BANKNOTE TECHNOLOGY REPORT

BTR
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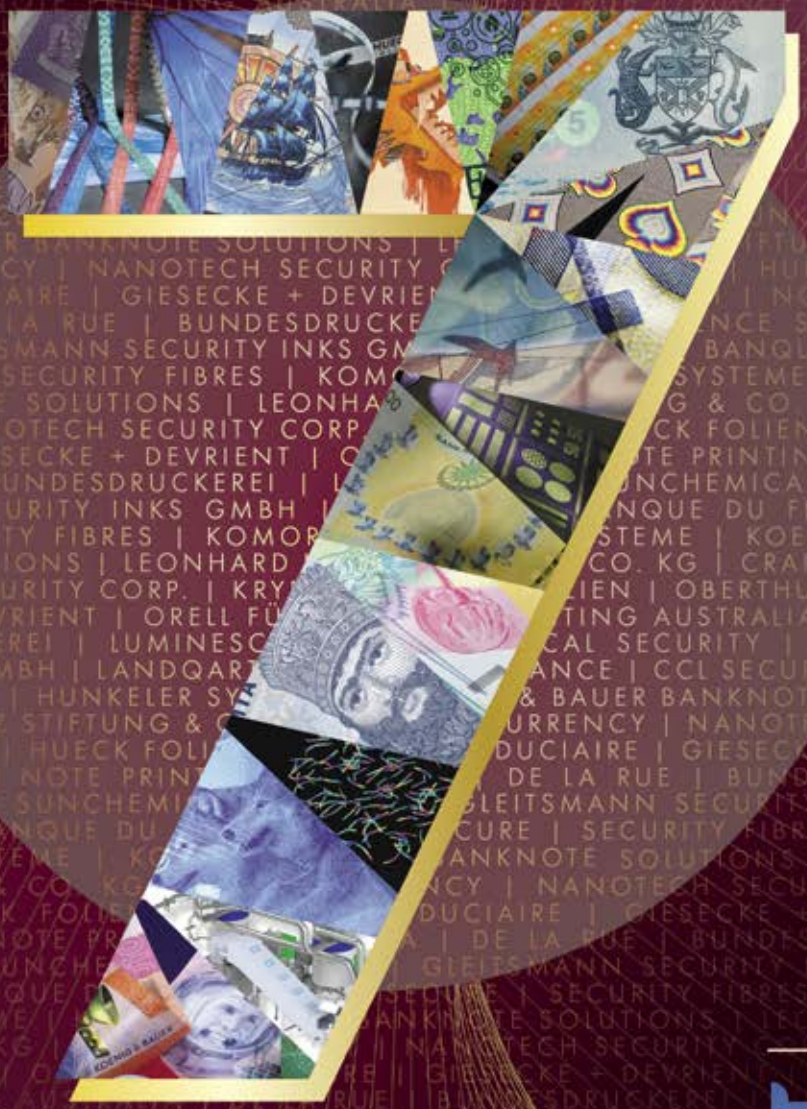

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A new paradigm in banknote security

Wide variety of eye-catching movements

Multiple bright metallic colors

Magnetism, IR or UV available

Fine-line partial metallization including micro- and nanotext

KURZ is a fully independent supplier of foil-based features to banknote printers and papermakers.

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Internet: www.kinegram.com
www.kurz-world.com

Request your samples **here** >

KURZ Technology – The Essential Element

The Banknote Technology Report is a platform where the latest technological developments and features are centralized on a regular basis.

IMPRINT

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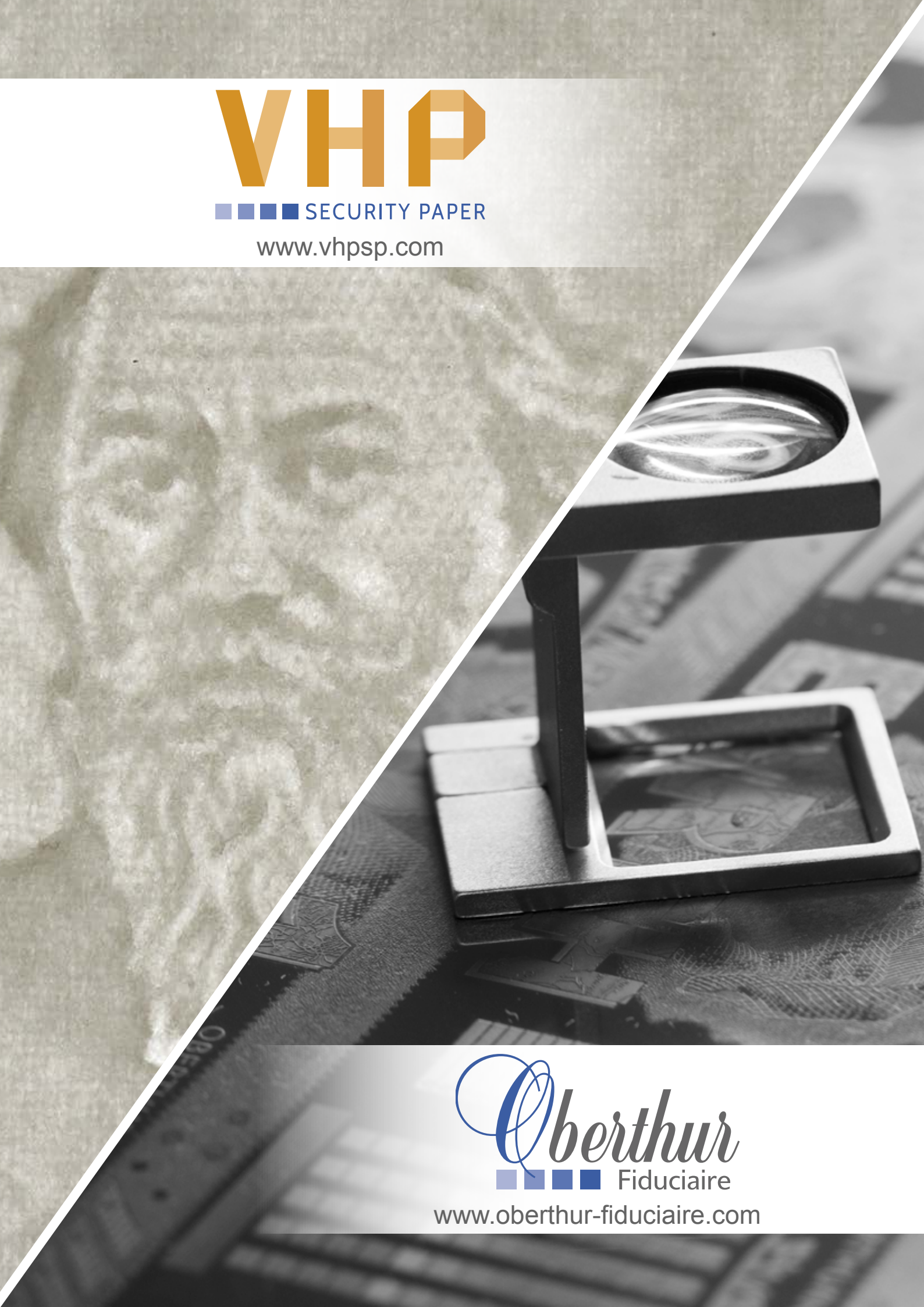

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FEATURES


KURZ
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CLICK OR SCAN

LEONHARD KURZ
STIFTUNG & CO. KG

PULLING THE STRINGS WITH KURZ THREADS AND KINEGRAM

Pulling the strings with KURZ THREADS and KINEGRAM

LEONHARD KURZ STIFTUNG & CO. KG

KURZ pioneered the development of foil-based security solutions for banknotes. We grew strong roots in the production of hot-stamping patches and stripes for all types of banknote substrates. In over 30 years, our solutions were applied to some of the world's most important currencies, allowing us to gain a leading edge in the manufacturing and delivery of foil-based features.
In other words, we collected vast resources of technical knowledge that is now being put to new use with KURZ THREADS, the latest addition to our portfolio of solutions.

While offering our foil products in the format of security threads is a novelty for KURZ, we can confidently build on the industry-leading experience of our engineers. The same know-how that goes into our surface-applied products is also the basis of our threads – including, most importantly, the adherence to technical specifications regarding quality and durability.

Surface-applied foil features and threads are actually closely related; their production and composition are quite similar. The same is true for the purpose of these features – both surface-applied foils and security threads are primarily first-line features aimed at the general public. With a prominent appearance, they are designed to be easily spotted and used for banknote authentication.

KURZ distinguishes itself not only by unparalleled know-how on foil production and application, but also by the unique KINEGRAM technology for the creation of outstanding visual effects. The one-of-a-kind, proprietary KINEGRAM technology allows you to create striking and clearly defined effects that conventional e-beam holography cannot achieve. Consequently, KINEGRAM features are immediately recognizable even by the untrained eye, enabling intuitive verification.

These characteristics are clearly reflected in the registered KINEGRAM ZERO.ZERO foil stripe on the new Australian $100 banknote. KURZ is providing KINEGRAM foils for all denominations of the Australian Dollar, applied in each case over a top-to bottom transparent window in the polymer substrate. Among other things, the foil features a stunningly three-dimensional fan motif with colorful lines and a beautiful rendering of an Australian Masked Owl that lights up in brilliant greyscale tones when the note is being tilted. It is worth noting that all industrially produced banknote series on polymer substrates use KURZ foils.

Over the last few years, the allotted areas for surface-applied foils have become wider and window areas in banknotes have become larger, both developments leading in turn to ever more detailed designs and effects. Obviously, even an extra-wide thread of up to 6 mm width cannot offer the same surface area and thus, clever design is extremely important. The KINEGRAM technology offers a range of highly distinct effects that work extremely well even on the small areas of a windowed security thread.

As such, a thread can also work as a valuable supplement to a surface-applied foil or registered stripe, offering additional opportunities for creating a 'character' for a banknote series and further facilitating design integration.

CUSTOMIZING EFFECTS AND COLORS - ENHANCING SECURITY AND DESIGN

Consequently, with our new line of KURZ THREADS, we aim to propose new perspectives for the security and design of banknotes. A standalone solution in the industry, our threads can combine:

- The unique KINEGRAM origination technology for best-performing visual effects, such as the KINEGRAM FLUX Effect for highly pronounced movements in various directions, and
- KINEGRAM COLORS, allowing the design of a security thread in multiple colors and color combinations.

REGISTERED KINEGRAM ZERO.ZERO STRIPE ON THE NEW AUSTRALIAN $100 BANKNOTE

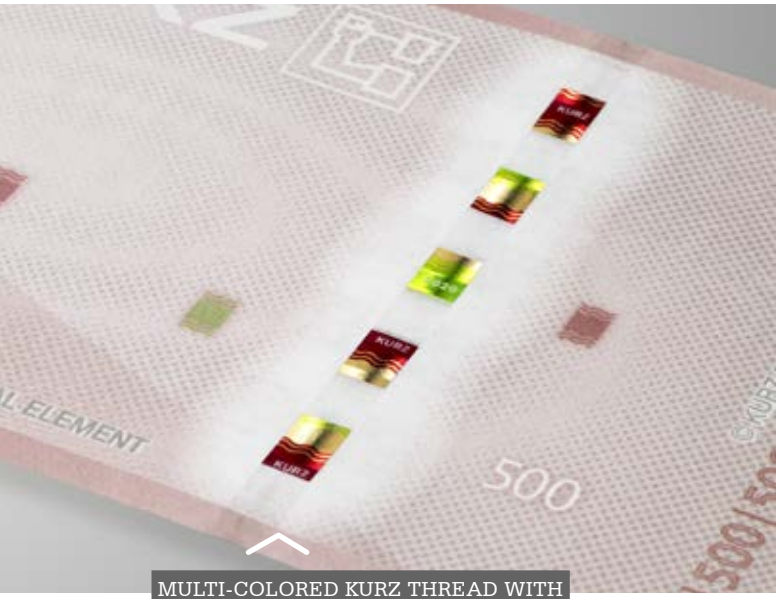
KURZ THREADS IN DIFFERENT VARIATIONS USING KINEGRAM COLORS AND FLUX EFFECT (SUBSTRATE EMBEDDING BY LANDQART)

The combination of FLUX Effect and KINEGRAM COLORS results in eye-catching movement effects, visually enhanced by adding brilliant colors that can mirror or contrast the banknote design. A KURZ THREAD can include multiple unique effects, based on the KINEGRAM technology platform, which cannot be created with any other technology in the market.

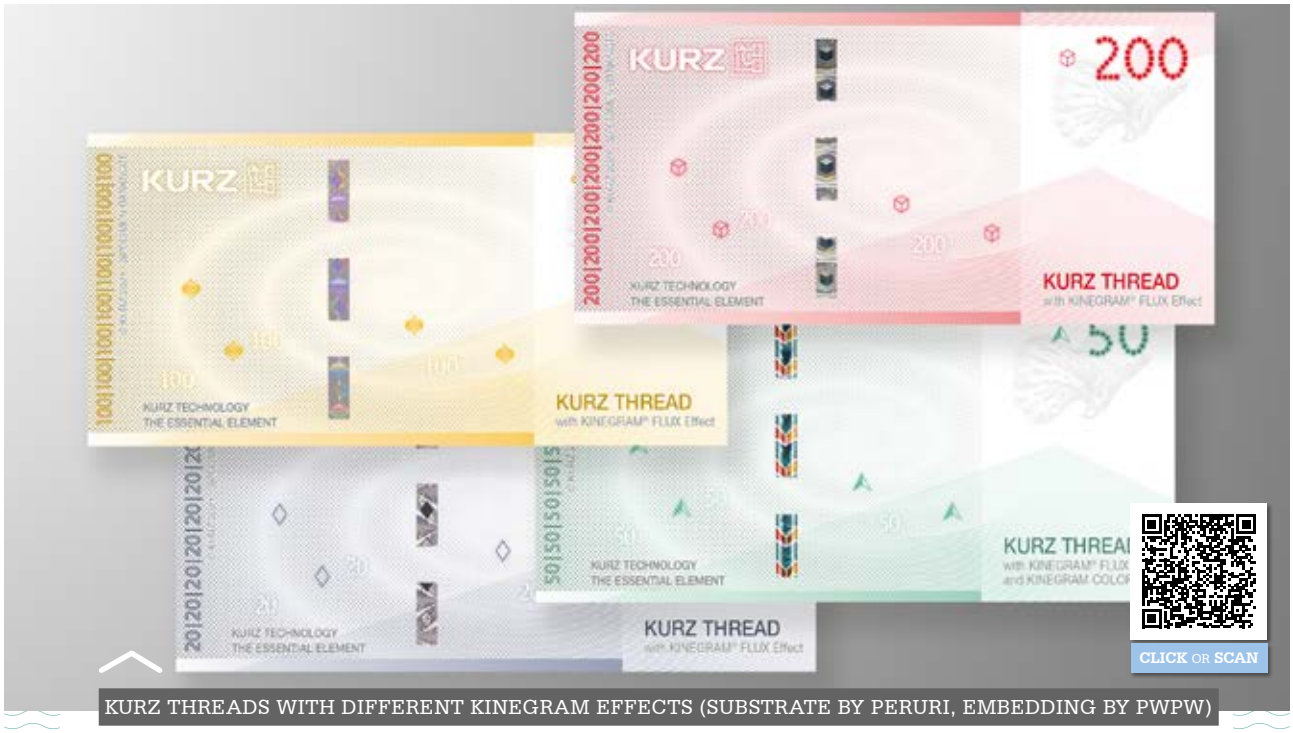
The colors of a security thread can be customized to the individual needs of a customer. KINEGRAM COLORS is a combination of metallization and perfectly aligned colors.

