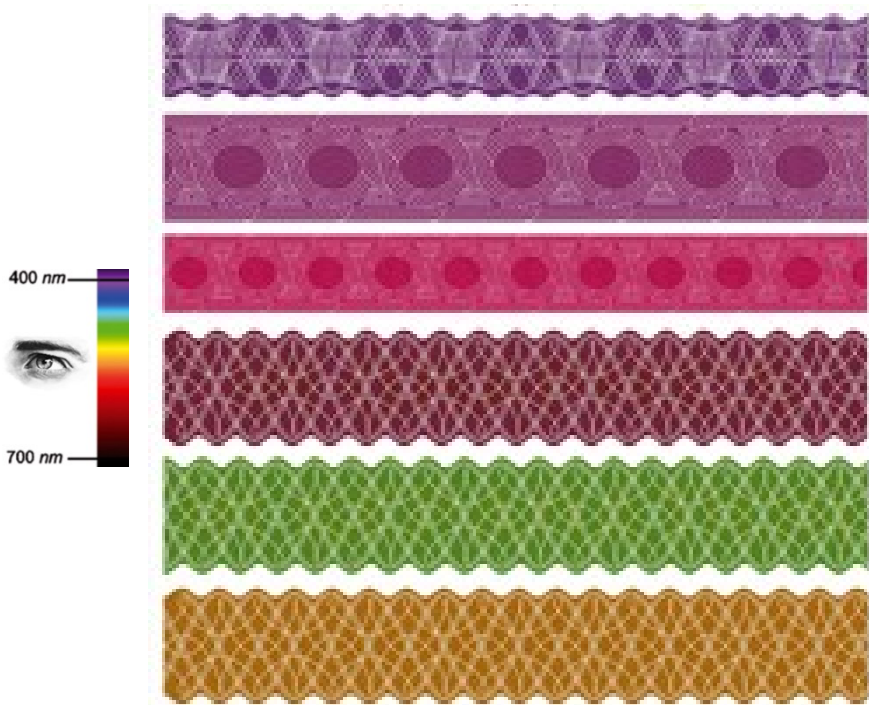
# INFRADESIGN® - Double portrait

for documents, passports, securities



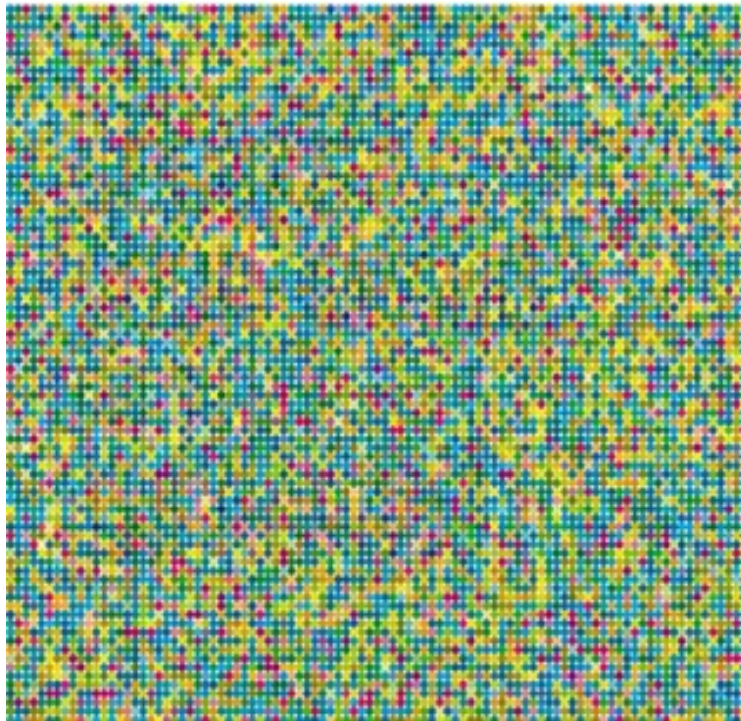
# INFRAREDESIGN® - Double text

for documents, securities



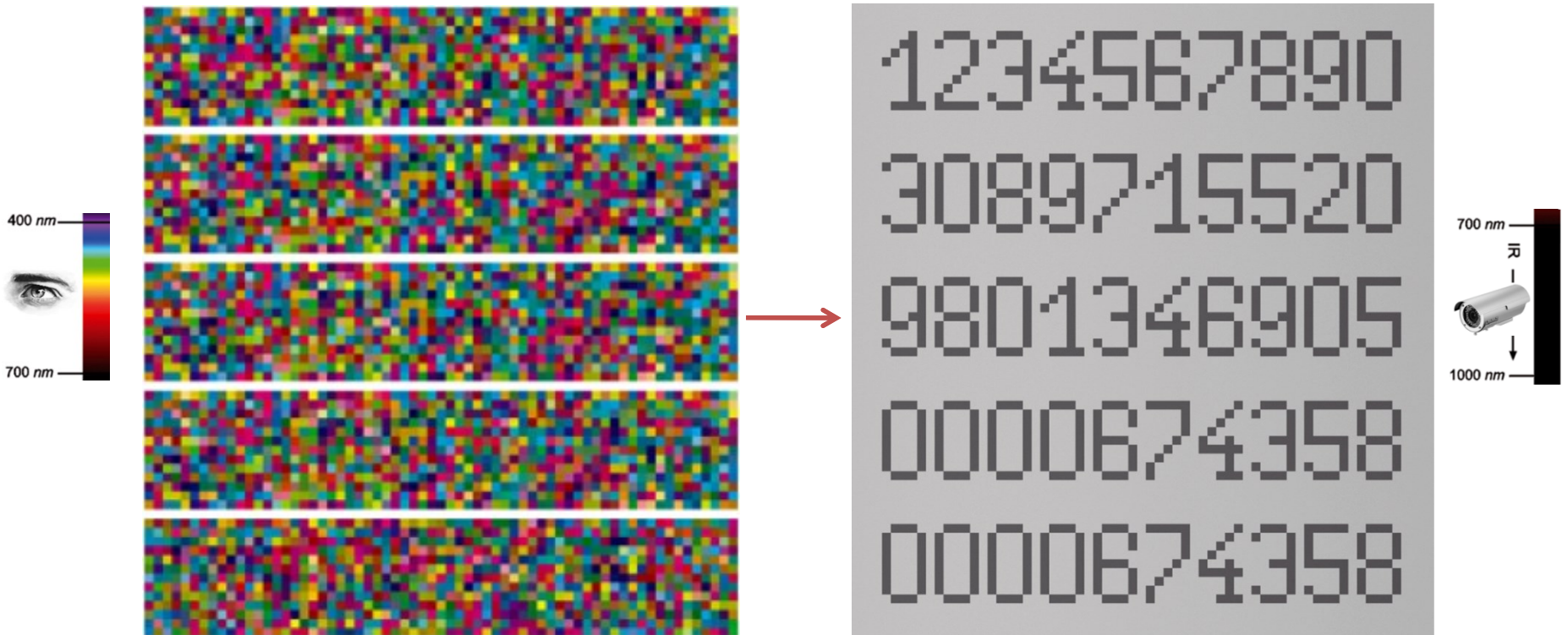
# INFRADESIGN® - Secured text

for branding, documents, securities



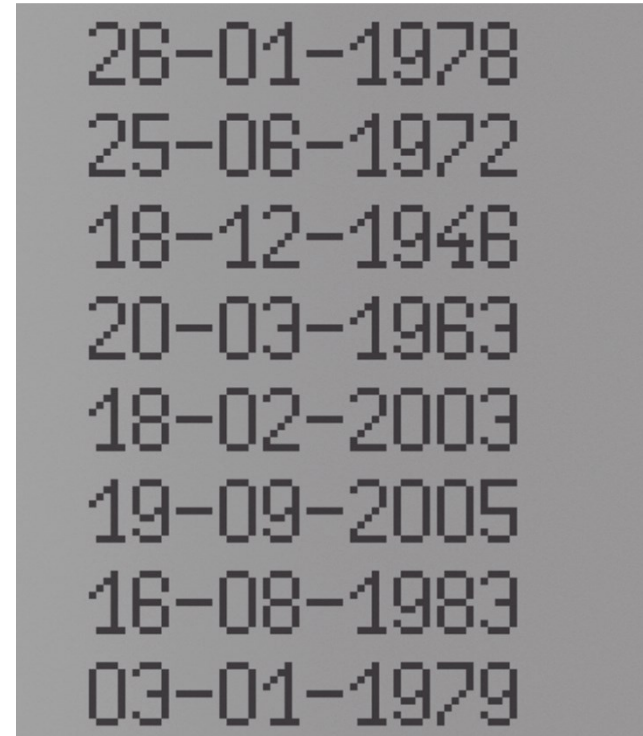
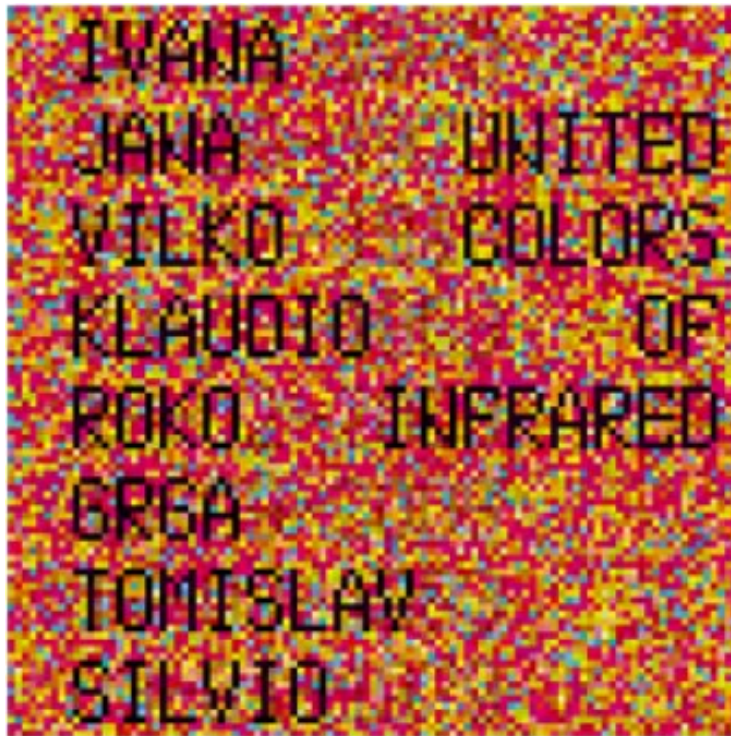
# INFRAREDESIGN® - Secured text

individualization by edition, date and place  
picture is the same in daylight, but different in infrared



# INFRADESIGN® - Secured text

individualization by edition, date and place  
with two different pieces of information



# INFRADESIGN® Security Typography for documents, books, newspapers, magazines

Infracrveno zračenje dolazi neposredno iznad elektromagnetskih valova našeg vidnog područja. U grafičkoj primjeni koristi se IR raspon do 1000 nanometara. Instrumentalno je moguće detektirati to zračenje i translirati signale u naše vidno područje. Translatirane slike manifestiraju se kao sive na uređajima u našem laboratoriju. Na tu pojavu se primjenjuje pseudokoloriranje, pridruživanje obojenog vidljivog spektra sivim tonovima. Te primjene moguće je susresti u gotovo svim industrijskim analizama u svakoj struci, u svim istraživačkim laboratorijima i astronomiji.



Infracrveno zračenje dolazi  
elektromagnetskih valova  
područja.  
IR raspon do nanometara.  
moguće  
translatirati signale vidno  
Translatirane manifestiraju  
sive uređajima  
laboratoriju.  
pridruživanje  
spektra tonovima  
moguće gotovo  
analizama struci,  
istraživačkim  
astronomiji.





