
SECURITY PRINTING CONTROL SOLUTIONS

PARVIS

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# UV FEATURE CHARACTERISTICS MEASUREMENT IN BANKNOTE PRODUCTION

WorldBanknoteSummit

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# Agenda

- Security features control in banknote printing
- Substrate and ink UV characteristics
- PARVIS UVision: a new hand-held device for UV emission measure
- Conclusions

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## A Machine-Readable Security Feature (MRSF)

- Is (usually) a security feature of level 2 or 3
- It is not visible to naked human eyes
- Can be measured by specific tools
- It should be designed to be:
  - Accurate (for detection by Banknote Handling Machines - BHMs)
  - Robust (for re-circulation checks)
  - Not easily reproducible by counterfeiters

The correct key is to optimize
feature security, detection easiness, and integration into narrative elements

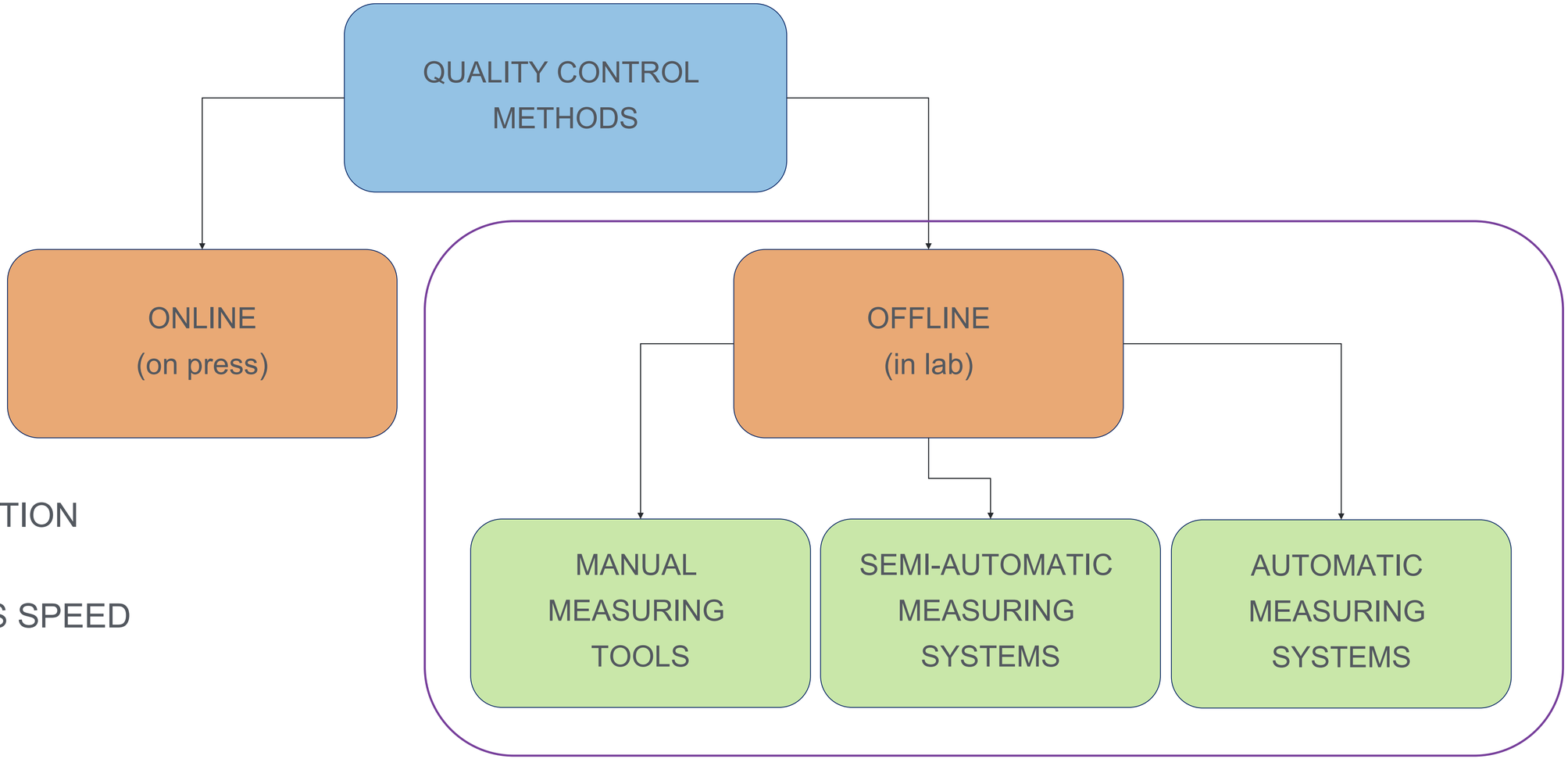
## Why should MRSF quality be checked during design and production phases?