LATEST KURZ THREADS DEVELOPMENTS

Building on the industrially produced samples that were unveiled in 2020, new varieties devised in recent months include additional visual effects based on the KINEGRAM origination technology. Additionally, the portfolio of colors has been enlarged further, making a broader selection available for designers and customers.



MULTI-COLORED KURZ THREAD WITH KINEGRAM COLORS AND FLUX EFFECT (SUBSTRATE EMBEDDING BY LANDQART)



KURZ THREADS WITH DIFFERENT KINEGRAM EFFECTS (SUBSTRATE BY PERURI, EMBEDDING BY PWPW)

The new samples, available with immediate effect, showcase a selection of the best performing visual effects and appearances, including extraordinary effects such as a scissor-shaped movement or diamond-shaped lens-effects. They also illustrate the outstanding possibilities offered by KINEGRAM COLORS technology and are equipped with highly detailed partial metallization.

KURZ THREADS WITH COSMIC TECHNOLOGY

A new rising star in terms of visual appearance, KURZ THREADS can also be equipped with the COSMIC effect, short for color shift with metallic colors. These threads are created using a thin-film based interferometric technology, and exhibit a very bright and clear metallic surface with a prominent color change when the banknote is tilted. Among other options, the colors can shift from pink to green or yellow to blue, allowing for a highly accentuated contrast and optimized recognition.

Partial metallization added into the thread enables the incorporation of finely designed images, for example depicting the denomination numeral, or other design elements. In addition to the colorization,

KURZ THREADS WITH COSMIC TECHNOLOGY 'PINK TO GREEN' (SUBSTRATE EMBEDDING BY LANDQART)

this can further link the thread to the banknote design. Unlike other threads in the market, the partially metallized design elements can appear in a stable color, contrasting strongly with the color shifting effect in the background.

COMPREHENSIVE DESIGN AND SECURITY: KURZ THREADS COMBINED WITH SURFACE APPLIED KINEGRAM

An ideal opportunity for maximizing security and design integration presents itself to banknote designers and customers by a clever combination of KURZ THREADS and a surface applied KINEGRAM patch or stripe. Besides opening up lots of creative potential, cross-referencing between banknote print, thread design and a foil element greatly increases both the attractiveness and the security of a banknote. By using combinations of colors as well as harmonizing optical structures and effects, counterfeiting threads can effectively be warded off, and a contemporary visual appearance can be achieved with minimal effort.

This principle of cross-referencing communicating features is illustrated by the new house note by Indonesian security printer PERURI. Their specimen note 3.0, its main motifs telling the story of the mythological Garuda bird-animal, contains a KURZ THREAD and a registered KINEGRAM COLORS stripe. Both features are designed to fit in with the theme of the note. The thread in an auburn red color contains a striking Surface Relief effect with a 3D impression, depicting a Garuda feather, and the demetallized text 'PERURI' and 'KURZ'. The registered KINEGRAM COLORS stripe in auburn red and gold colors boasts several visual effects, among which are an image flip

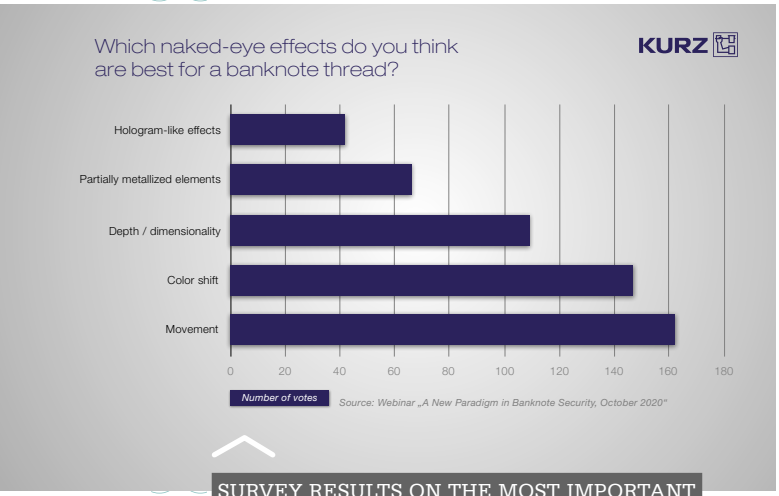
PERURI HOUSE NOTE USING A REGISTERED KINEGRAM COLORS STRIPE AND A KURZ THREAD WITH KINEGRAM COLORS

between the company name PERURI and the figure '3.0', as well as highly precise fine-line movement effects imitating the flapping wings of a Garuda.

DIGITAL PRODUCT LAUNCH AND WEBINAR

The ongoing Covid-19 pandemic not only resulted in higher volumes of cash in circulation around the world, but also doubtlessly accelerated the journey from physical to digital currencies and related solutions. At KURZ, we have ramped up our digital capabilities, resulting in the possibility of offering highly advanced, perfectly detailed digital foil and thread animations, as well as creating a highly successful webinar.

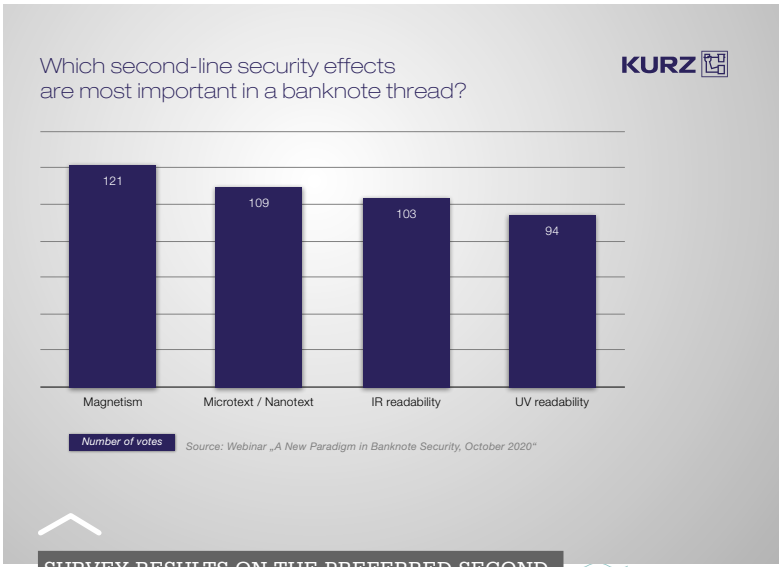
The online event 'KURZ THREADS – A New Paradigm in Banknote Security', held in cooperation with Reconnaissance, saw the product launch of KURZ THREADS and allowed attendees to gain valuable insights into market needs and requirements. It was widely confirmed through active participation and live surveys that the unique characteristics of KURZ THREADS capture the very essence of the industry's main requirements:



SURVEY RESULTS ON THE MOST IMPORTANT NAKED-EYE EFFECTS FOR SECURITY THREADS

The KINEGRAM origination technology allows you to create striking movement effects and other optical impressions that are unreachable with other technologies in the market. Highly pronounced color shift effects as well as the unique portfolio of colors based on KINEGRAM COLORS technology are both attractive and highly effective in enhancing the security level of the banknote.

In terms of second-line defense, KURZ THREADS can be equipped with magnetism, IR/UV readable features as well as micro- or nanotext.



SURVEY RESULTS ON THE PREFERRED SECOND-LINE FEATURES FOR SECURITY THREADS

Central Banks and banknote printers can rely on the longstanding experience of KURZ and our successful cooperation with substrate manufacturers around the globe. As a result of this experience and robust testing, KURZ THREADS are ready for industrial mass production and hassle-free integration into banknote substrates.

KURZ has been an independent supplier of surface applied foil features to printers and papermakers for over 30 years. Projects with several papermills using KURZ THREADS are currently underway in several countries. Central Banks and industry partners are invited to request samples or to contact the Sales Team for further information.

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KURZ Banknote Security

Email: banknote.security@kurz.de
Website: www.kurz-world.com
www.kinegram.com

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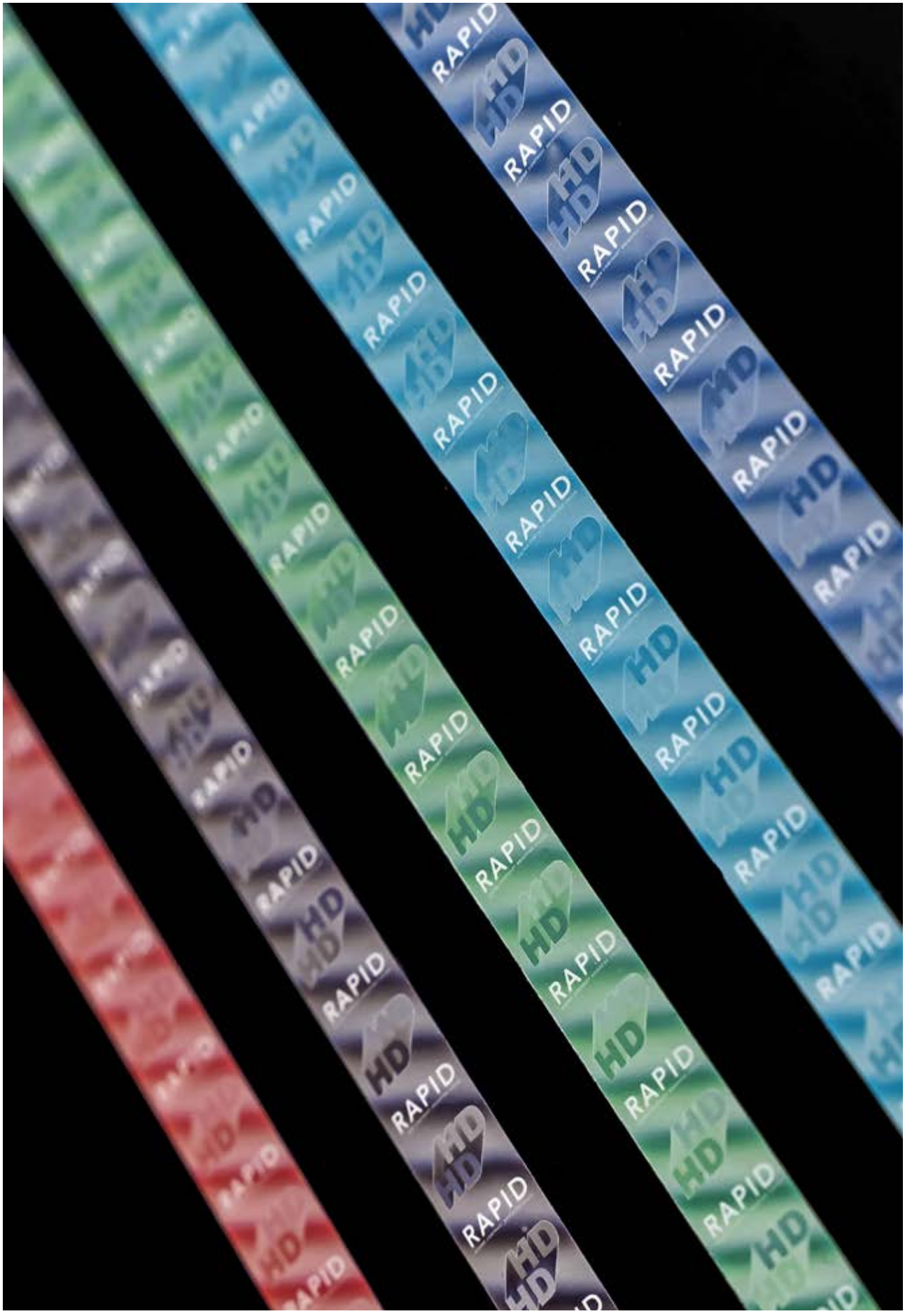
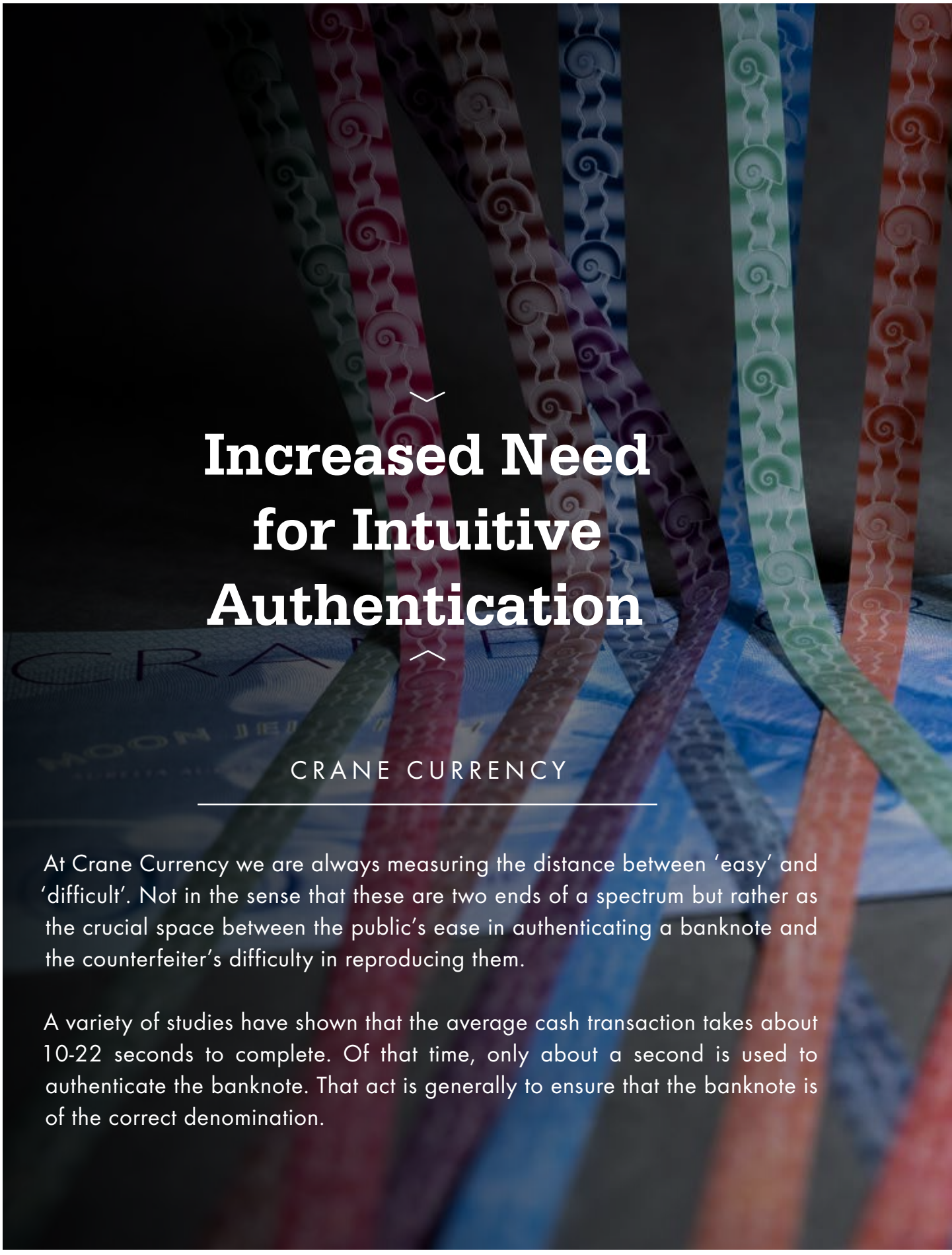