## INFRAREDESIGN® benefits for security printers:

- + **simple implementation by using standard CMYK printing inks** and traditional printing methods and machines - **revolutionary in security printing**
- + **without any extra procedures**, printing phases and costs with standard process CMYK printing inks or spot colors  
*(Even the pressman himself doesn't need to know that print contains the hidden infrared message.)*
- + **printing with all printing techniques** (digital printing, dry toner, inkjet printing, silk printing, offset printing, flexo printing, intaglio)



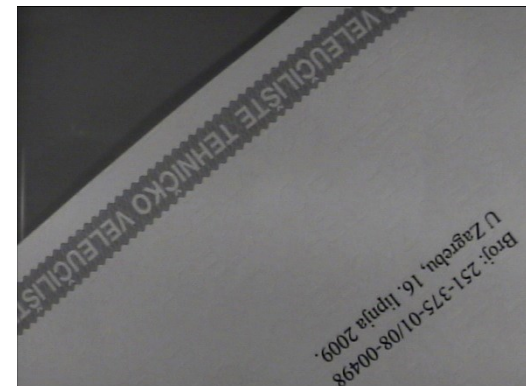
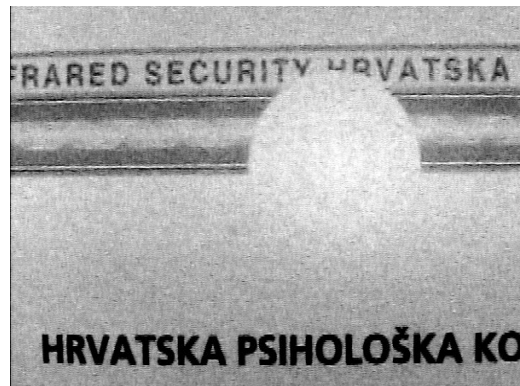
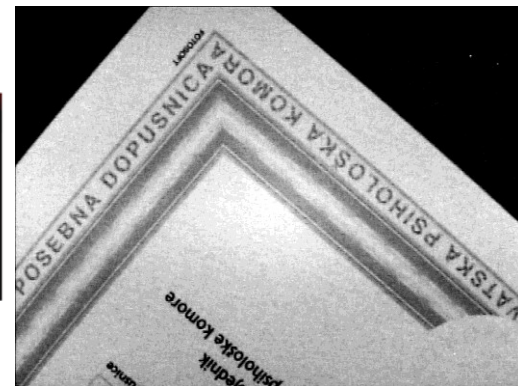
## INFRAREDESIGN® benefits for security printers:

- + **unlimited sizes and formats** as opposed to other security techniques
- + **printing on various materials:** paper, canvas, textile, leather, ceramic, glass, metal, plastic
- + **cannot be scanned or copied** - by transition through RGB the IRD message is lost



## INFRAREDESIGN® benefits for manufacturers:

- + **creation of superior brand protection**  
with easy identification of security
- + **simple implementation in all existing designing solutions,**  
improvement of design with double information
- + **protection of wide range of products:** documents, securities,  
books, packaging, as well as textile, leather  
fine arts, double image
- + **individualization** by edition, time and place

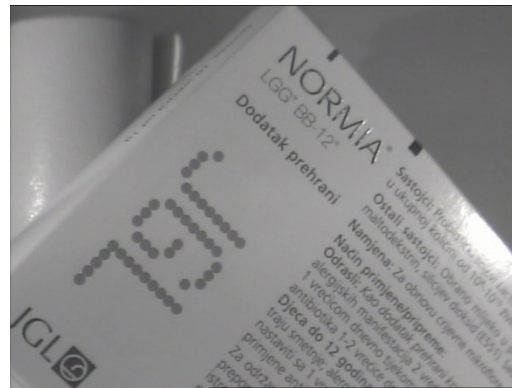
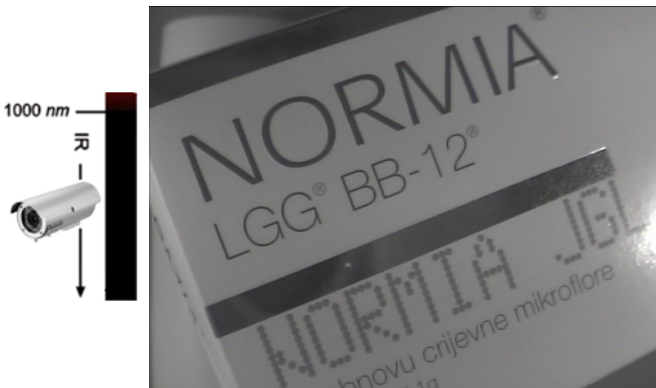
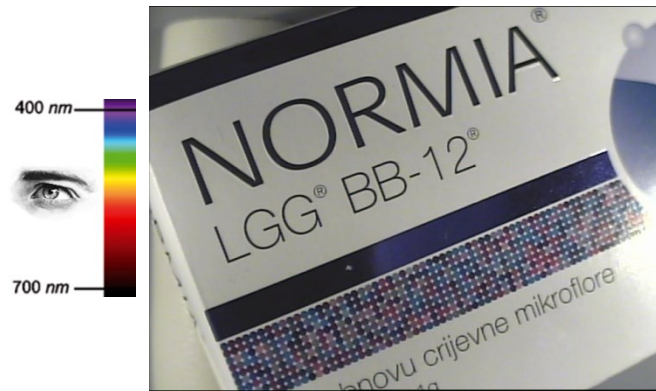