Defective MRSFs may lead to undesired side effects:

- High banknote discard rates by single note sorting machines
- End user stress in case of iterative banknote rejections of BHMs
  resulting in the reduction of end user confidence in banknotes as payment method


In production, certified measure and control of MRSFs are MANDATORY

## How are MRSFs checked in production nowadays?




- ✓VIBRATIONS
- ✓DIRT
- ✓HARD CALIBRATION PROCEDURES
- ✓HIGH PROCESS SPEED

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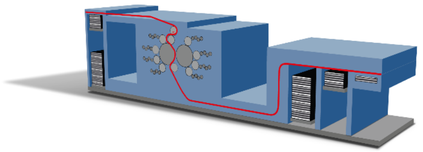
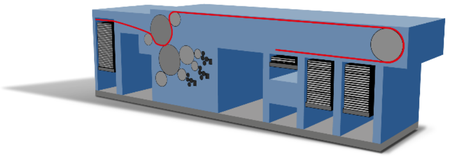
## Offline manual measuring tools

PRODUCTION LINE

INCOMING PAPER



OFFSET PRINT



INTAGLIO PRINT

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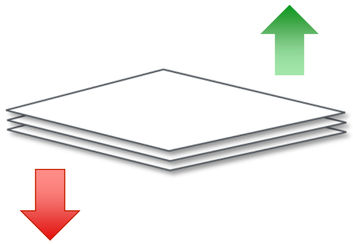
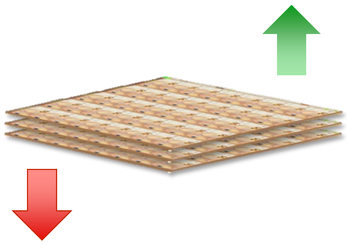
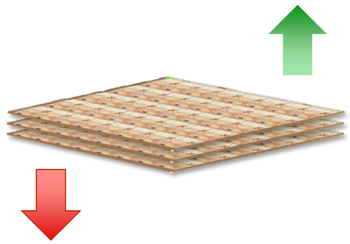
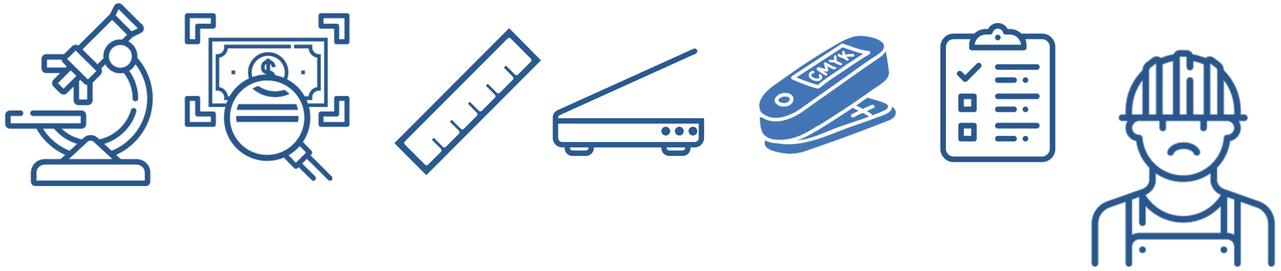






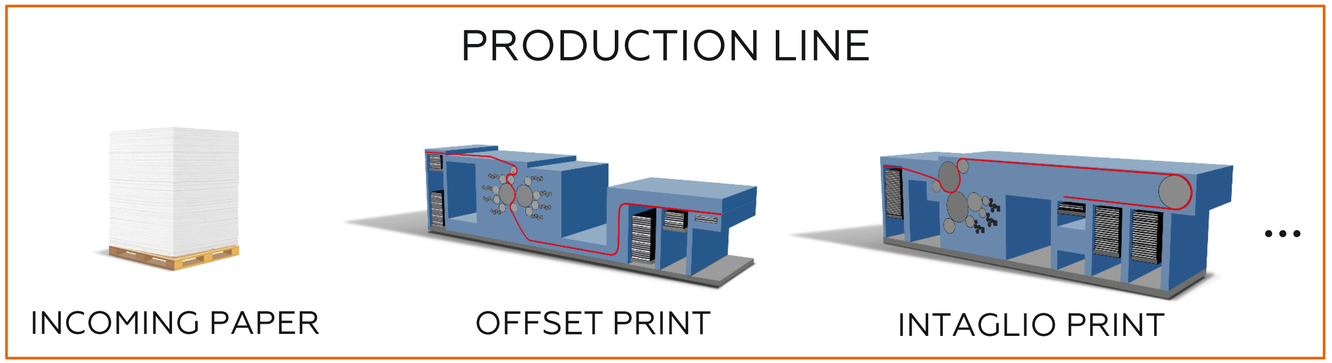
- Many lab tools
- Manual tool calibration
- Measure accuracy is operator dependent
- Expensive and time-consuming tasks
  - Few measured sample sheets
  - Long response time
- Error prone method!