CRANE CURRENCY

INCREASED NEED FOR INTUITIVE AUTHENTICATION



Increased Need for Intuitive Authentication

CRANE CURRENCY

At Crane Currency we are always measuring the distance between 'easy' and 'difficult'. Not in the sense that these are two ends of a spectrum but rather as the crucial space between the public's ease in authenticating a banknote and the counterfeiter's difficulty in reproducing them.

A variety of studies have shown that the average cash transaction takes about 10-22 seconds to complete. Of that time, only about a second is used to authenticate the banknote. That act is generally to ensure that the banknote is of the correct denomination.

PUBLIC VERIFICATION ON AUTOPILOT

In this situation, the public behaves as if on 'autopilot' – and the fraction of a second used to verify a banknote is less about checking a security feature than simply noting its presence. The industry's response has generally been to create larger and shinier features.

In contrast to the public's inattention, counterfeiters look at banknotes very closely. Research by Hans de Heij, De Netherlandsche Bank recognized the importance that the public places on simplicity and ease of use, and suggested that public security features on banknotes are used less by the public, and more by the counterfeiter.

Counterfeiters are criminals and criminals are attentive observers of behavior. They are motivated by the business principles of profit and loss and in the case of counterfeiting banknotes are driven to view the strengths and weaknesses of banknote features as an evolving cost of doing business. If the counterfeiter deems a new feature is extremely difficult to replicate, it rises their costs and may even increase the risks of getting caught. The great untold success stories of secure banknotes are those where costs to counterfeit are high enough that the counterfeiter doesn't even attempt it.

MOVING AWAY FROM SHINY, COLORCHANGING FILM

The decrease in cost and increase in quality of desktop printing and scanning drove the need to add optically variable devices to banknotes. The addition of features that could not be simply scanned and printed increased the cost of counterfeiting. For many years, diffractive, 'shiny' features with highly detailed elements prevailed. Materials exhibiting a change from one color to another color depending on viewing angle were exotic, but that was a generation ago.

Today color changing decorative films are commonplace, even color-changing automobiles are no longer unusual. Try a simple Google search of "how to counterfeit money." It returns tens of millions of results in less than a second, or about as quickly as the public looks at a banknote. Inexpensive laminates, films and foils, and even complete security features ready for use can today be accessed directly, globally via the internet. As these materials become more widely available, they lower the costs to the counterfeiter fueling opportunity. This is only part of the problem.

Highly obvious features, those that are generally known to the public as shiny and metallized, and only glanced at, are particularly vulnerable to simulations using these materials. As these simulations become as prominent as genuine features, they have the potential to increase counterfeiting.

THE SOLUTION: EASY-TO-USE AND DISTINCTIVE

The solution will not come through a change in public behavior – the public will demand that paying with cash remain easy. Rather the solution that is already underway is to ensure that the most obvious feature on a banknote is also the most secure, i.e. the most distinctive is the most difficult to replicate.

It is this knowledge that has guided the security feature development of Crane Currency since the early 2000s, and

which provided the industry with its first micro-optic security feature MOTION® in 2005, followed by RAPID® in 2014. RAPID addressed the need for a public security feature that was easy-to-use, provided superior protection against counterfeiting, and was also resistant to soiling. RAPID uses encapsulated microlenses that resist dirt and grease, allowing its secure visual effects to be authenticated easily, even in banknotes that are worn.

HIGH-DEFINITION MOVEMENTS AND COLORS COMBINE WITH COGNITIVE SCIENCE

Crane has pursued enhancements to RAPID that have led to colors that appear brighter and movements that appear sharper. These ultimately led to a "high-definition" version of RAPID. In late 2020, Crane Currency launched RAPID® HD and RAPID® HD Detect, a machine-verifiable form that is visually identical.

Our attention is drawn to movement especially in a glance. When that movement is difficult to simulate or counterfeit, a high level of security is attained. To achieve this, the movement effects of RAPID HD are guided by cognitive science. An example is seen in the RAPID HD security thread with ocean theme. The nautilus shell produces highly responsive movement in multiple directions simultaneously. Behind the shell is a pattern of oscillating waves. The waves' opposing movements accentuate a sense of speed. This perception is further enhanced by a design that harnesses the public's optimum sensitivity to contrast. The number the waves, i.e., the number of dark and light bands that form them, are optimized for the length of the window in the banknote.

Cognitive science informs us that a frequency of five cycles of light and dark within a length of approximately 15 millimeters, in this case the windowing length, is the frequency of maximum perception. Fewer cycles decrease the perception of distinct movement, while more cycles would also reduce it. Fortunately, the micro-optics behind RAPID HD allows for the creation of customized effects each optimized for quick verification.

THE NUMBER OF WAVES PER A GIVEN LENGTH OF THE OCEAN-THEMED RAPID HD THREAD ARE OPTIMIZED BOTH TO THE PUBLIC'S SENSITIVITY TO CONTRAST, AND THE SIZE OF THE BANKNOTE'S WINDOW.

Counterfeiters understand public behavior and will mark the most obvious features to simulate. Their study of our behavior will eventually be rewarded if highly prominent security features are neither intuitive nor resistant to simulation. In competition for the public's attention, security is achieved not by prominence, but by keeping a good distance between easy and difficult.

CRANE CURRENCY

Mr. Tod Niedeck
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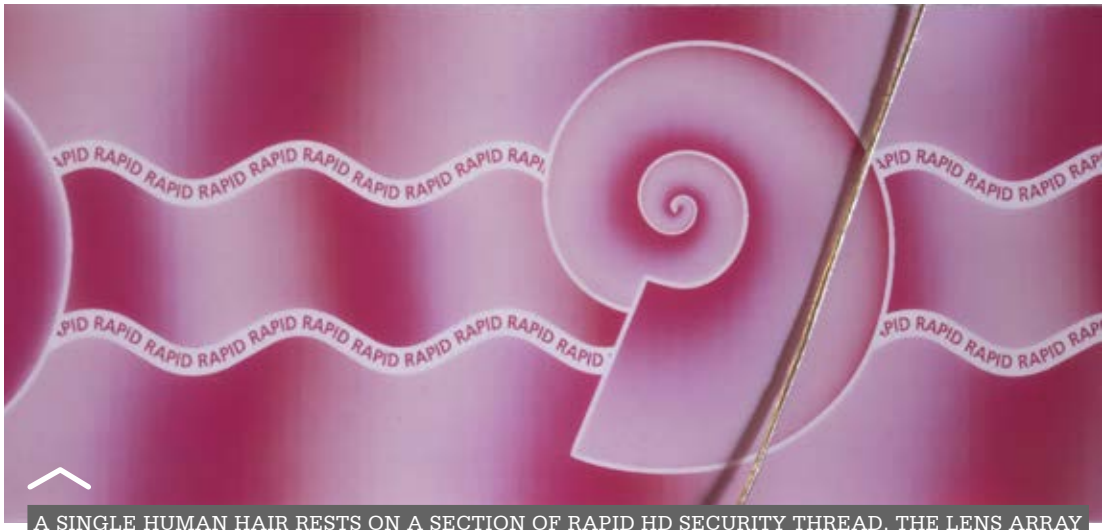
Website: www.cranecurrency.com

CLICK OR SCAN

The intrinsic security of RAPID HD is assured by its proprietary materials and production processes. Public ease of use is assured by the feature's highly noticeable movement effects, that are intuitive, tuned for maximum ease of use and easily seen in all lighting conditions. Security is not necessarily helped by adding more and larger security features to a banknote.



A SINGLE HUMAN HAIR RESTS ON A SECTION OF RAPID HD SECURITY THREAD. THE LENS ARRAY FAR TOO SMALL TO SEE ASSEMBLES A CUSTOMIZED DESIGN OF RICH COLOR AND HIGH CONTRAST.

ENABLING TRUST

SICPA is a leading global provider of secured authentication, identification and traceability solutions and services.

Founded in 1927, headquartered in Switzerland and operating on five continents, SICPA's mission is to *Enable Trust* through constant innovation. Based on core expertise in high security inks, the company protects the majority of the world's banknotes from the threats of counterfeiting and fraud.

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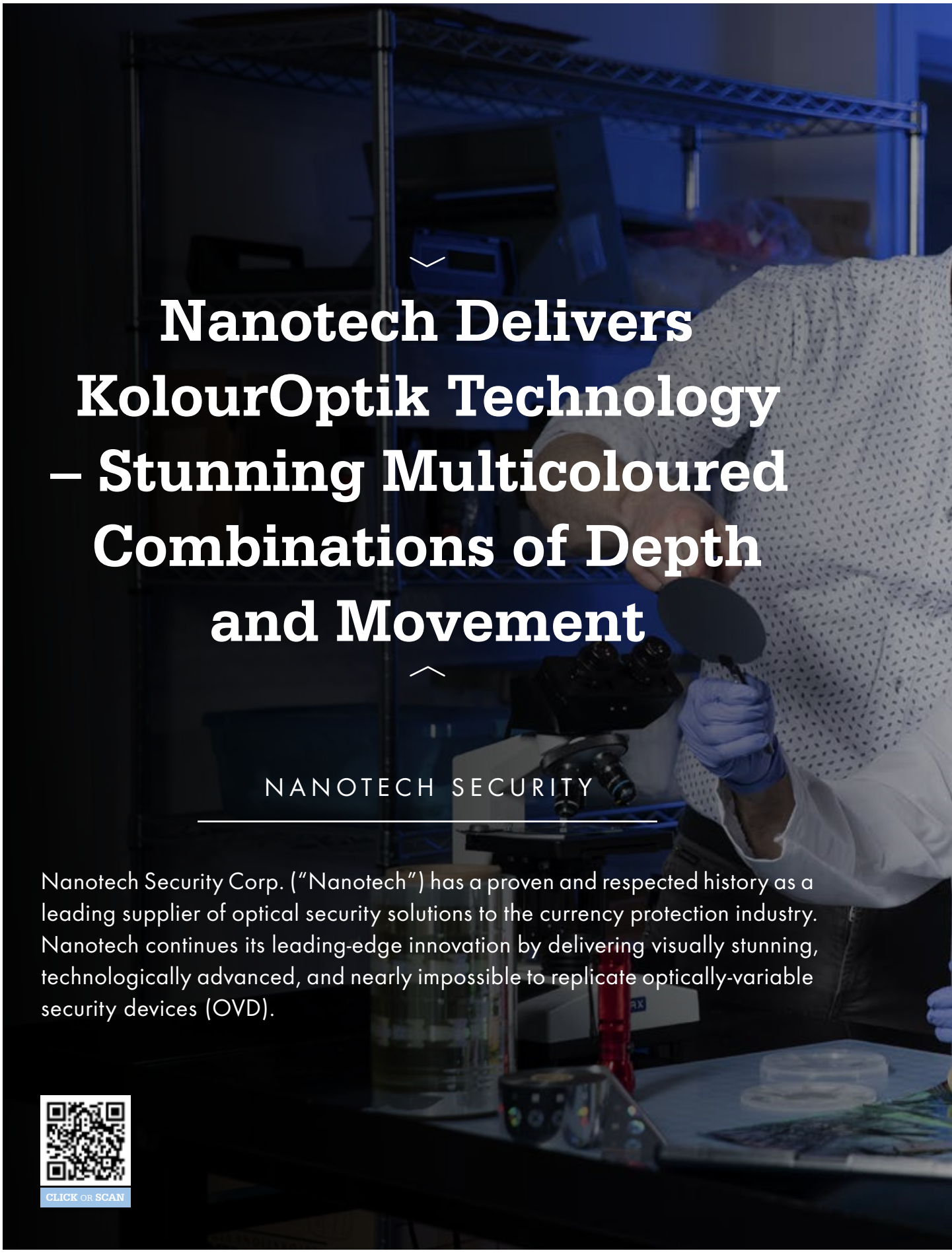
SICPA

Enabling trust

SECURE PRODUCTION FACILITY

NANOTECH SECURITY

NANOTECH DELIVERS KOLOUROPTIK TECHNOLOGY – STUNNING MULTICOLOURED COMBINATIONS OF DEPTH AND MOVEMENT



Nanotech Delivers KolourOptik Technology – Stunning Multicoloured Combinations of Depth and Movement

NANOTECH SECURITY

Nanotech Security Corp. ("Nanotech") has a proven and respected history as a leading supplier of optical security solutions to the currency protection industry. Nanotech continues its leading-edge innovation by delivering visually stunning, technologically advanced, and nearly impossible to replicate optically-variable security devices (OVD).