# INFRADESIGN<sup>®</sup> – Packaging Flexo printing





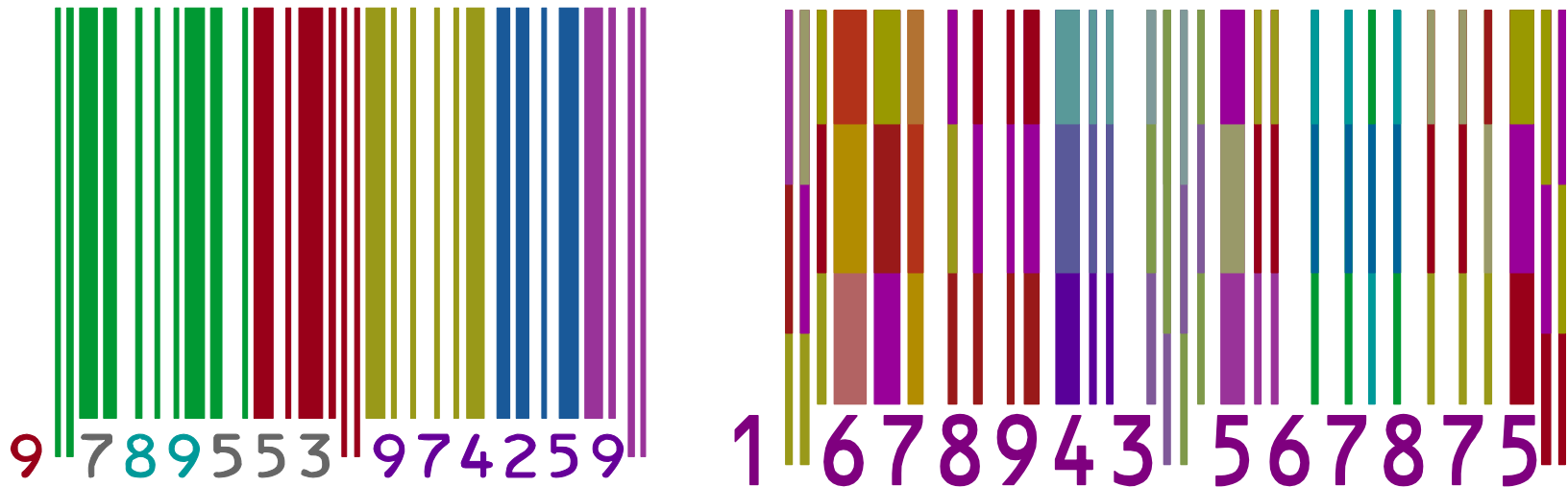
# INFRAREDESIGN<sup>®</sup> – Packaging, Pharma offset printing



# INFRADESIGN® security color barcode

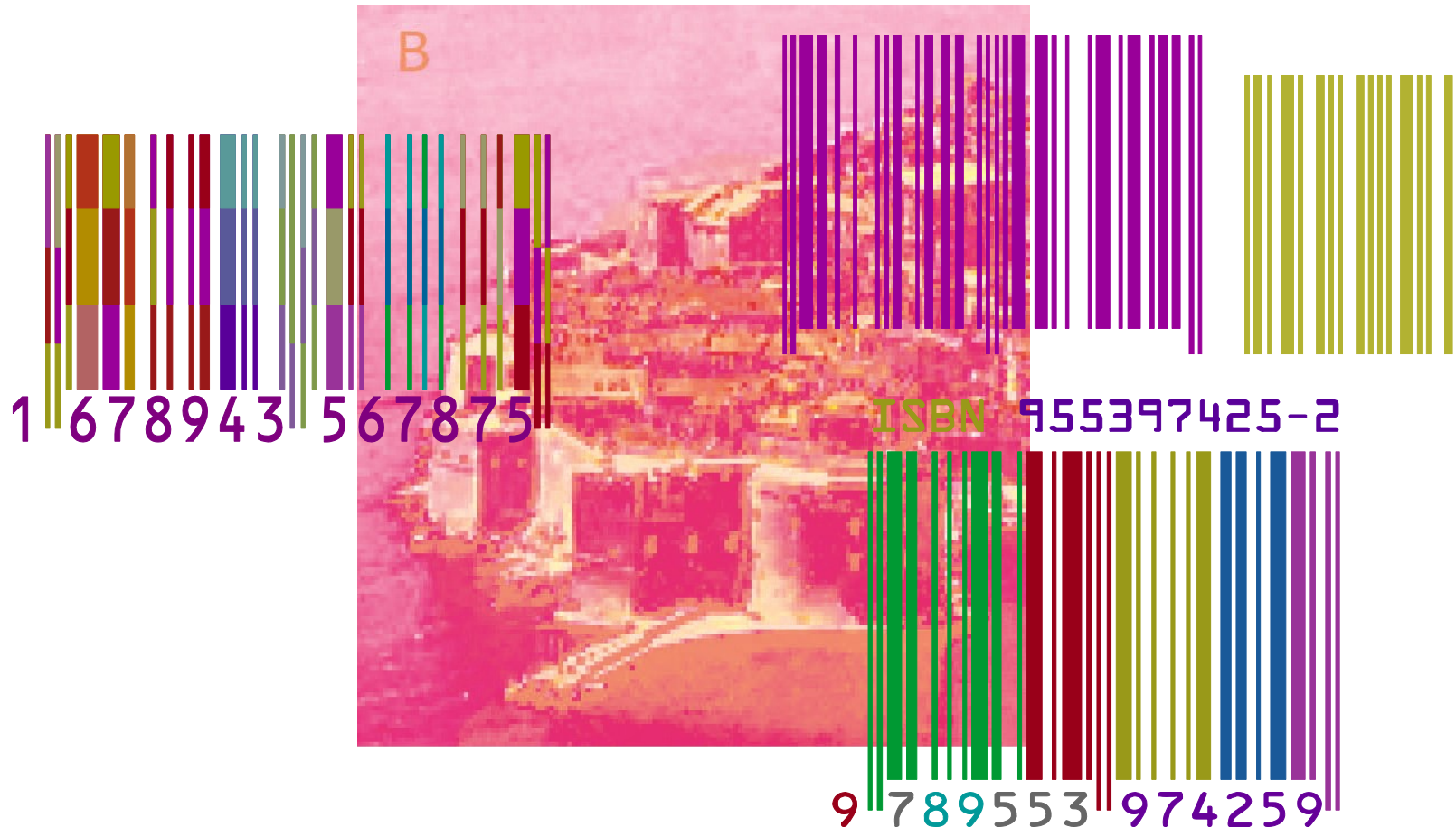
- readable to all barcode readers
- by scanning or coping visual information will stay the same, **but the infrared message is lost**
- **counterfeit packaging will be rejected by the barcode reader**
- **barcode becomes secured**