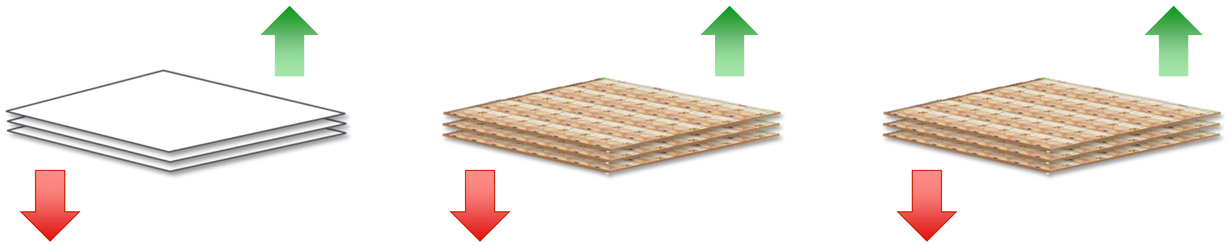
LABORATORY




# Security features control in banknote printing

## Offline automatic measuring systems




- Few tools
- Automatic system calibration
- More accurate and reliable measures
- Faster measuring execution
  - More measured sample sheets
  - Faster response time
- Generation of a variety of statistical data and reporting
- Operators focus on data analysis

# Security features control in banknote printing

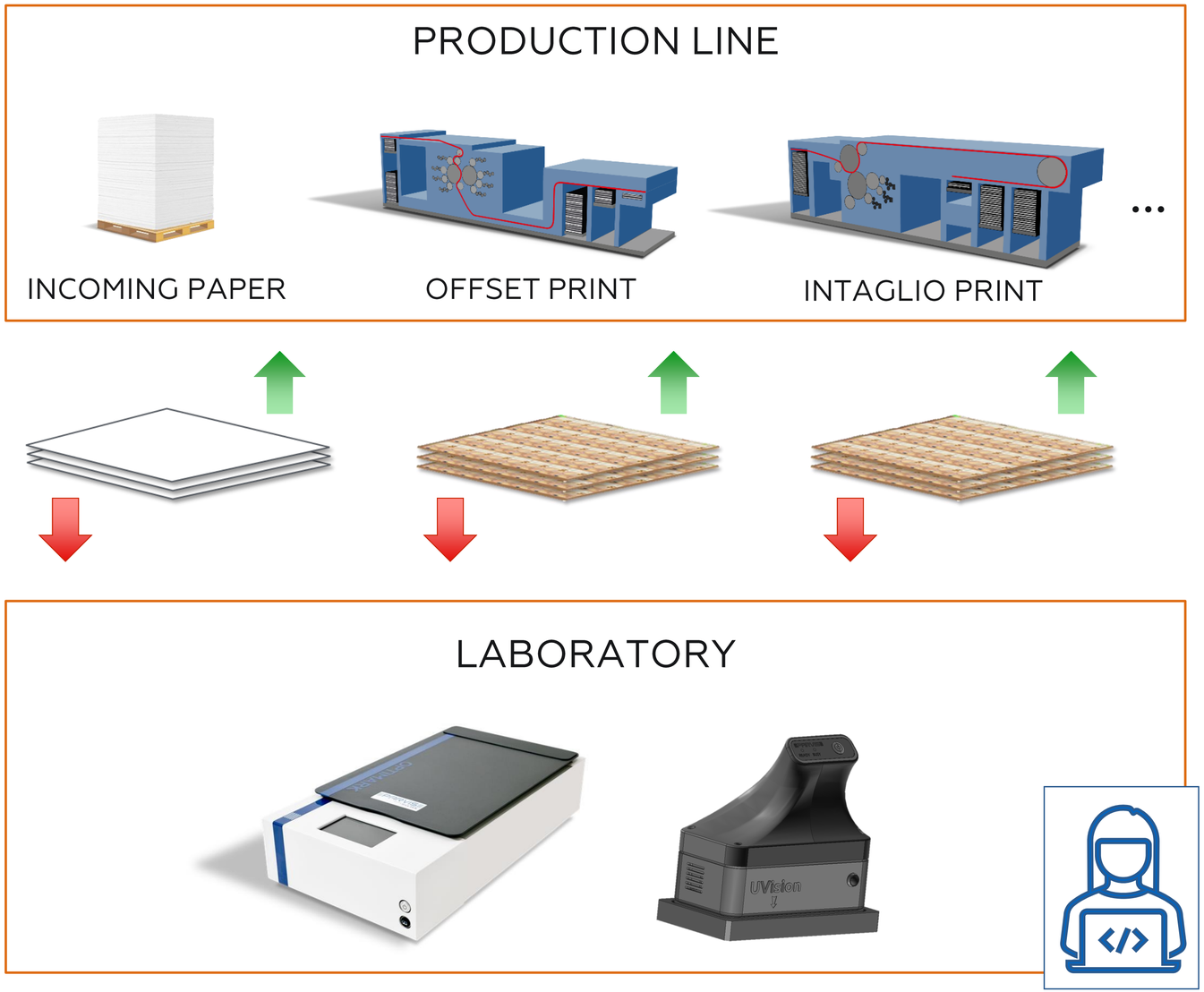
Proxima-substrate / Proxima-offset


Proxima-intaglio

## Offline automatic measuring systems

- One shot inspection of front, back and transparency of substrate and offset printed sheets
- Inspection of freshly printed intaglio sheets
- Integrity of substrate and offset/intaglio print
- Inking
- Registers
  (plate-to-plate, print-to-substrate, recto-verso, intaglio-to-offset)
- Geometry, registers and integrity of substrate security features
  (security thread, iridescent stripe, watermark, OVD stripe, window)
- Control and measure of printed security features
  (SC-marks, IR inks response, IR inks transition lines and contamination)