CLICK OR SCAN

This year, Nanotech introduces the latest advancements in its proprietary KolourOptik® technology; security features with multi-coloured 3D stereo depth effects now combined with striking movement effects. Together, these effects deliver a compelling and engaging authentication experience far superior to legacy technologies available in the banknote market.

With decades of experience manufacturing and supplying LumaChrome colour-shifting optical thin films, Nanotech has a trusted network of partners and customers throughout the banknote industry. In recent years, Nanotech has established itself as a vanguard in innovative nano-optic solutions with its proprietary KolourOptik technology. In 2020, Nanotech introduced KolourDepth™, a new product exclusively available to the government high security and banknote industry. Following this introduction, Nanotech's KolourOptik platform was recognized by the International Association of Currency Affairs as a finalist in the 2020 Excellence in Currency Technical Awards, in the category of 'Best New Currency Innovation'.

EVOLUTION AND INNOVATION OF KOLOUROPTIK TECHNOLOGY

Exclusive to the banknote and government high-security market, KolourOptik technology uniquely showcases the combination of multiple significant optical security effects, such as multi-colour, 3D depth, and motion. While each characteristic individually serves as a strong banknote security measure, when combined, these effects exhibit extraordinary synergy, such that the whole security feature solution is much greater than the sum of the individual effects.

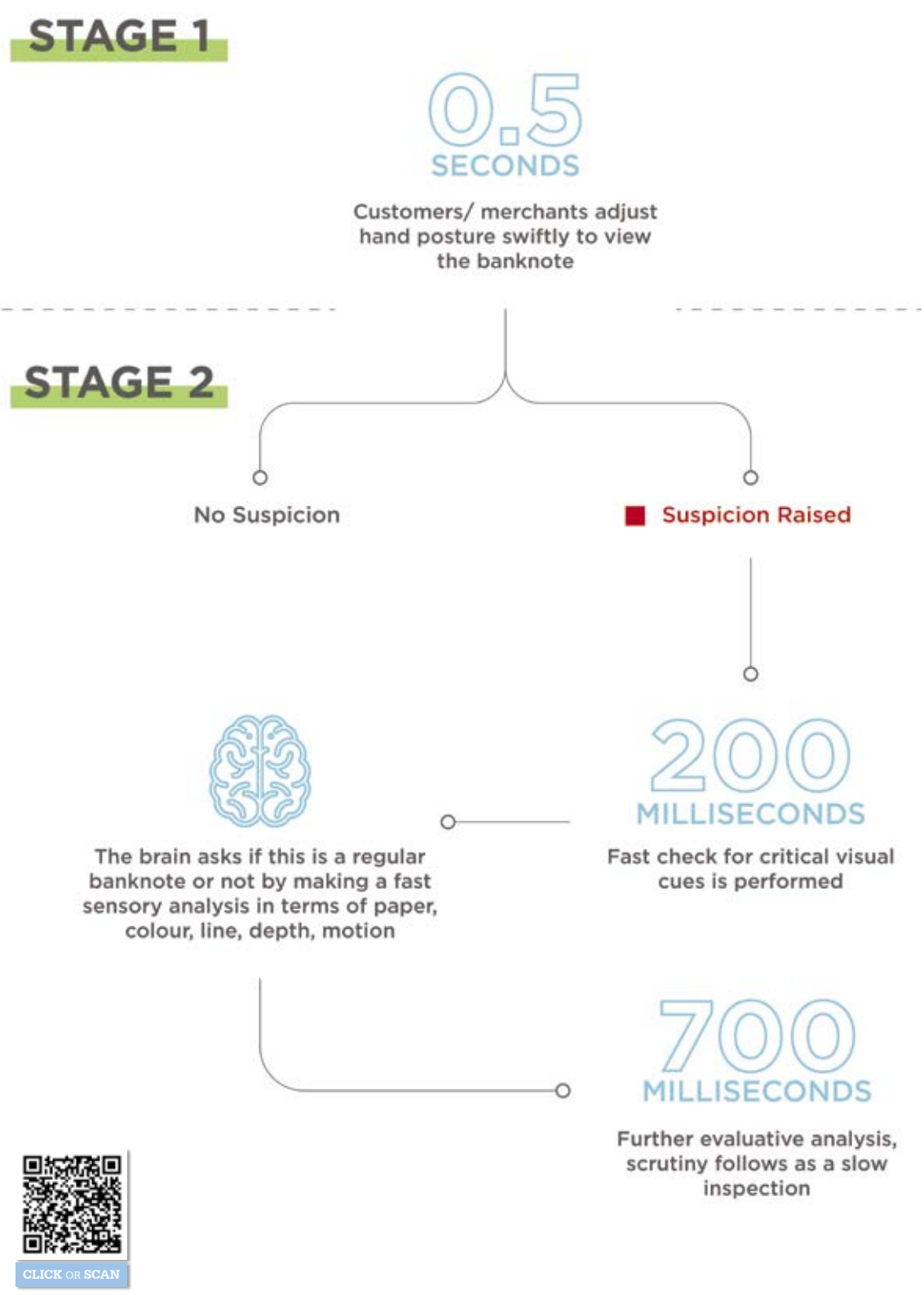
'Always-on' optical security features are active and visible across a wide viewing angle. This is especially important in banknote security to ensure reliable authentication and security performance in both lowlight conditions and environments with multiple, diffused light sources. Leveraging decades of experience with optical thin film, Nanotech recognized the importance of multiple colours within a single opticallyvariable effect, as it relates to human visual perception, and has included multi-colour designs as one of the core features of KolourOptik technology.

Similarly, perceived depth is an important authentication tool for security features as it supports intuitive authentication within a brief viewing period, performs well under low illumination, and is readily visible when a banknote is static.

Studies have shown that the cognitive processes involved in the visual authentication of banknotes are multistage processes, operating in the order of hundreds of milliseconds. It has been demonstrated that an exposure to a security feature with 3D depth for a mere 100 milliseconds is adequate for the human brain to create signals and confirm authenticity, while exposure of half a second increases the rate of correct authentication significantly. (J Raymond et al, '3D Micro-Optics Enable Fast Banknote Authentication by Non-Expert Users', Optical Document Security Conference 2020, S5P2, San Francisco USA). Adding movement to a feature further enhances the security and recognition of the OVD.

This year, Nanotech has further developed its KolourOptik platform to incorporate striking movement effects into security features, providing both an opportunity and the encouragement of customer interaction and engagement to deliver a compelling authentication experience. By combining movement and depth, Nanotech has created unique designs with images that appear at various depths within 3D space and slide above or below each other. The ability to selectively obscure and reveal optical images beneath one another on a 2D banknote surface delivers an instinctively compelling reaction. Employing multiple colours, shapes and geometries, Nanotech is able to offer uniquely intricate designs that can be customtailored to any national design or denomination theme.

Nanotech's new KolourOptik technology offers central banks, issuing authorities, and commercial print works the unique ability to honour their traditional banknote design guidelines, enhance their story-telling experience, and provide the strongest optical security that will continue to serve as a robust and effective anti-counterfeit measure for years to come.


STAGE 1
0.5
SECONDS
Customers/ merchants adjust hand posture swiftly to view the banknote
STAGE 2
No Suspicion
Suspicion Raised
200
MILLISECONDS
Fast check for critical visual cues is performed
The brain asks if this is a regular banknote or not by making a fast sensory analysis in terms of paper, colour, line, depth, motion
700
MILLISECONDS
Further evaluative analysis, scrutiny follows as a slow inspection
CLICK OR SCAN

BIOMIMICRY: INNOVATION INSPIRED BY NATURE

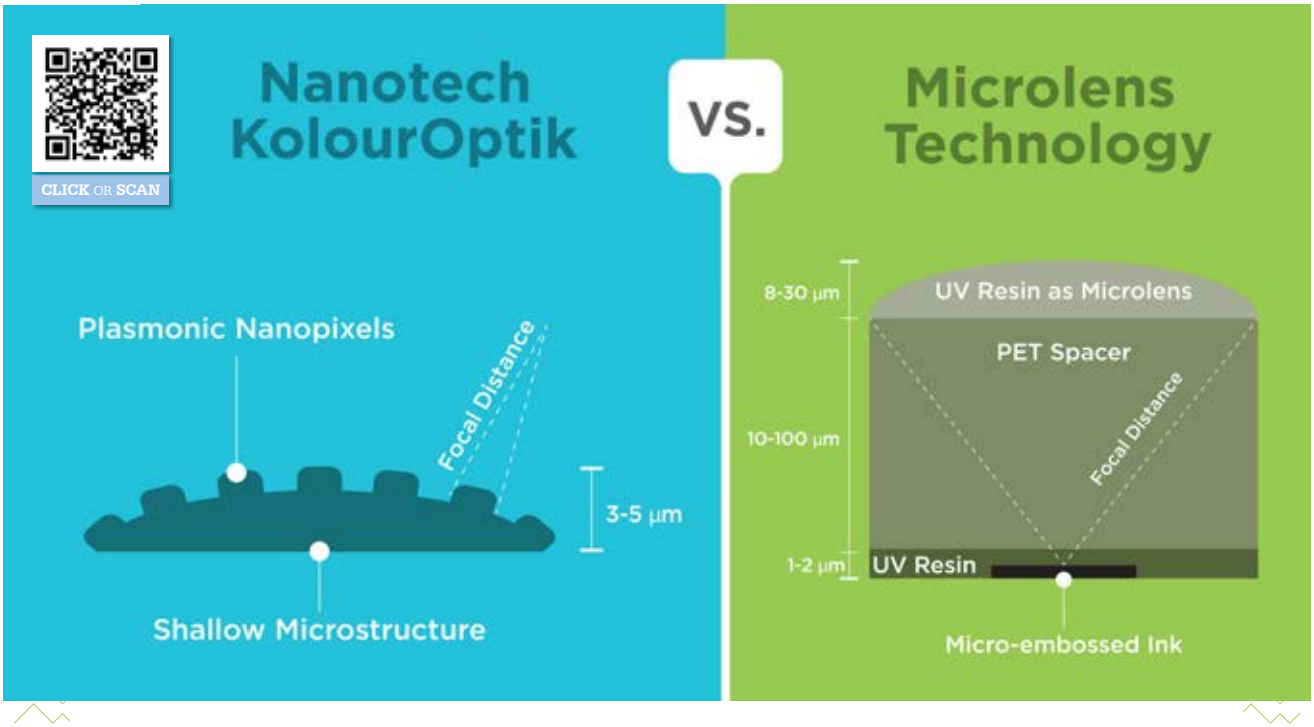
It is often said that necessity is the 'mother of all invention' but a strong argument can be made that Mother Nature is the greatest innovator. Nanotech's KolourOptik technology is biomimetic innovation at its best. Inspiration for KolourOptik technology is drawn from the Blue Morpho butterfly of Central America, whose iridescent colours are produced by nanostructures that absorb and reflect specific wavelengths of light. Nanotech Security has harnessed the surface plasmonic resonance effects of nanotechnology to create similar dazzling colours, movement, and depth effects without the use of lenses or printed inks. Through the complex and proprietary combination of metal and dielectric materials constructed with subwavelength nanostructures, Nanotech delivers optical security innovation for the banknote industry.

KolourOptik nanostructures are used to change the colour of a metal surface through selective light wave absorption, reflection, and transmission. With more precise control of the hue and saturation, the resulting effect is closer in look to metallic colour pigments than more traditional diffractive "holographic" effects.

Nanotech's new KolourOptik technology motion effects are a result of a unique combination of expertise in motion and graphic design, electron beam lithography, and proprietary optics modelling and software development. Working at nanometer scale, Nanotech can create ultra high-resolution imagery that is unmatched by any lens-based or print technologies.

The combination of microstructures with sub-wavelength nanostructures allows Nanotech to deliver unprecedented control over the reflection of light at the macro and micro level.

Blue Morpho wing at 100k magnification



SIMPLE IS HARD: UNIQUELY SECURE AND TECHNOLOGICAL BENEFITS

KolourOptik technology incorporates multiple effects into a single feature which represents significant challenges to counterfeiters. Unique, single construction technology delivers the thinnest and most robust solution on the market, making it ideal for a variety of formats and applications, from paper to polymer.

Plasmonic nano-optic technology can create unique combinations of colour, depth, and movement through the complex arrangement of subwavelength structures, without increasing the thickness of a feature. Proprietary software and EBL design processes strictly control the OVD movement, perceived depth, and colour palette through a unique arrangement of nanostructures. In fact, security features with KolourOptik technology are one of the thinnest depth or motion optical security features on the market today. With heights of only 3 – 5μm they are an order of magnitude less than the typical 20 – 130μm thickness required by micro-lens structures.

While KolourOptik structures and processes are complex, the materials are simple and drastically reduce the production variables while increasing durability, consistency, and application compatibility. Without the use of printed inks or micro-lenses, currency suppliers can avoid the associated cost, thickness, and application test variables.

Beyond its thin construction, movement effects in a security feature serves as the foundation for another critical benefit; intuitive customer engagement. Just as the eye is naturally drawn to movement, so too are end-users and their desire for interaction. With features that have KolourOptik technology, users can tilt the banknote to align visually appealing patterns or assemble the geometric components of their national flag. The unexpectedness of moving images on a two-dimensional banknote delivers

an awe-inspiring and memorable experience that encourages banknote self-authentication, without additional tools or processes. Security features with movement effects are easy to explain and recognize, while nearly impossible to duplicate with competing optical security technologies.

The principal advantages of Nanotech's proprietary KolourOptik technology include:

(1) application in a wide variety of formats, such as stripes, threads, patches, etc.,
(2) high visibility,
(3) easy to trigger,
(4) high interactivity, and
(5) high degree of freedom for design and customization.