ISBN 955397425-2



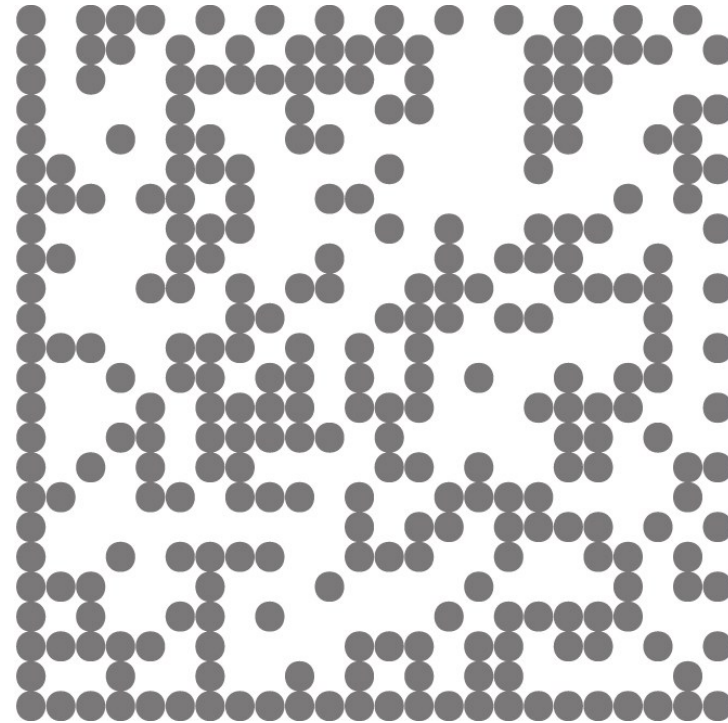
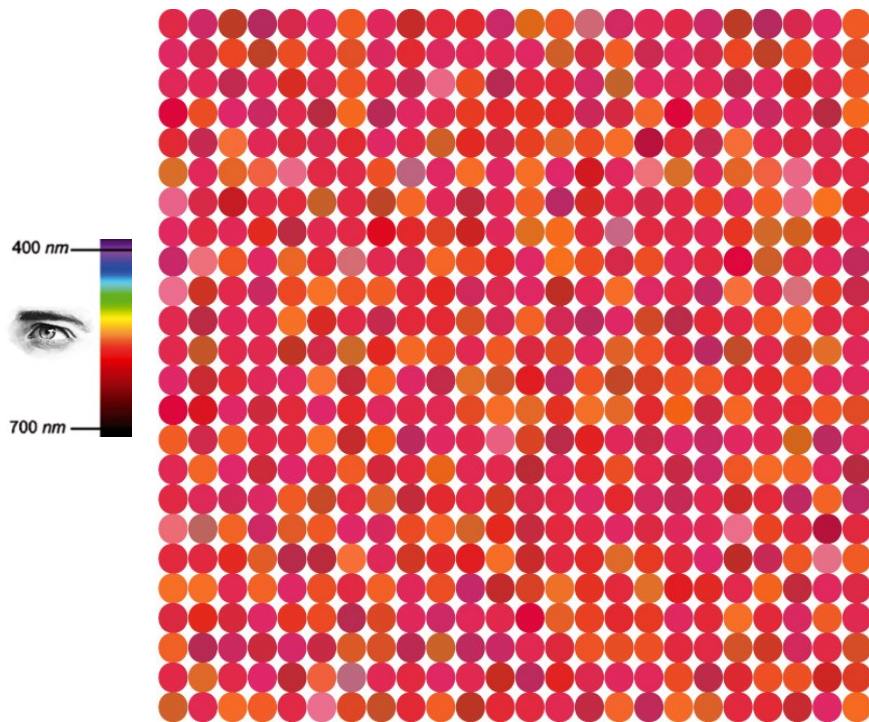
# INFRADESIGN® color barcode

- color barcode on color background - high security
- nowadays need for products with multiple barcodes, for faster recognition by barcode readers



# INFRADESIGN<sup>®</sup> 2D color barcode

- readable to all 2D barcode readers (honeywell 2d, datalogic, motorola)



# INFRAREDESIGN® – Textile products

complete protection of material (silk)





# INFRAREDESIGN<sup>®</sup> – Textile products

complete protection of material (silk)



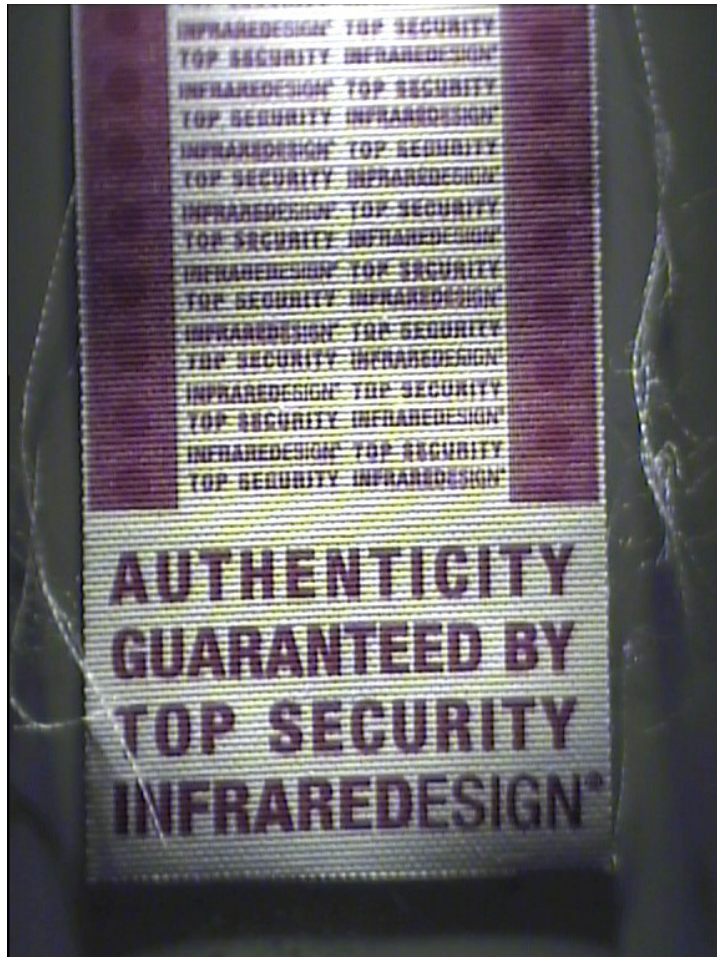
# INFRADESIGN<sup>®</sup> – Textile products, T-shirts