## Offline semi-automatic measuring systems




All the advantages of the fully automatic measuring systems with a slightly higher user interaction

## Offline semi-automatic measuring systems

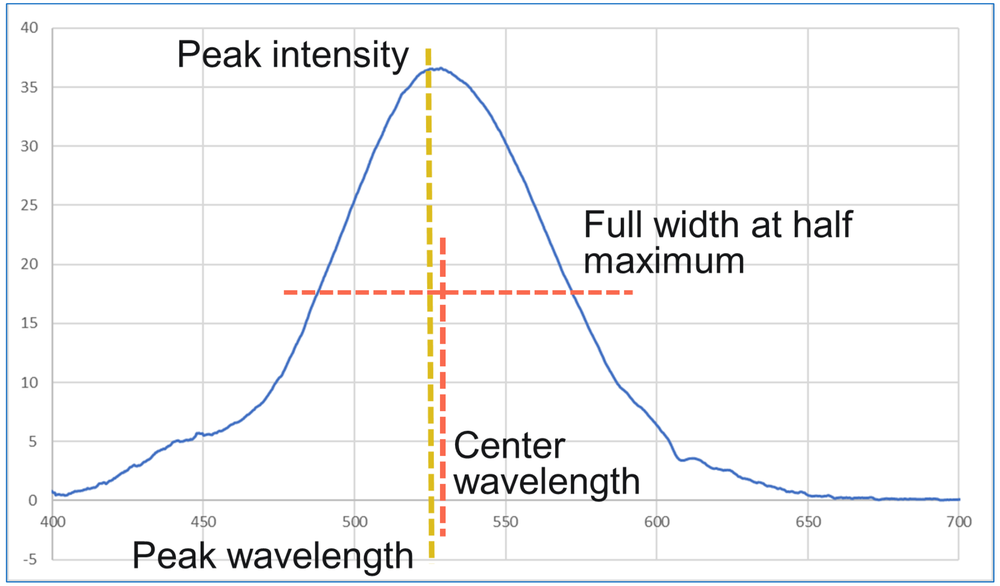
Inspection of single or multiple banknotes for:

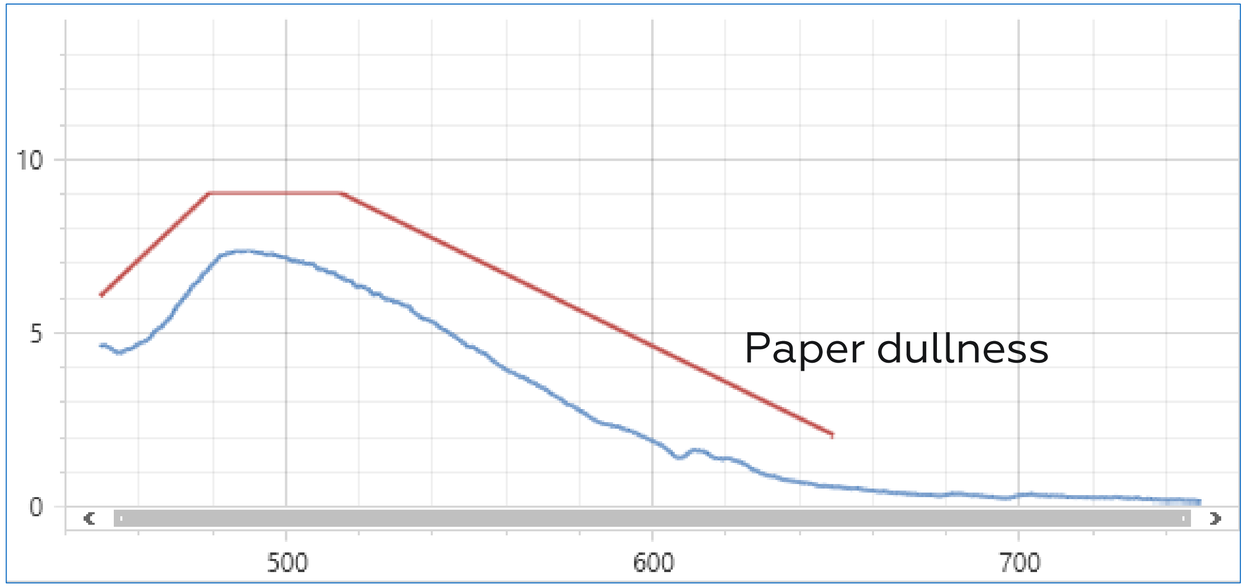
- Measure and control of SC marks characteristics
- Measure and control of substrate and inks UV emission