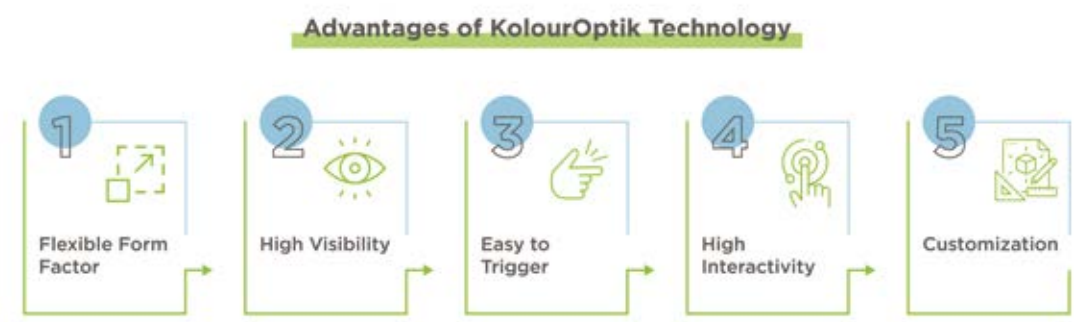
CONCLUSION

Nanotech developed KolourOptik technology to deliver the two most important measures of an optical security feature's effectiveness; how well it aids in authentication and how well it deters counterfeits. Through cutting-edge, proprietary technical processes Nanotech has produced optically-variable features that are intuitively engaging and add new dimensions of movement and depth to banknote security, far above the capability of counterfeiters. Adding movement and 3D depth to security features creates a naturally memorable authentication experience that is simple to explain, easy to recall, and intuitive to use. Nanotech is excited to bring KolourOptik technology from research and development into commercial production and is working with trusted industry partners to deliver the next generation of banknote optical security features.

NANOTECH SECURITY.

Mr. Brian Donnelly
Email: info@nanosecurity.ca
Website: www.nanosecurity.ca

CLICK OR SCAN



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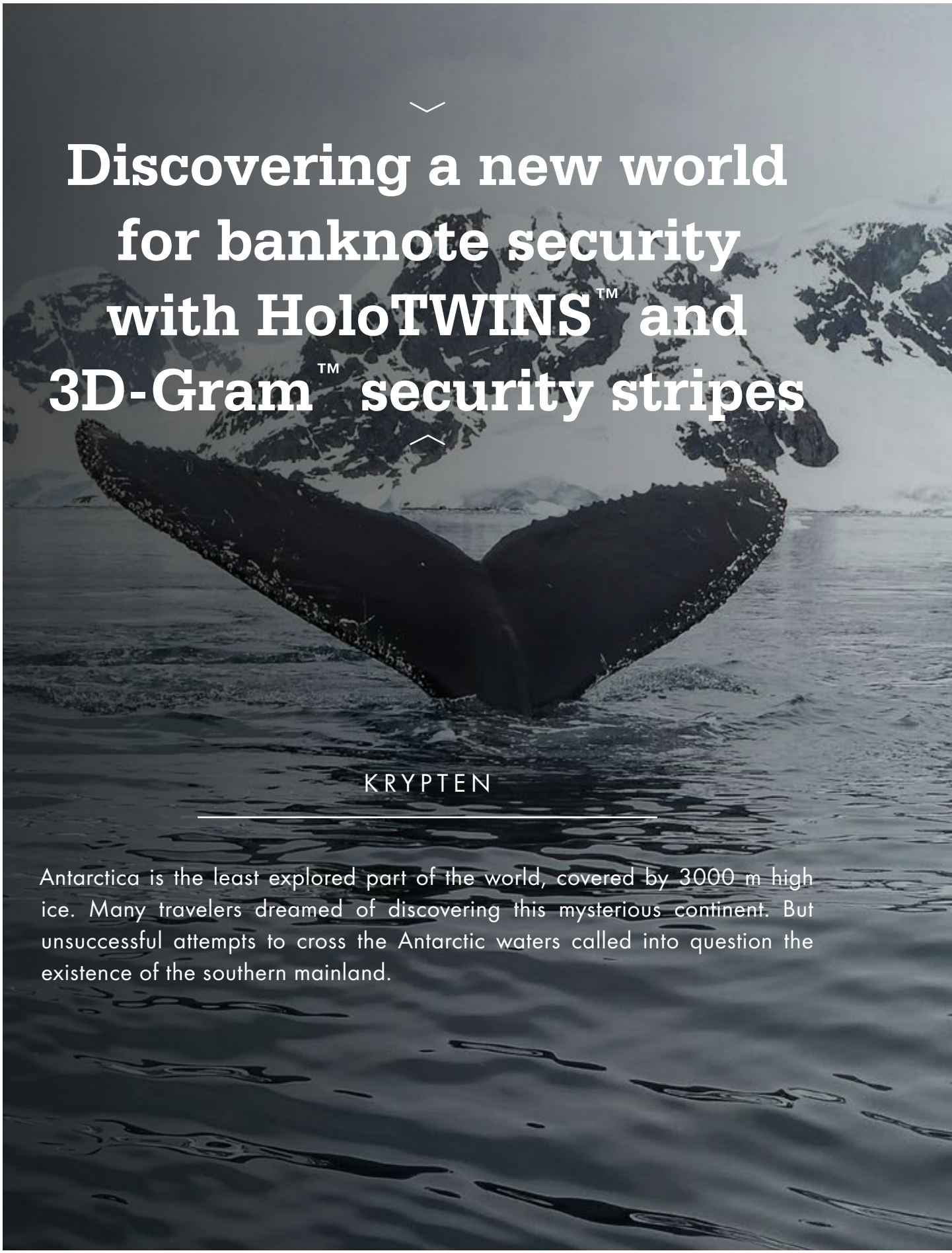
KRYPTEN

DISCOVERING A NEW WORLD FOR BANKNOTE SECURITY WITH HOLOTWINS™ AND 3D-GRAM™ SECURITY STRIPES



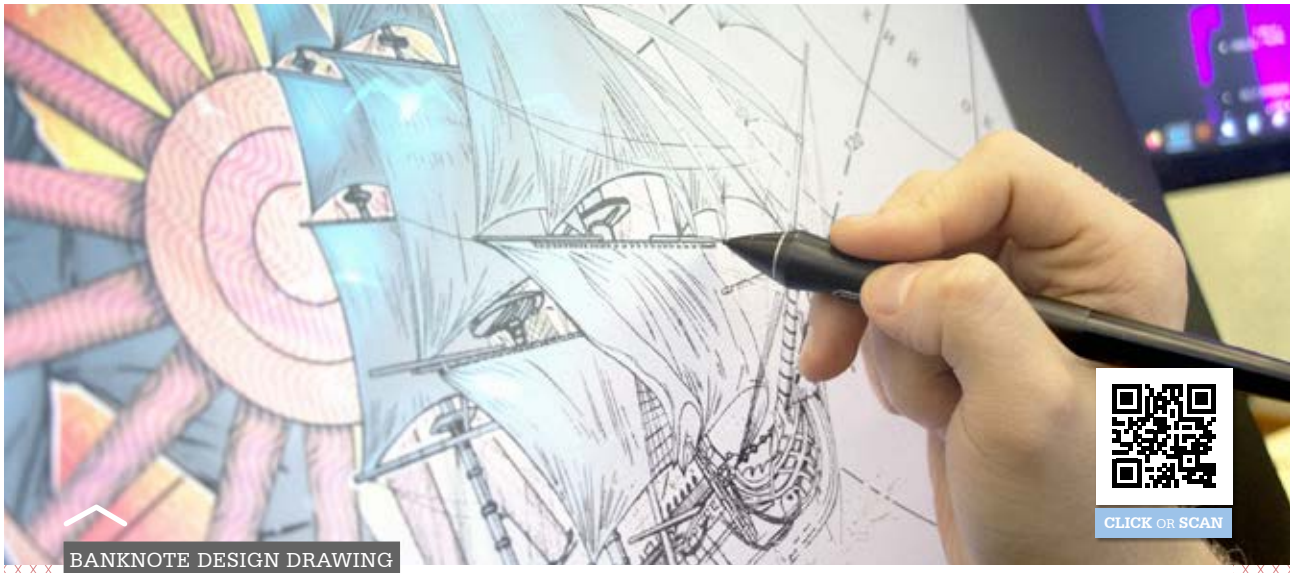
Discovering a new world for banknote security with HoloTWINS™ and 3D-Gram™ security stripes

KRYPTEN

Antarctica is the least explored part of the world, covered by 3000 m high ice. Many travelers dreamed of discovering this mysterious continent. But unsuccessful attempts to cross the Antarctic waters called into question the existence of the southern mainland.

Persistence and thirst for discoveries helped the Russian expedition to cope with the severe ice and finally reach the shores of the "Unknown Land of the South". 200 years ago, in 1820, Faddej Bellingshausen and Mikhail Lazarev first saw the ice shelves of the cherished continent and proved the existence of Antarctica.

Persistence and search for new, non-standard technological solutions help us to create security elements with vibrant catchy effects and fast identification. On the "Antarctica 200" house banknotes we present our latest developments for banknote security – a two-sided HoloTWINS™ security stripe with the image change effect and a composite 3D-Gram™ stripe with photopolymer and demetallized elements.



BANKNOTE DESIGN DRAWING

"I have always been inspired by the era of explorers. So with particular interest, I began the work on the design of the banknote and studying the history of the Russian expedition to Antarctica. The gift was a book, a travel diary, which was kept by Faddej Bellingshausen, the head of the expedition. A first-person narrative takes you to the center of those distant events as if you become one of the sailors on the sloop. Such living evidence of the past is very valuable for the designer.

The "Antarctica 200" banknote is made in blue. The blue colour conveys the endless blue ocean and the unknown that awaits the brave sailors. The obverse shows a map of the South Pole with the secret continent located in the center. The ships of the navigators are eager to meet the long-awaited discovery. The steering wheel symbolizes the motion of life and the search for new knowledge. On the reverse the ships reach their destination. In front of the travelers in the seemingly lifeless cold desert, wildlife appears. They are watched by Antarctica itself in the image of a ghostly mermaid, whose hair resembles the Aurora Australis".

Andrey Rachkov, Designer

HOLOTWINS™. INTERACTIVE FEATURES FOR INTUITIVE IDENTIFICATION

HoloTWINS™ security stripe expands the two-sided security element series for window banknotes. HoloTWINS™ features use an intuitive effect of two-sided images. Turning over the banknote the user immediately identifies two different images on opposite sides of the security feature. The series includes a bimetallic two-sided hologram and a two-sided hologram with the image change effect.

On the "Antarctica 200" banknote we have complicated the technology. The HoloTWINS™ element in the banknote window is supplemented with demetallized images visualized only on the obverse. To produce such a combined feature the high-precision micro-demetallization technology (HPMD) is used. The sophisticated HPMD process creates two distinct images on opposite sides of the HoloTWINS™ element. The obverse features a compass framed by a monogram and an anniversary date. The reverse displays the numerals "200".

HOLOTWINS™. JEWELRY ACCURACY REST ASSURED

HPMD technology reproduces precise demetallized elements, displaying the smallest details, fine lines, and various shapes. HPMD allows creating any image design depending on the general concept of the banknote. Holographic elements on the security stripe exhibit vibrant optical effects which are easily identified upon tilting the banknote – dynamic colour change effect, tone flow effects, monochrome images with bas-relief effect.

"High-precision micro-demetallization is a complex technology, a multitasking process where the final result is determined by many factors. Each time the production of a holographic image begins with the optimization of the diffraction structures' parameters. It cannot be standardized. Each hologram has an individual design, hence a unique diffraction gratings profile. To reproduce the original design, every time we select the correct technical parameters. Moreover, defining the parameters is crucial at different stages of production. Both at the initial stage and throughout the entire production cycle. But it is exactly high-precision micro-demetallization that enables us to create advanced elements that emphasize the optical effects, the depth of relief, and the microtexts that the HoloTWINS™ security stripe displays".

Andrey Akimenko, Lead Engineer

3D-GRAM™. TECHNOLOGY MIX AND STUNNING 3D EFFECTS

The security stripe on the "Antarctica 200 3D" house banknote combines two technologies in one element – 3D-Gram™ photopolymer images and elements made by the HPMD technology. To produce 3D-Gram™ elements a transparent ultra-thin photopolymer is used which allows to compliment them with other security features. As photopolymer holographic elements are originated in a transparent layer they maintain the visibility of other security features and images placed under them. As a result, developers get a wide range of opportunities to use them in conjunction with other elements.

HoloTWINS™ SECURITY STRIPE WITH THE IMAGE CHANGE EFFECT. OBVERSE AND REVERSE

3D-GRAM-C™ TWO-COLOUR IMAGES. MONOCHROME BAS-RELIEF AND MIRROR EFFECTS

The security stripe on the "Antarctica 200 3D" banknote includes a photopolymer layer with colour images made by 3D-Gram-C™ (Colour) technology in two contrasting colours – green and red. Stable intense colours, high angular, and spectral selectivity are the main advantages and differences between photopolymer elements and conventional, widespread rainbow holograms.

Another characteristic of 3D-Gram™ technology is creating three-dimensional mini-copies of real objects. The physical principles of analog holography used in 3D-Gram™ technology, generate elements with the visual effects of real objects such as full-parallax and volume effects. Examining the banknote, the user identifies bright 3D images of the whale and commemorative dates. The optical effects of photopolymer holograms are easily visualized in both diffused and point light sources.

Under the photopolymer layer, there is a layer with demetallized elements. The design and visual effects of demetallized holograms make up a harmonized composition with 3D-Gram™ photopolymer objects. The combination of the two technologies provides extreme resistance of the security stripe to counterfeiting.

"When working on the 3D-Gram™ composite security stripe, we focused on improving the technology for creating photopolymer images. The stripe demonstrates the latest effects of 3D-Gram™ technology. This is a monochrome bas-relief effect used to display three-dimensional images of the whale and commemorative dates. The second technologically complex effect reflected is two-colour images. For the 3D-Gram™ stripe we used a new method to copy two-colour holograms, which reproduces colours with maximum brightness".

Stanislav Orlov, Senior Designer

3D-GRAM™ SECURITY STRIPE. IHMA PEOPLE'S CHOICE AWARD 2020

3D-Gram™ security stripe was voted the winner of the People's Choice Award at the prestigious International competition Excellence in Holography Awards 2020, organized by the International Hologram Manufacturers Association.