## T-shirt (silk printing)



# INFRADESIGN® – Textile products, tags

IRD protection on clothing tags, labels



# INFRADESIGN® – Textile products, tags

IRD protection on clothing tags, labels – IRD + hologram



# INFRADESIGN® – on Leather





# **INFRADESIGN<sup>®</sup> Security in newspapers**

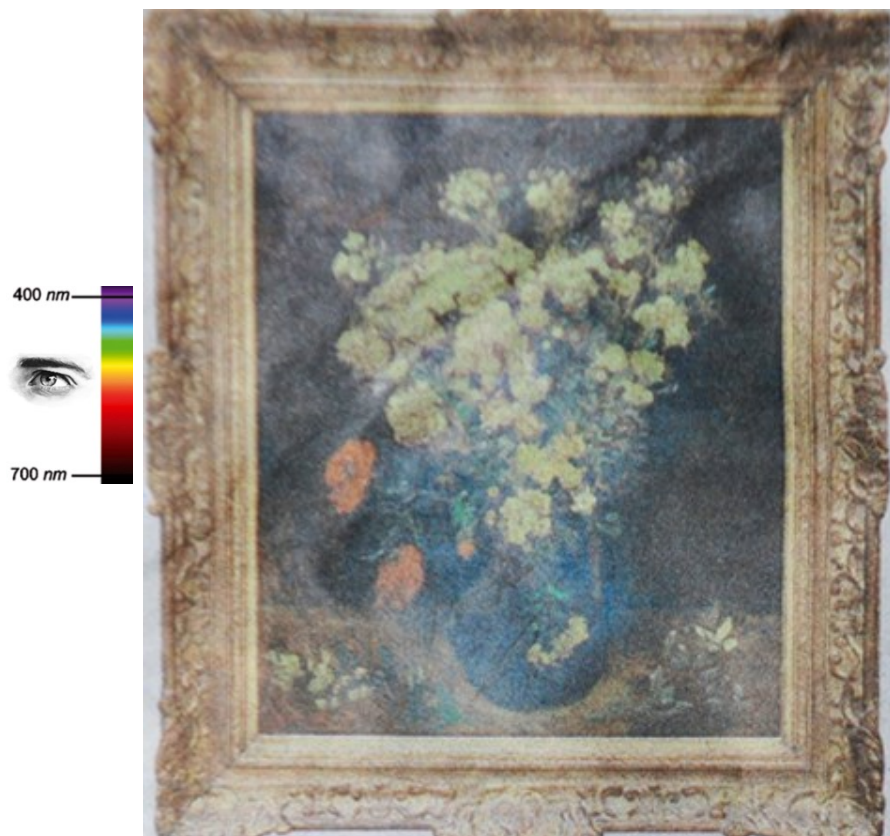
- in the high circulation production of daily newspapers, a double image, double information is set under the rules of Infraredesign (IRD) theory
- includes daily implanting of IR graphic elements in given graphics of daily newspapers
- implementation in the page borders, in the titles of sections, in the issue numbers or regions for which the issue relates and in images
- newspapers, as massive carriers of information are receiving a new security feature: printed image with a built-in invisible image

# INFRADESIGN® Security in newspapers



VJESNIK – issue 27.8.2010. – p. 32., Physicists in Daylight and Albert Einstein in Infrared

# INFRADESIGN® Security in newspapers



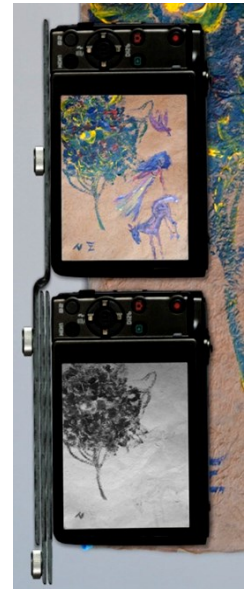
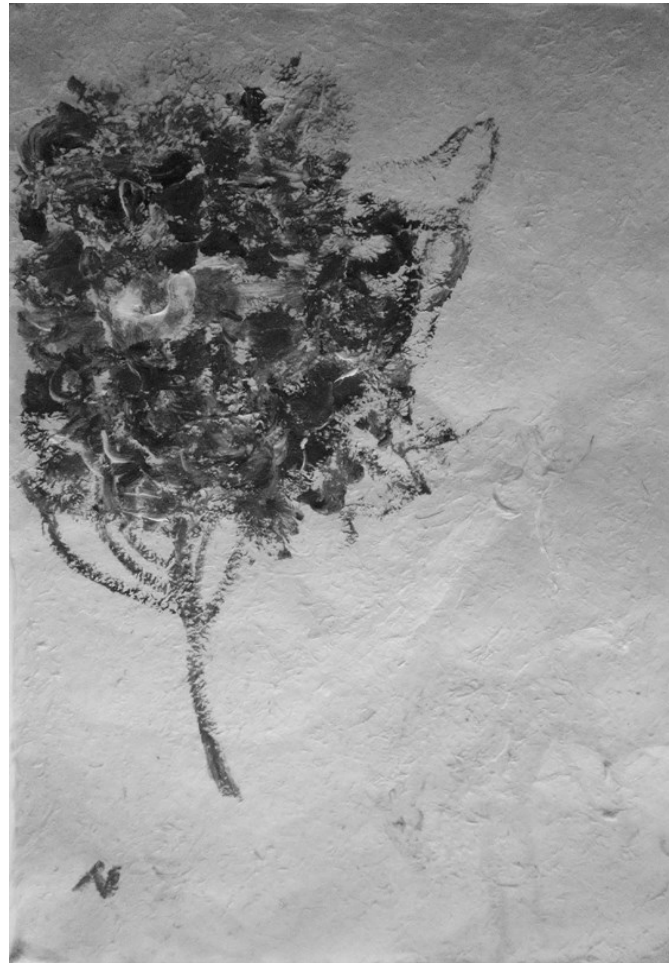
VJESNIK – issue 25.8.2010. – p. 32 Van Gogh



**INFRAREDESIGN® FINE ARTS**



# INFRADESIGN® Fine Arts and security



Nada Žiljak, Exhibition, Hvar, Loggia 2010.