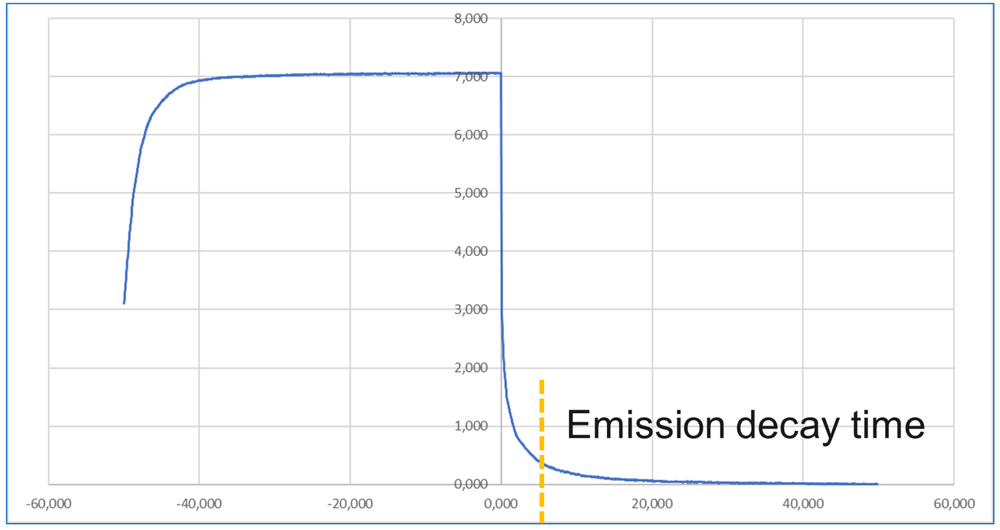

UVision

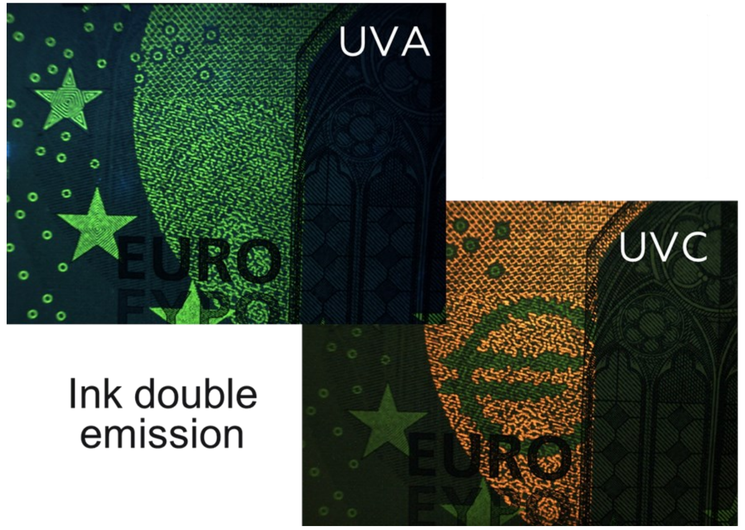

Optimark

# Ink and substrate UV characteristics

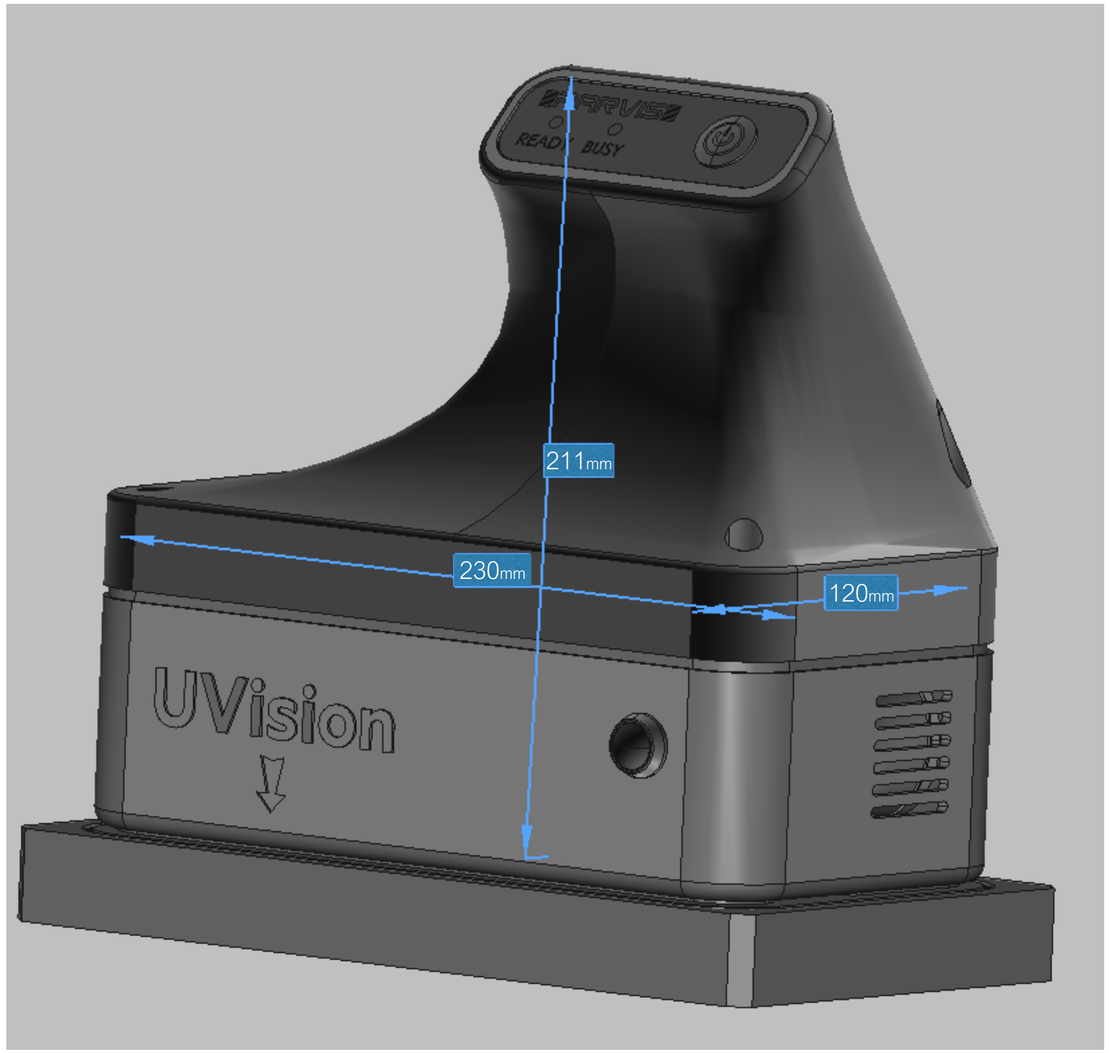