"We are honored to get this award in the premier international competition for the holography industry. It is even more valuable to become the first-ever winner of the People's Choice and get such high recognition from our colleagues. 3D-Gram™ security stripe is a completely new product showing that photopolymer holograms are perfectly combined with other holographic elements and jointly create innovative security features with impressive visual effects".

Andrey Smirnov, Head of Holographic Laboratory

JSC RPC KRYPTEN

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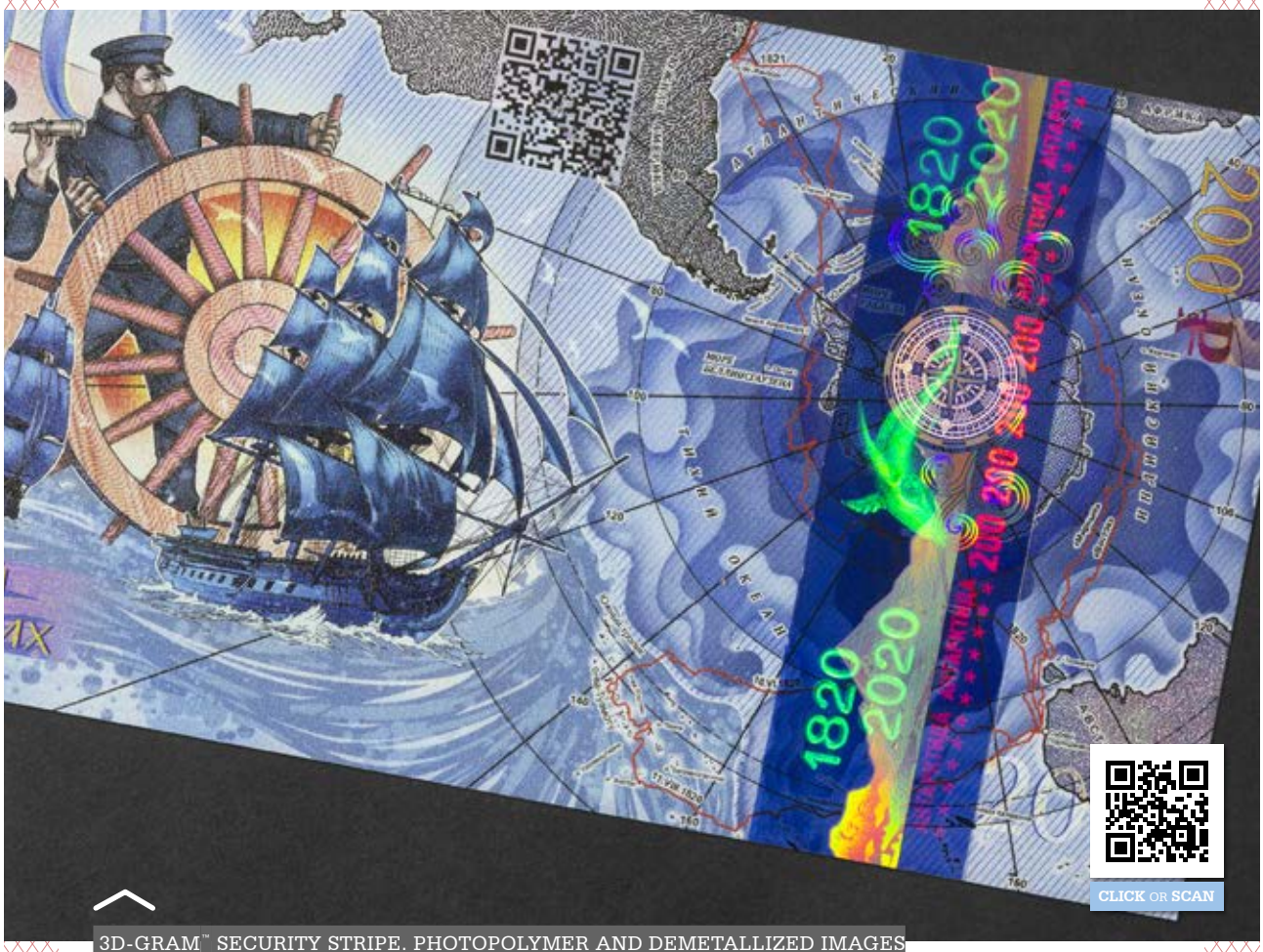
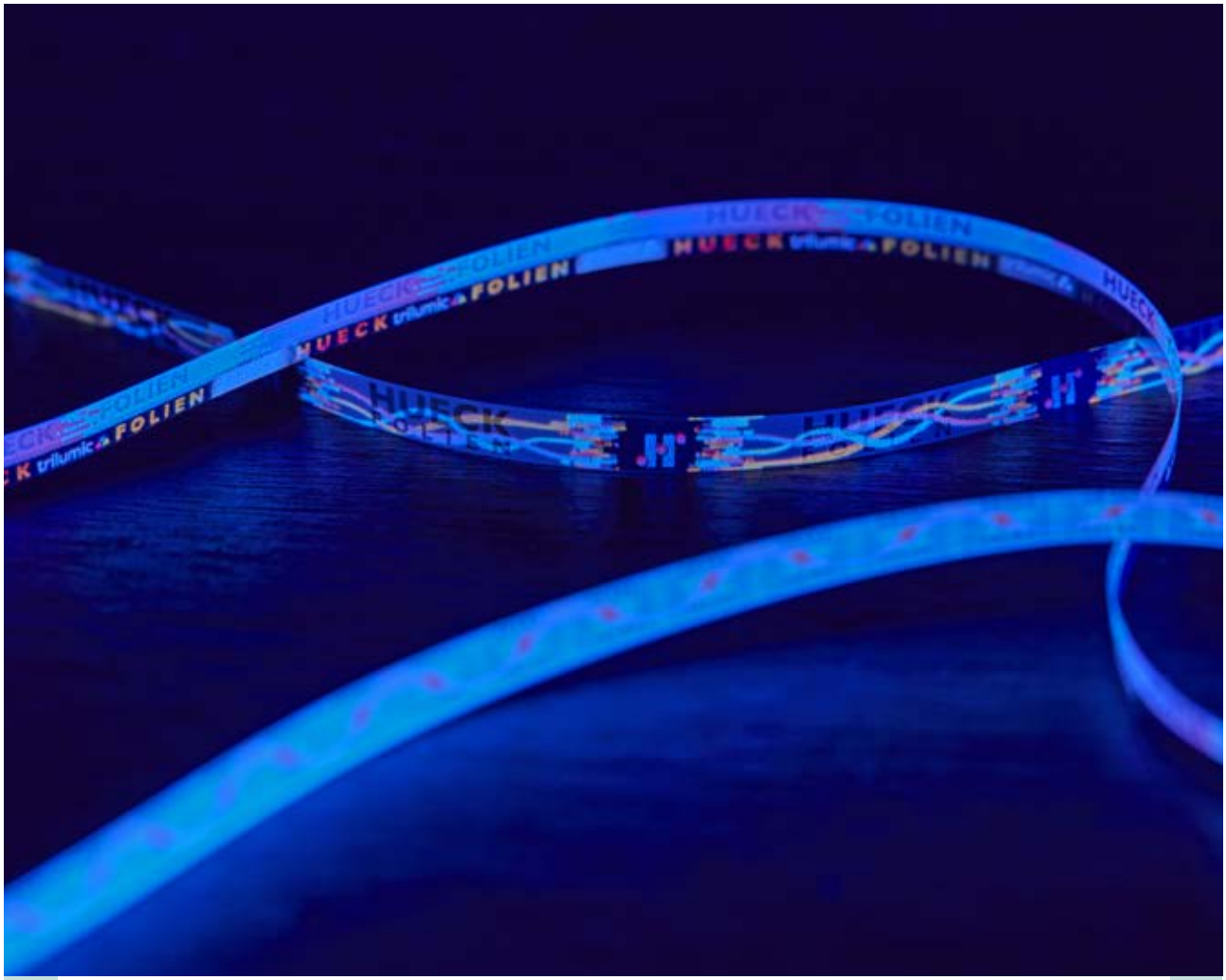


3D-GRAM™ SECURITY STRIPE. PHOTOPOLYMER AND DEMETALLIZED IMAGES

ADVERTORIAL: HUECK FOLIEN GMBH

TRILUMIC®: HIDDEN UV HALFTONE DESIGN FEATURE BASED ON RGB REPRODUCTION TECHNOLOGY

Invisible in daylight, the latest of HUECK FOLIEN's top products is an enhanced optically attractive effect incorporated in its holographic security foil SIGNET. It expands the authentication level 1 properties of the hologram with a level 2 feature called TRILUMIC® which is a trademark resulting from cooperation between HUECK FOLIEN and Banque de France. This complex security feature is placed registered on the holographic stripe and is hidden under daylight. Under UV light source it is showing an extremely brilliant true colour half tone image which cannot be realized on paper surface but on foil. The special technology of the feature in combination with the demetallized area of a holographic stripe ensures attractiveness for the public, interesting opportunities for the banknote designers and a significant barrier for counterfeiters. The evolution of TRILUMIC® has now produced a new feature: "TRILUMIC® threads" that can be inserted into banknotes. Using the TRILUMIC® technology for banknote threads opens a new perspective for the designer. A variety of different designs is already available and more will follow. The feature can be applied to all kind of thread types and widths. A TRILUMIC® thread will make a difference from existing UV threads.



POWERFUL FEATURES FOR BANKNOTE INDUSTRY

HUECK FOLIEN is a privately owned, innovative enterprise with high technology standards, a distinctive customer-oriented focus and the ability to realise powerful solutions. Being a coating specialist since more than 50 years, HUECK FOLIEN has a wide expertise and reached world-wide technological leadership in the field of high security threads and foils for banknotes and high security documents. The company is a sole feature supplier for the banknote industry and its products are qualified at most of the worlds papermills and printing works. This is a true benefit for the Central Bank to have such an independent supplier.

In-house development of innovative high security features and long-time development partnerships with leading international players in the high-security industry have earned HUECK FOLIEN a world-wide reputation for a unique customer support and reliability for technically demanding products and services.

HUECK FOLIEN GMBH

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Email: j.hofmann@hueck-folien.at
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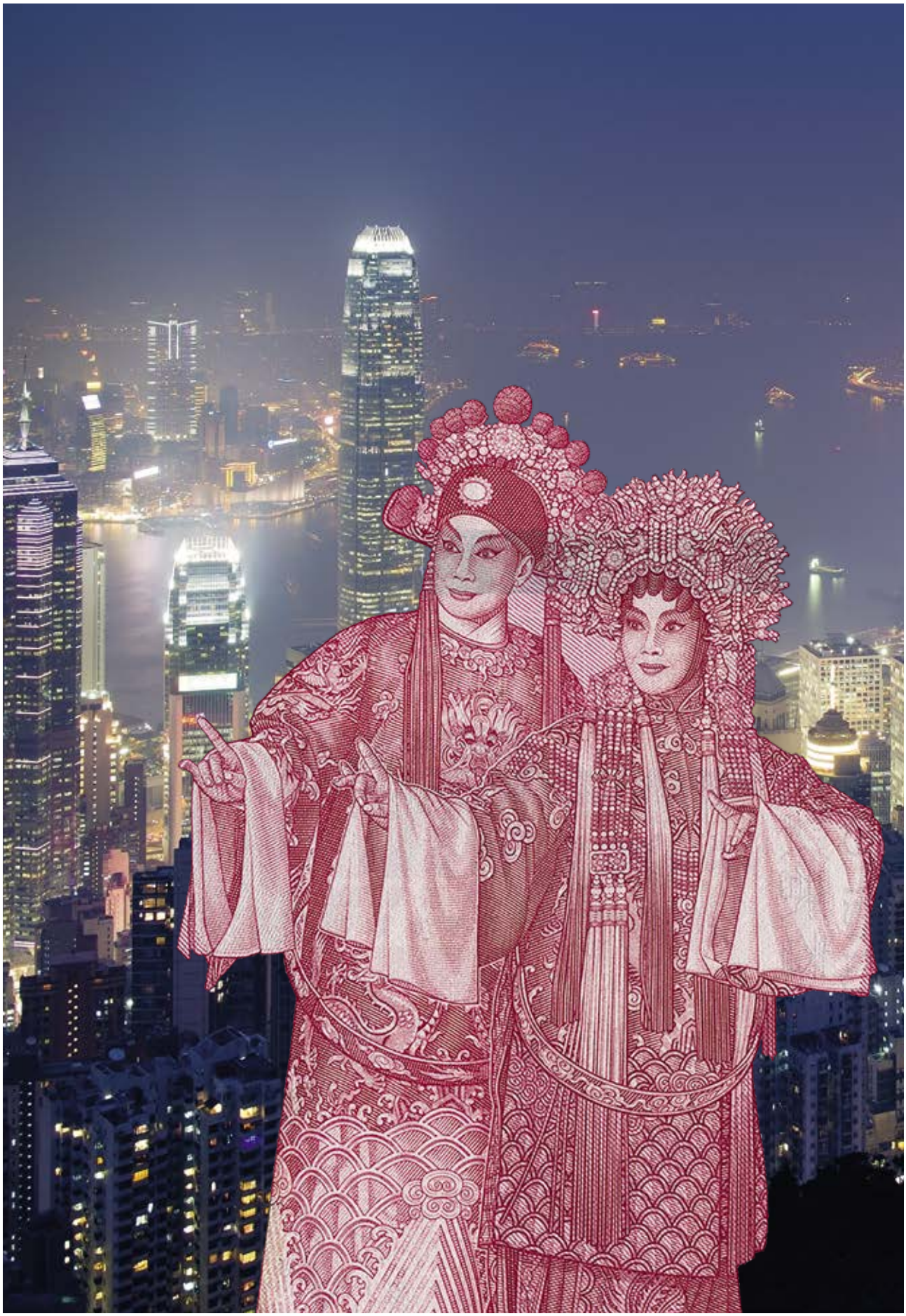
PRINTERS


PRINTERS



SET YOUR BENCHMARK IN BANKNOTES.