**INFRADESIGN® ZRGB CAMERA**

MONITORING AND QUALITY CONTROL

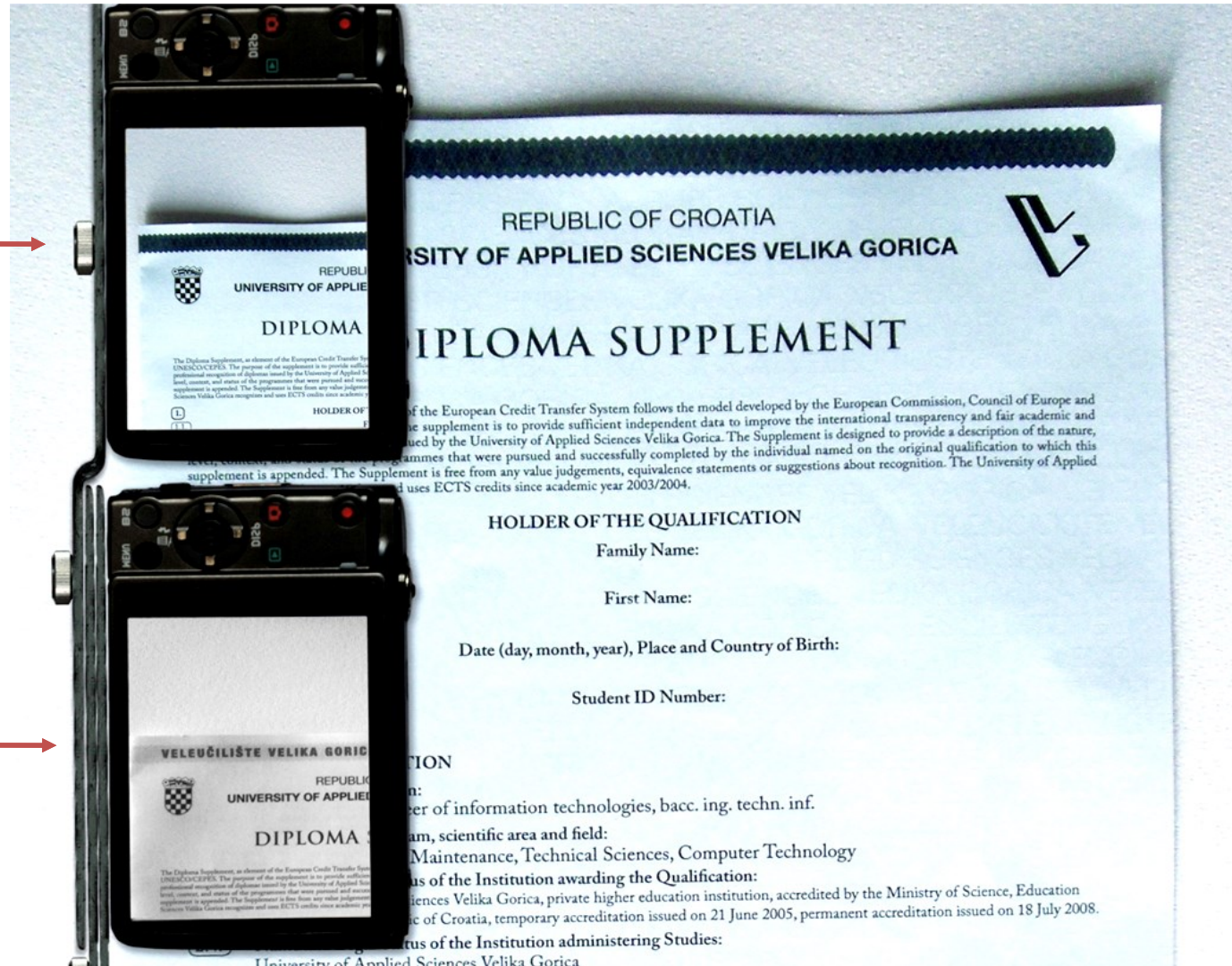


## INFRAREDESIGN® monitoring and quality control:

- + **simple and quick validation** with our **ZRGB camera**  
**with two screens: daylight and infrared**
- + simultaneously two screens, **one** that validates  
human-eye view (standard colour cam) and  
**the other** which validate **INFRAREDESIGN IR** view
- + simple and quick validation with **any camera with infrared**  
**source** (video camera **night view**, security cameras) in total  
darkness

# INFRAREDESIGN® ZRGB camera

for Visual and Infrared spectrum, VIR graphics






**WHY INFRAREDESIGN® ?**



## **Why INFRAREDESIGN® ?**

- + superior brand protection at no extra costs**
- + simple implementation**
- + new marketing**
- + new product positioning**
- + art and design improvement with double information**