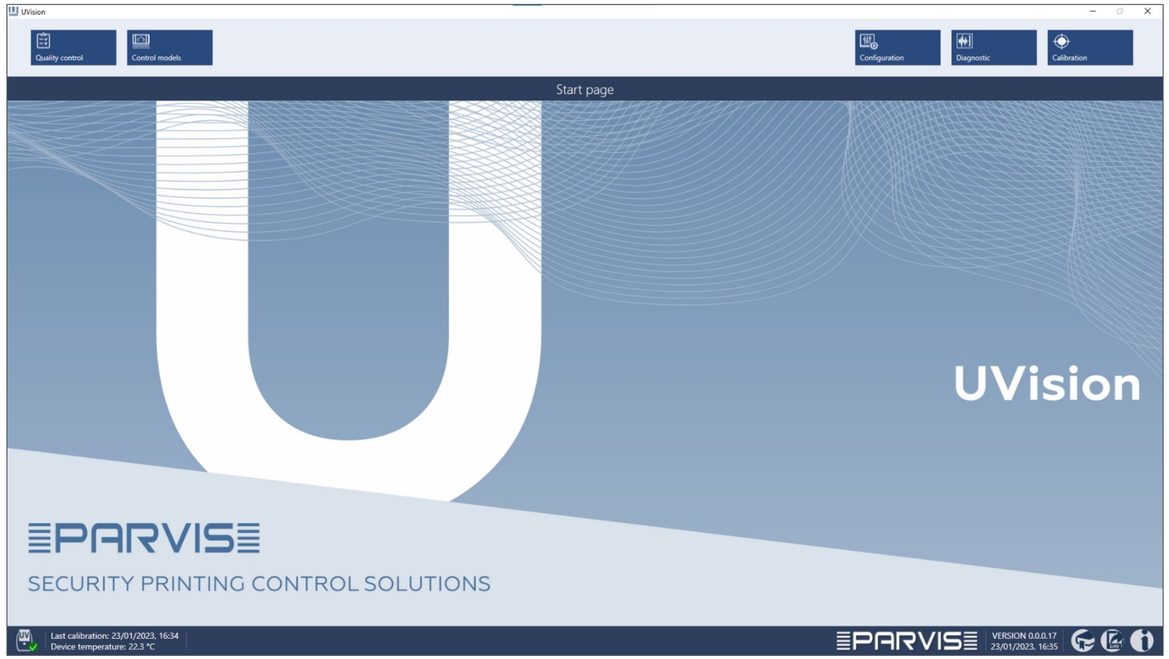



# PARVIS UVision: a new hand-held device for UV emission measurement




- Device
- Calibration plate
- Wet ink measurement setup
- Software

Visit our booth to meet the device!