GIESECKE+DEVRIENT

Engineering the standards in design, security, and sustainability, when it comes to setting the benchmark with exceptionally secure and impressively attractive banknotes, G+D is the trusted partner to talk to. For example, about the new G+D security thread RollingStar®i+, which turns banknotes into real eye-catchers with stunning new effects. Or about HybridADDvance®, the new hybrid composite paper that combines the benefits of cotton and polymer with a minimal use of plastic for a maximum of security and durability.

G+D has been safeguarding value and making the lives of billions of people more secure since its beginning. Our innovative products and solutions help to create trust in global payment transactions, advanced communications, digital identities, and data security.

Mastering a world that is changing at an ever-increasing pace is a question of new ideas – and of technologies people can trust. It means turning large-scale transformations such as digitalization, IOT, Big Data and intelligent automation into real long-term prosperity and growth. As a technology leader in the industry, G+D embraces change – finding new ways to progress in currency creation and management and reinventing the banknote over and over again to anticipate future challenges.

For example, with the Hybrid ADDvance® banknote, which meets growing customer needs for more durability and sustainability – and makes no compromises whatsoever when it comes to security. After all, security at all authentication levels is the mandatory prerequisite for confidence in cash.

Hybrid ADDvance®'s unique concept combines a cotton-based core with embedded state-of-the-art security features with an ultra-thin polymer film for improved durability and longevity.

As a result, every Hybrid ADDvance® note is a highly complex piece of technology – but there are no simple answers to complex requirements. Of course, plastic is a helpful durability component when used moderately. However, due to its production process, it does not provide embedded security features. So let's take a look at the following pages to learn more about the unmatched security from within.

CONFIRM TRUST IN YOUR BANKNOTES.

As a leader in banknote technology, Giesecke+Devrient has unrivaled expertise and competence in the production and management of banknotes. And it goes far beyond design and printing. At G+D, the best possible solution for a banknote starts with its best possible security architecture.

The choice of substrate is a key factor in determining the security of a banknote. Cotton-based substrates are proving to be the superior solution, as only they allow counterfeit-proof security features to be embedded directly into the substrate. Watermarks and security threads, for example, are embedded into the substrate during the sheet forming process and therefore inseparately bond to the paper, a technique that is exclusively available to a small and well-known number of banknote paper manufacturers worldwide. This exclusive process makes the watermark and security thread extremely secure – in contrast to pure polymer substrates, where the integration of security features is technically impossible.

The importance of both security features should not be underestimated, not least because of their high level of awareness and acceptance among the public: after all, consumers want to be able to check a banknote for authenticity within seconds.

And although neither feature is fundamentally new, G+D is constantly developing them further to keep the growing technical possibilities of counterfeiters at bay. For example, G+D's high-tech watermarks That give a three dimensional impression and can be combined with highlight and watermark elements.

CREATE STUNNING VISUAL EFFECTS.

As a specialist for cutting-edge security thread technology, G+D's subsidiary Louisenthal is driving with RollingStar® i+ the success of RollingStar® security threads even further. New shores of brilliance, dynamics, and colorshift purity become reality - without compromising the proven reliability of RollingStar® threads.

RollingStar® i+ offers a new range of modern designs, an expanded potential for customization and outstanding design integration possibilities. The modern and appealing look comes with a sub- structure and allows an even gerater design integration. And, of course, its well-known and machine-readable magnetic properties stand for efficient processing.

G+D'S ROLLINGSTAR® I+ ADDS GREATER VIBRANCE TO SECURITY.

For more than 25 years already G+D has also been a pioneer in the field of security foil applications in the form of sophisticated LEAD stripes – such as the RollingStar® or Micromirror LEAD® or the form of stunning patches that cover individually shaped paper windows – known as varifeye® ColourChange Patch. All these innovative

DYNAMICS AND COLORSHIFT FOR GREATER SECURITY WITH MICROMIRROR LEAD® STRIPE AND HYBRID ADDVANCE®

foil-based examples described above result in more attention and engagement from the observer, more eye-catching impressions, and therefore fast and reliable authentication.

All this is possible with banknotes with a cotton-based core. Polymer substrates, on the other hand, depend on printed or applied security features in the form of optically variable inks or security foils and patches. And while printing on polymer was considered a challenging task for counterfeiters many decades ago when the polymer technology for banknotes was born, now everyone, both novices and professionals, is rapidly adapting and improving the techniques of printing on plastic.

MAKE CONFIDENCE SUSTAINABLE.

But speaking of plastic and the best possible banknote architecture: Polymers are not a fundamentally bad component of banknotes. It just depends on how they are used: The challenge is to use as much of them as necessary and as little as possible. With the Hybrid ADDvance® note, G+D shows how it's done: the security-relevant core of the banknote made of cotton substrate, including the embedded and applied security features described before, is coated with an ultra-thin film of polymers. By doing so, the substrate and all security features are well protected against humidity and dirt. And longevity and durability of the note are increased without compromising on security. This solution also ensures a high level of sustainability, as only a minimal amount of plastic is processed and the circulation life of the note is longer. The cotton substrate, on the other hand, is created from fibers that are a by-product of textile processing – basically, recycled material. Further proof that G+D thinks in terms of holistic solutions, not just products. After all, banknotes that are made purely of plastic and are not biodegradable may even be recycled at the end of their lifespan into another product – the plastic, however, still remains and is certainly not a sustainable solution.

No wonder the recent IACA Sustainability Award was won by G+D's Louisenthal paper mill, since G+D as a whole already takes a 360-degree perspective on sustainability.

GIESECKE+DEVRIENT

Mr. Andreas von Loeper
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Giesecke+Devrient
Creating Confidence

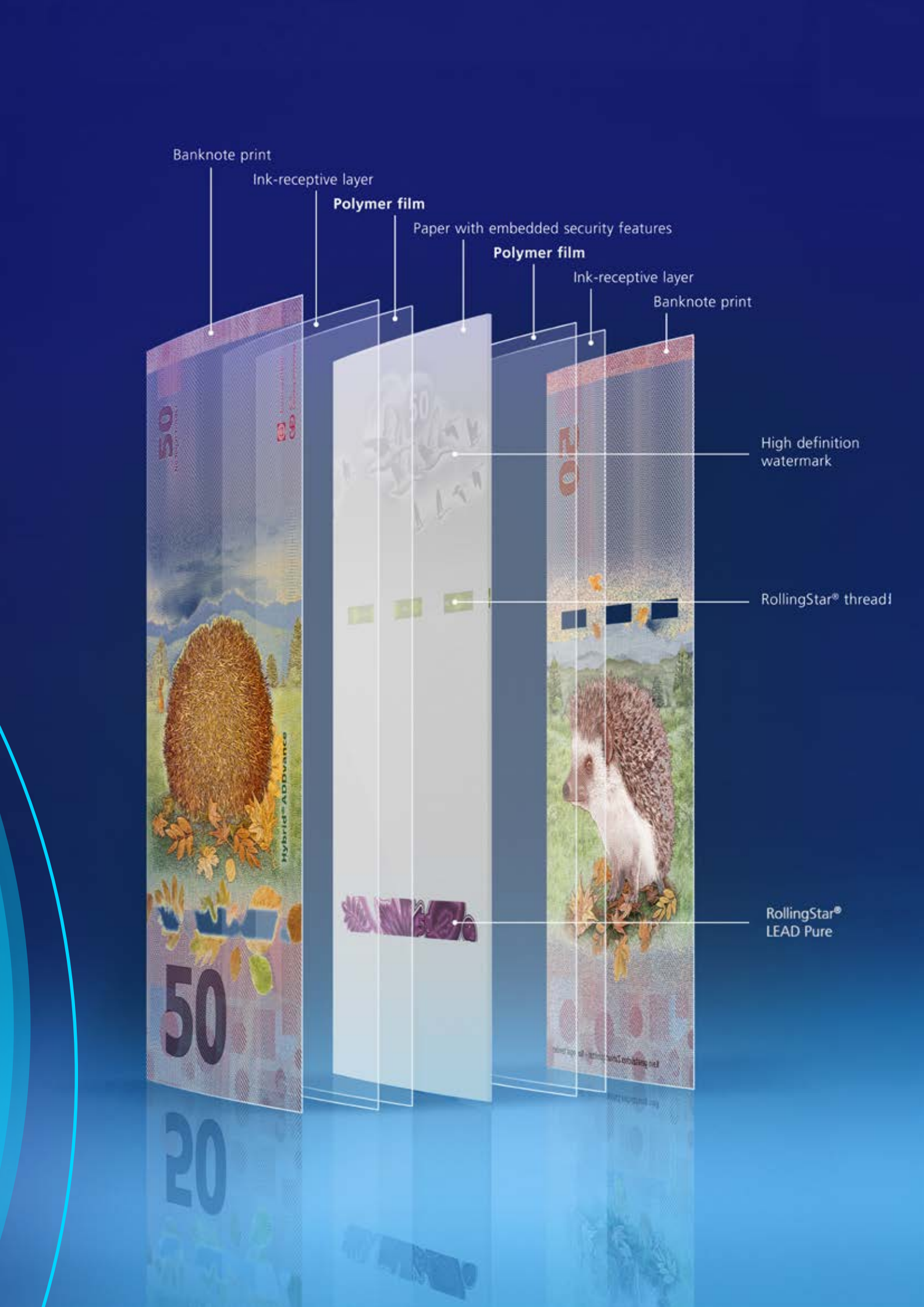
Create long-lasting confidence. With unmatched security from within.

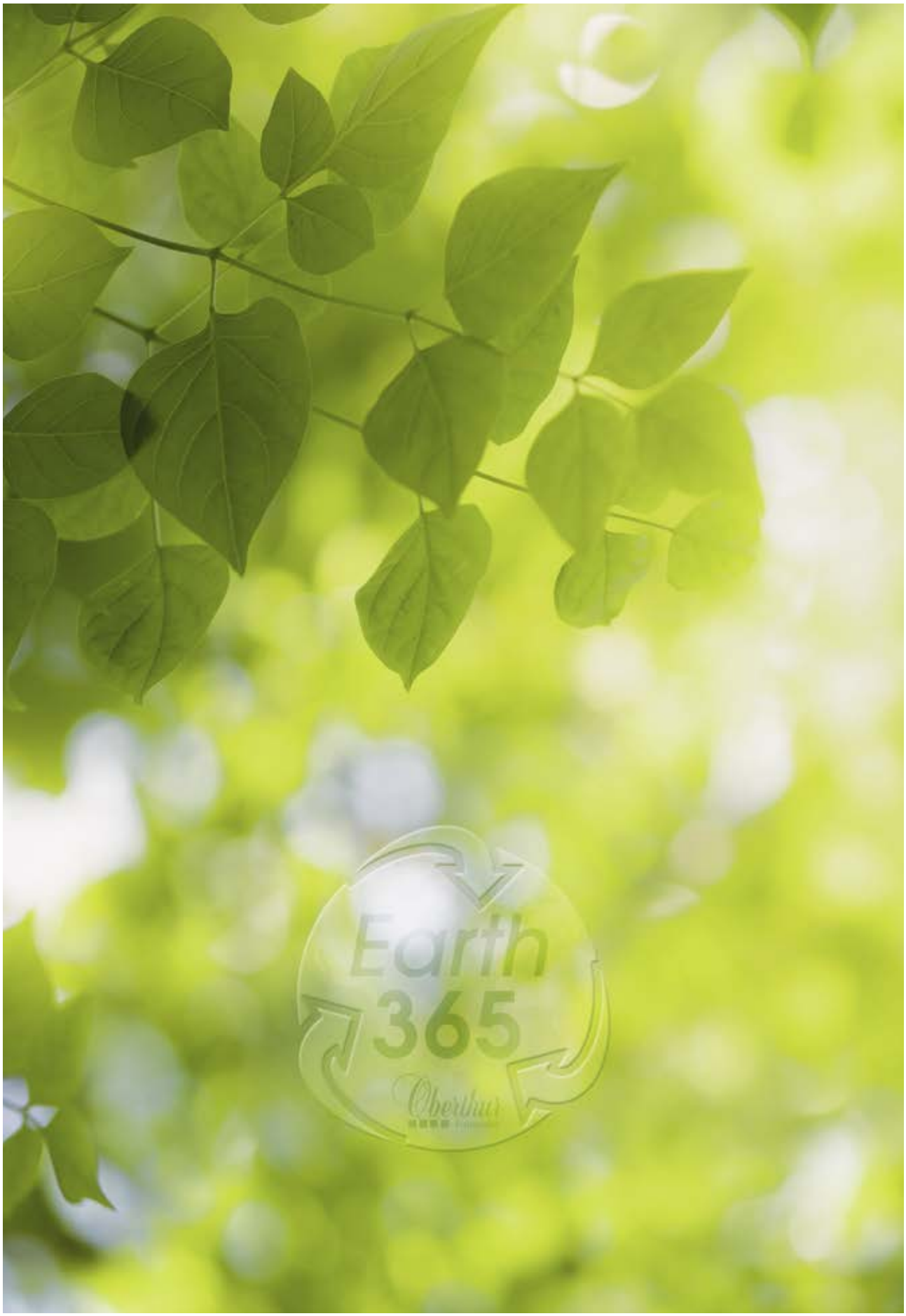
Hybrid ADDvance®

Creating trust in banknotes is above all a question of security. And nothing is as counterfeit-proof as security features that are already embedded into the substrate during the paper manufacturing process. This is only possible with cotton-based substrates. Polymer banknotes, on the other hand, are restricted in terms of intrinsic security.

With our high-tech substrate Hybrid ADDvance®, we combine the best of both materials: An ultra-thin polymer film protects the banknote's cotton core with integrated security elements. This makes the banknote highly resistant to soiling and wear while requiring only minimal usage of polymer materials. Talk to us about how you can achieve greater security with less plastic. gi-de.com

Louisenthal


Banknote print
Ink-receptive layer
Polymer film
Paper with embedded security features
Polymer film
Ink-receptive layer
Banknote print
High definition watermark
RollingStar® thread
RollingStar® LEAD Pure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OBERTHUR FIDUCIAIRE

OBERTHUR FIDUCIAIRE AT THE FOREFRONT OF CSR IN THE INDUSTRY

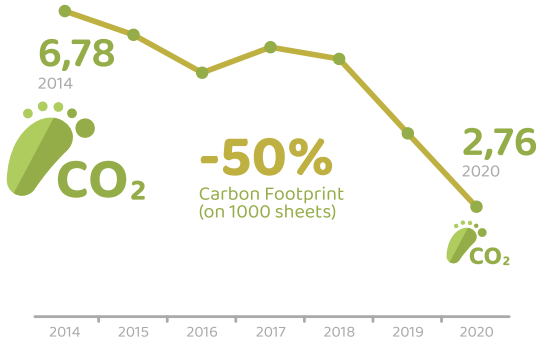
Oberthur Fiduciaire at the forefront of CSR in the industry

OBERTHUR FIDUCIAIRE

Environmental awareness is affecting many companies. Oberthur Fiduciaire is no exception and is contributing to the tremendous momentum created with the COP21 in Paris in 2015. Our Chairman, Thomas Savare, has therefore taken the decision to commit Oberthur Fiduciaire to a constant effort to reduce its carbon footprint by implementing a sustainable management program, Earth 365, for all activities carried out at our banknote production plant in Rennes (France).