# INFRAREDESIGN®: superior technology in relationship to methods currently marketed to fight counterfeit markets

Technology vs. Usage	FujiFilm ForgeGuard	Moire generating raster structure	Watermarks	Embedded Security Fibers	Hologram / DOVID	UV Inks	Thermo-chromic Inks	Optical Variable Inks	Conductive Inks	RFID	EAS Tags	2D Codes	INFRAREDESIGN
Usage on Large-scale formats	1	2	1	2	1	4	3	2	2	1	1	5	5
Printing with standard colours	1	4	1	1	1	1	1	1	1	1	1	5	5
Printing with spot colours	2	4	1	1	1	4	4	4	4	2	2	3	5
Easy identification of security	3	2	3	2	3	4	4	4	3	3	1	3	5
Printing cost reduction	1	3	1	1	1	2	1	1	1	1	1	3	5
Steganografic effect	5	3	2	2	5	3	3	3	2	2	1	3	5
Impossible to scan and copy security	5	2	2	2	3	3	3	3	3	3	2	1	5

5 - Outstanding

4 - Very good

3 - Good

2 - Sufficient

1 - Insufficient



# **INFRAREDESIGN® AWARDS**

# AWARDS & RECOGNITIONS



## **DIAMOND AWARD & GOLD MEDAL**

The 10th British Invention Show & Awards,  
British Innovation & Technology Show,  
**13-16 October 2010, London, UK**



*Grand Prix  
First Runner-Up*

INPEX 2010  
Pittsburgh, PA USA

**GRAND PRIX & GOLD MEDAL  
INPEX 2010**

Invention & New Product Exposition,  
Pittsburgh, PA, USA

INVENTHELP'S  
**INPEX**<sup>®</sup>  
AMERICA'S LARGEST INVENTION SHOW

DATE June 18, 2010

\$ 3,000.00

PAY TO THE ORDER OF

Vilko Ziljak, Klavdija, Jana Vojic Ziljak, Jana Ziljak

Three Thousand 00/100

DOLLARS

Grand Prix 1st Runner-Up

25th Anniversary

Nicole HAIT

NICOLE HAIT, TRADE SHOW DIRECTOR



<http://www.inpex.com/special-awards.aspx>



**NIKOLA TESLA  
ANNUAL AWARD**  
Croatian Inovator Association  
**BEST CROATIAN INOVATOR  
FOR 2009**


[www.infraredesign.net](http://www.infraredesign.net)



**British Invention Show  
DOUBLE GOLD AWARD**



**GENEVA INVENTIONS  
Salon International Des  
Inventions  
CITY OF GENEVA  
AWARD**



Na temelju članka 38. točke 28. Statuta Grada Zagreba i članka 11. stavka 1.  
Odluke o javnim priznanjima Grada Zagreba,

## GRADSKA SKUPŠTINA GRADA ZAGREBA

na 12. sjednici, 18. svibnja 2010. godine, donijela je Zaključak kojim se

dodjeljuje

# NAGRADA GRADA ZAGREBA

doc. dr. sc. IVANI ŽILJAK STANIMIROVIĆ

za veliki doprinos unapređivanju grafičkog dizajna, osobito zaštiti od krivotvorenja. Izum *Infraredesign*, za koji je širom svijeta osvojila 25 međunarodnih priznanja i nagrada zajedno sa svojim suradnicima, potpuno je nova i jedinstvena zaštita koja u potpunosti štiti proizvode od krivotvorenja. Radi se o grafičkoj inovaciji koja je do sada primijenjena na ambalažama lijekova, diplomama te na dizajnu tekstila, košulja i majica. Objavila je i 46 znanstvenih radova i tri knjige.

# INFRAREDESIGN® awards



## EURO INVENT 2010

European Exhibition of Creativity  
and Innovation  
**GOLD MEDAL +  
"GRAND PRIZE 2010"**

## BFIIN

British Female Inventors &  
Innovators Network  
**SPECIAL AWARD**

## I-CAT 2009

Inter National  
Conference on Anti-  
Counterfeiting  
Technologies  
**INDIA**

**ARHIMED  
Moscow  
GOLD MEDAL**

# INFRAREDESIGN® awards



**TIIS  
Taipei  
International  
Invention  
Show  
SPECIAL  
AWARD**



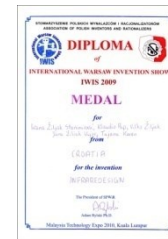
**TIIS  
Taipei  
International  
Invention  
Show  
SILVER  
MEDAL**



**INOVA  
Croatian  
Association of  
Invention  
GOLD  
MEDAL**



**INOVA  
Croatian  
Associati  
on of  
Invention**



**IWIS -  
Internatio  
nal  
Warsaw  
Invetion  
Show  
MEDAL**



**GWIIN  
Global  
Women  
Inventors  
England  
&  
Innovator  
s Network  
GOLD  
MEDAL**



**IFIA  
International  
Federation of  
Inventors'  
Associations  
GOLD MEDAL**

# INFRAREDESIGN® awards



**MRAK**  
Mreža za Razvoj i Kreativnost  
**1st AWARD**



**EURO INVENT  
2009**  
European  
Exhibition of  
Creativity and  
Innovation  
**GOLD MEDAL**



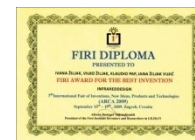
**MARS**  
**Malaysian**  
Association of  
Research  
Scientists  
**GOLD MEDAL**



**IENA**  
International  
Trade Fair  
**GOLD MEDAL**



**GENEVA**  
**INVENTIONS**  
Salon  
International  
Des Inventions  
**GOLD MEDAL**



**FIRI**  
International  
Fair of  
Inventions,  
New Ideas,  
Products and  
Technologies  
(ARCA)  
**BEST  
INVENTION**



**FIRI**  
International  
Fair of  
Inventions,  
New Ideas,  
Products and  
Technologies  
(ARCA)  
**GOLDEN  
ARCA**



**BIS**  
**British**  
Invention  
Show  
**GOLD MEDAL**



**INFRAREDESIGN®**

**Contact:**

**Prof. dr.sc. Klaudio Pap**

Faculty of Graphic Arts Zagreb, Croatia

Tel: + 385 1 6 157 157

Fax: + 385 1 6157 134

Mobile: + 385 91 1216 946

**e-mail: [klaudio.pap@gmail.com](mailto:klaudio.pap@gmail.com)**

<http://www.infraredesign.net/>