# PARVIS UVision: a new hand-held device for UV emission measurement

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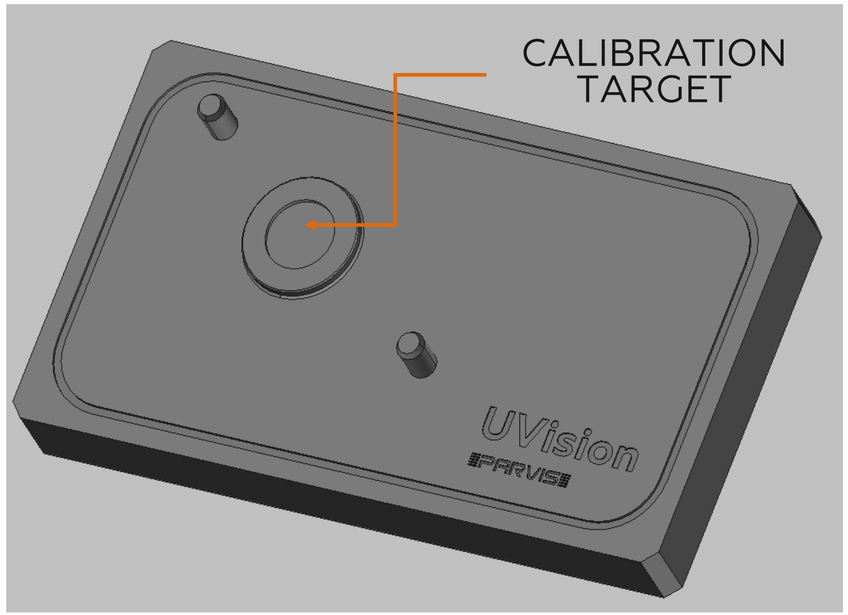
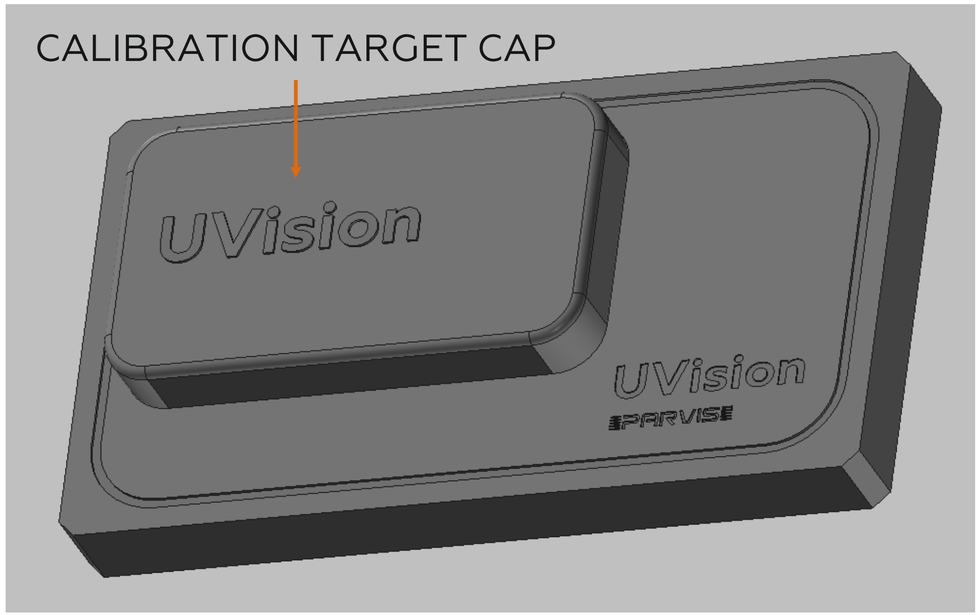
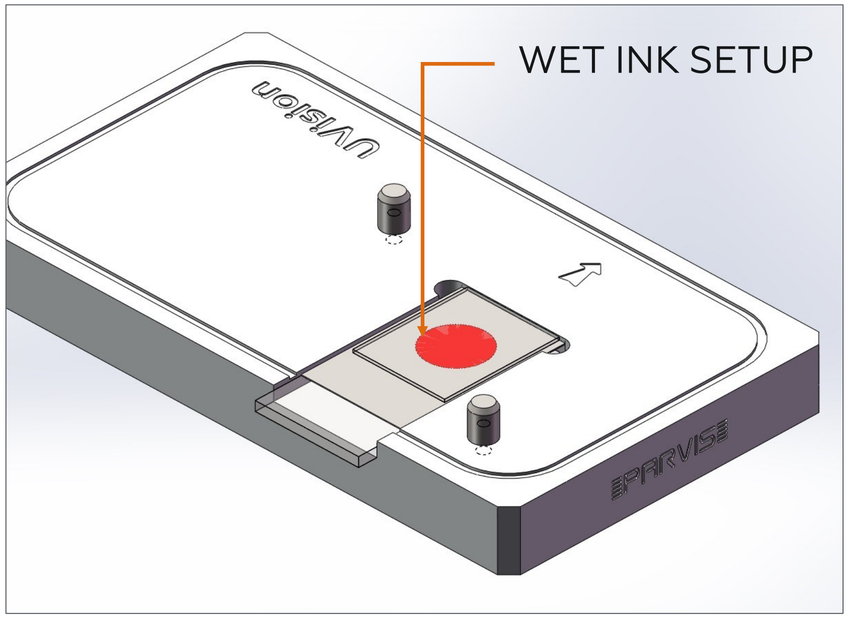
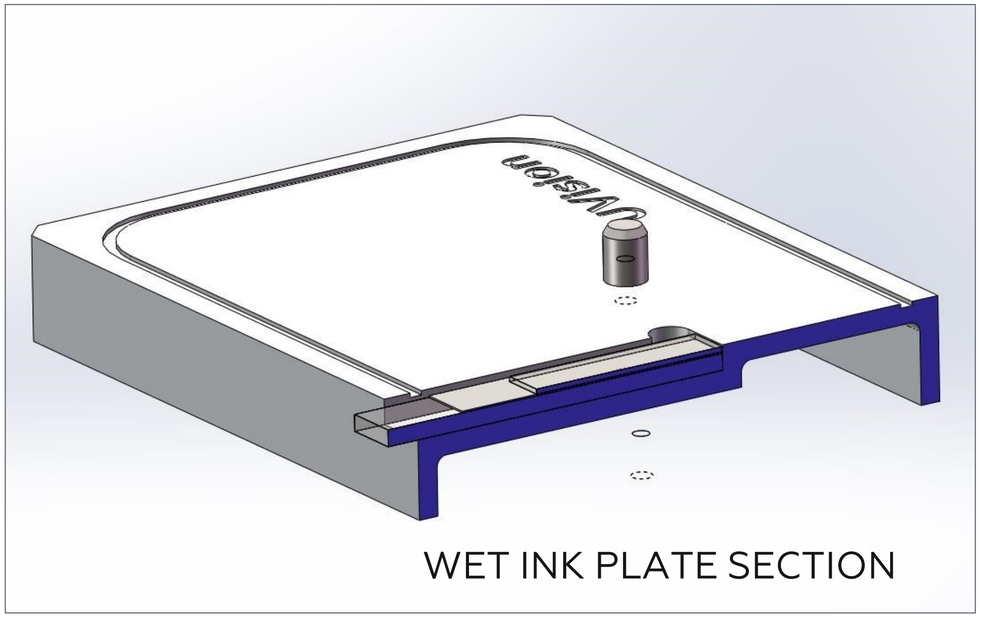
## CALIBRATION PLATE




## WET INK PLATE



# PARVIS UVision: a new hand-held device for UV emission measurement

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## UVA:

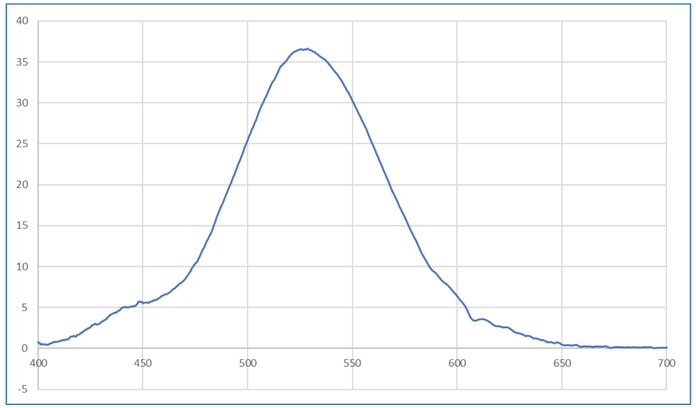
- Spectrum measure (4x4mm acquisition area):
  - Up to 3 peaks
    (wavelength, intensity, full width half maximum, center wavelength)
  - Paper dullness
    (the emission spectrum must be below a reference)
- Decay time measure (min. 20µs)
- Display of the UVA image

## UVC: only display of the UVC image

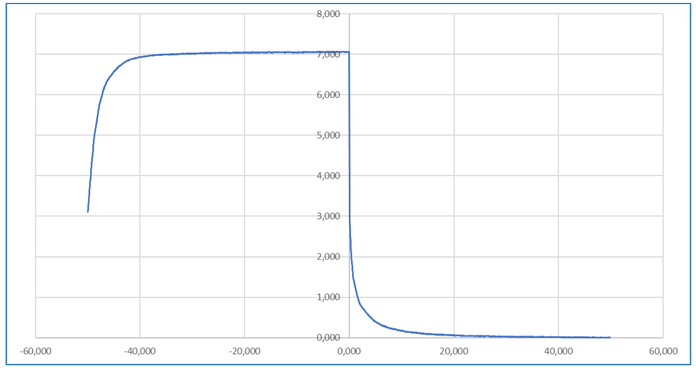
## UVB Ready

## Possible future developments:

- Substrate UV fibers counting
- UVB and UVC measures and controls
  (depending on the LEDs available on the market)




UVA SPECTRUM




UVA DECAY TIME

UVA IMAGE

UVC IMAGE

# Conclusions

**MRSFs should be designed…**

- To be hardly counterfeitable
- To be easily measured/checked

**In production, MRSFs must be checked…**

- To reduce waste
- To increase the feature accuracy and robustness
- Preferring automatic measuring systems to manual tools

**Measure and control of substrate and ink UV emission is more and more of interest…**

- UVision is a semi-automatic offline lab tool which allows:
  - measuring the main UV spectrum characteristics and the decay time,
  - controlling the substrate dullness,
  - showing multiple emission images of samples excited by different UV light sources

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THANK YOU FOR YOUR ATTENTION