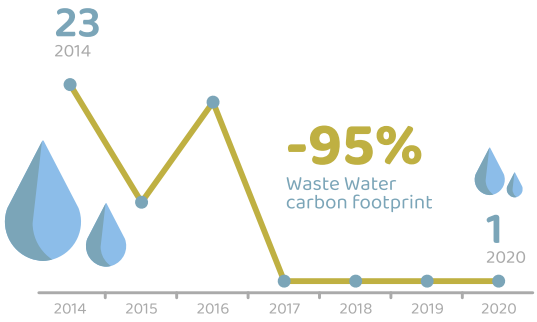
This environmental policy is only possible with the mobilization of all employees and managers. Everyone at Oberthur Fiduciaire is proud and delighted with the already very positive results that reinforce our unfailing commitment.

In the space of three years, our energy consumption has already decreased by 10%, and the impact of our environmental policy is even more satisfactory with a carbon footprint that is down 50% between 2016 and 2020. With the ISO 14064 standard, we now aim to reduce our carbon footprint by a further 40% by the end of 2025, a 70% gain in 10 years.



Oberthur Fiduciaire's determination to limit its carbon footprint took a new turn on June 1, 2020. Indeed, since that date, our Rennes plant has been operating 100% thanks to renewable energies, including green energy from the Rance tidal power plant. Our carbon footprint has been reduced from 2.20 kg /1,000 sheets of printed banknotes to 0.45 kg /1,000 sheets.

This spectacular reduction is also coupled with particularly significant efforts in terms of recycling: 80% of the waste recycled at



our historic Rennes plant is now recycled by local service providers, which reduces the environmental impact of logistics by a further 30%.

In addition, we have set up more than 62 different recycling processes at our plant:

- Recycling 100% of wastewater through a treatment process now saves us 1,200m3/ year.

- We have achieved the goal of zero industrial liquid discharge in 2020 that we had set ourselves.

- The recovery of residual heat for our buildings has enabled us to reduce our annual gas consumption by 50%.

- In addition, we are very proud of our involvement in our community by supporting organizations and individuals who are trying to build a new society that is more committed to the environment, such as the eco-adventurer Julien Moreau or the Explore fund.

These reductions in our carbon footprint are only a first step. For example, we are targeting the carbon offsetting of our sales team's travel, and then of all the group's staff.

A STRONG CSR REQUIREMENT

All of these advances have been made possible thanks to detailed analyses and monitoring that allows us to optimize our industrial processes: waste rate and flow management are enhanced. Our CSR policy goes even further by integrating social and environmental criteria that contribute to well-being in the workplace and improved ecological performance: speed, workstation layout, air analysis, etc.

CSR criteria are also taken into account in requests for proposals for our service providers. Indeed, we work with our suppliers so that they follow this same approach, thus making our entire industrial process virtuous. For example, we have chosen to work only with cotton producers who use environmentally responsible farming methods, under high quality local conditions. This raw material, which retains all its technical qualities in the printing of our customers' banknotes, is also fully recyclable at the end of its life.

We have also chosen to control our entire supply chain, the only guarantee of transparency and quality for our customers.

This makes it easier to exchange with our industrial partners on environmental issues and to set up thoughtful, efficient and safe processes.

Traceability, integrity and commercial transparency also guarantee security and ethics, values that are at the heart of our fiduciary printing business, the very essence of which is trust. As for our environmental commitment, Oberthur Fiduciaire has chosen to take the most demanding path in terms of good practices against attempts or acts of corruption throughout our supply chain, to have: the international certification ISO 37001 which is the universal reference for all sectors of activity.

Oberthur Fiduciaire has gone even further in its CSR commitment, with the joining of the Global Compact program at the beginning of this year. This is a binding initiative set up by the United Nations to encourage private companies to improve their practices in four key areas: Human Rights, international labor standards, environmental protection and anti-corruption.

OBERTHUR FIDUCIAIRE

Ms. C. Lafont
Email: c.lafont@fcof.com
Website: www.oberthur-fiduciaire.com

CLICK OR SCAN

Spanish Language

CLICK OR SCAN

ORELL FÜSSLI

COVID-19 DISRUPTED THE BANKNOTE INDUSTRY AND CHANGED THE WAY ORELL FÜSSLI LTD. SECURITY PRINTING APPROACHED ITS ORIGINAL VISION FOR FUTURE TRENDS.

COVID-19 disrupted the banknote industry and changed the way Orell Füssli Ltd. Security Printing approached its original vision for future trends.

ORELL FÜSSLI

The stubborn inventiveness of counterfeiters has traditionally been the agent of change in the banknote industry. In the past year however, change was driven by the COVID-19 pandemic, compelling this industry to implement new processes. Orell Füssli Ltd. Security Printing (OFS) had to adapt quickly to meet increased demand whilst ensuring the safety of its employees. This is their COVID-19 story.

Industrial players in general have been facing new challenges since the outbreak of the pandemic. OFS has also been weathering the storm in the face of a sudden increase in demand for banknotes, in combination with lockdown measures impacting the availability of staff, materials, and other essentials. The Zurich-based firm managed to provide their clients with an uninterrupted flow of banknotes, on time. There was no recourse to Force Majeure.

Production planning, procurement, IT and HR, in a show of Swiss efficiency, implemented contingency plans to increase raw material supply, manage physical distancing at the workplace, and provide new tools and technologies to employees working from home.

COVID-19 TASK FORCE

A taskforce was implemented at the outbreak of the pandemic, and continues to monitor the situation on a daily basis. Led by the Group CEO Daniel Link, members come from top management, security and safety, HR, production and liaise regularly with cantonal authorities including security and medical consultants. The taskforce has a clear and simple dual mandate: employee safety and business continuity.

The COVID task force follows four key principles:

1. EVIDENCE-BASED DECISION TAKING

The epidemiological data in Switzerland and in neighbouring countries, from where many employees commute, is regularly analysed with ad-hoc experts. New COVID regulations are reviewed and translated into pragmatic actions at the workplace. In certain instances, internal rules have superseded those required by law. The wearing of masks, for example, was mandatory on OFS premises before it became compulsory in Switzerland.

2. REINFORCED COMMUNICATION

A direct channel of communication was opened up between employees and the taskforce, superseding traditional direct hierarchical lines. All COVID related queries were channelled through the taskforce and were dealt with on a priority basis, however benign the query. Communication with suppliers, including transport companies and forwarding agents, was reinforced. An open exchange with suppliers has been essential to reserving slots in the highly disrupted global transportation system.

3. BUSINESS CONTINUITY

After decades of painstakingly mapping risks and updating contingency plans to evolving technologies and know-how, the team at OFS felt vindicated when the firm continued running smoothly throughout the epidemic. “We had not anticipated the pandemic as such” says Michael Kasch, the Managing Director of the Orell Füssli security printing division “but we did have contingency plans for a sudden shortage of staff, or unplanned road blocks."

Business Continuity Management (BCM) is a core principle at OFS. Since almost half a decade, OFS has been refining its BCM know-how, and this bore fruit with the successful management of production and distribution during the height of the pandemic.

4. EMPLOYEE SUPPORT AND SAFETY

As strict confinement measures kicked in, everyone felt the impact in their daily lives, whether at home or at their workplaces. OFS did their best to alleviate some of the burdens by providing masks and hand sanitizers, at the very beginning of the epidemic when these items were hard to come by. Physical distancing was made possible in the tight confines of the historic building in Zurich thanks to the space freed up by colleagues ordered to work from home.

Are these measures temporary or will they outlive the pandemic? Meals have been served in the staff canteen, free of charge. The direct communication channel to the task force has offered an outlet to anxious staff who are able to seek prompt support and solutions. Working remotely was enforced whenever possible together with flexible work hours to help parents cope with closed schools. Teleconferencing tools were swiftly provided to staff working remotely.

“We took the right measures very early on and we were able to minimize risks for employees” says Michael Kasch, about how OFS handled the special situation. “Additionally, I must say that all our employees have been very consistent in implementing the measures in the offices and in our production.”

Employees belonging to a risk group have either been reassigned to positions

enabling them to work remotely, or have been provided with specific protective equipment. Whenever a contact case has been reported, however remote the risk, preventive quarantine measures have been enforced. These stringent rules have so far contained cross-contamination at the workplace.

LOOKING FORWARD TO A DIFFERENT FUTURE

Remote work is still the norm at OFS however, and will continue to be so for several months until it is deemed safe for employees to return to the office. "Virtual meetings have become a normality but can never replace physical events and face-to-face contact especially with our clients" says Michael Kasch.

On a more positive note, times of crisis create new initiatives. "The pandemic has accelerated the rollout of digital transformation" according to Michael Kasch. "We will introduce tools using virtual reality and artificial intelligence earlier than initially planned. Virtual visits of OFS premises and production facilities, using VR goggles, could soon become a reality."

LESSONS LEARNED

As the pandemic wreaked havoc within supply chains, leaving many companies at a near standstill, OFS ramped up production and filled new orders on time. "Business contingency plans simply kicked-in" confirmed Michael Kasch. "We have spent considerable resources over the years assessing risks and mitigating them

through these plans. We ask our suppliers to comply with our strict rules. It means extra security stock of raw materials. It means secure storing of printing materials in vaults. It is all about reserved, spare production capacity. We pay a premium to transporters for priority shipments. It all comes at a cost. But we have a responsibility in times of crisis. We are after all the main supplier of banknotes to major Central Banks."

Put to the acid test and based on their performance so far, it does seem that OFS knows a thing or two about prioritising Business Contingency Management and employee safety. This does not detract from OFS's core mandate: that the security of the printed product will always remain at the centre of everything.

ORELL FÜSSLI LTD. SECURITY PRINTING

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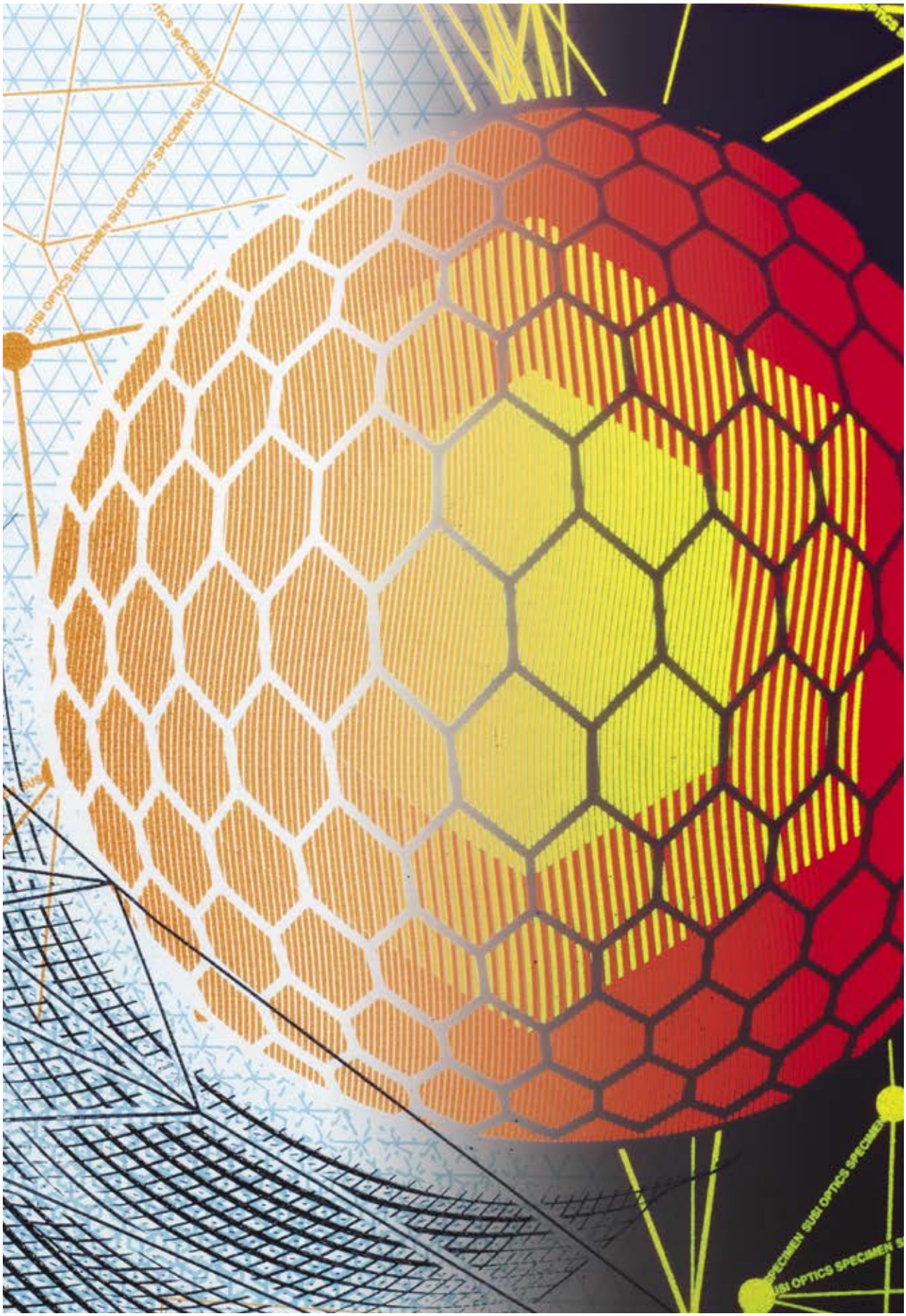


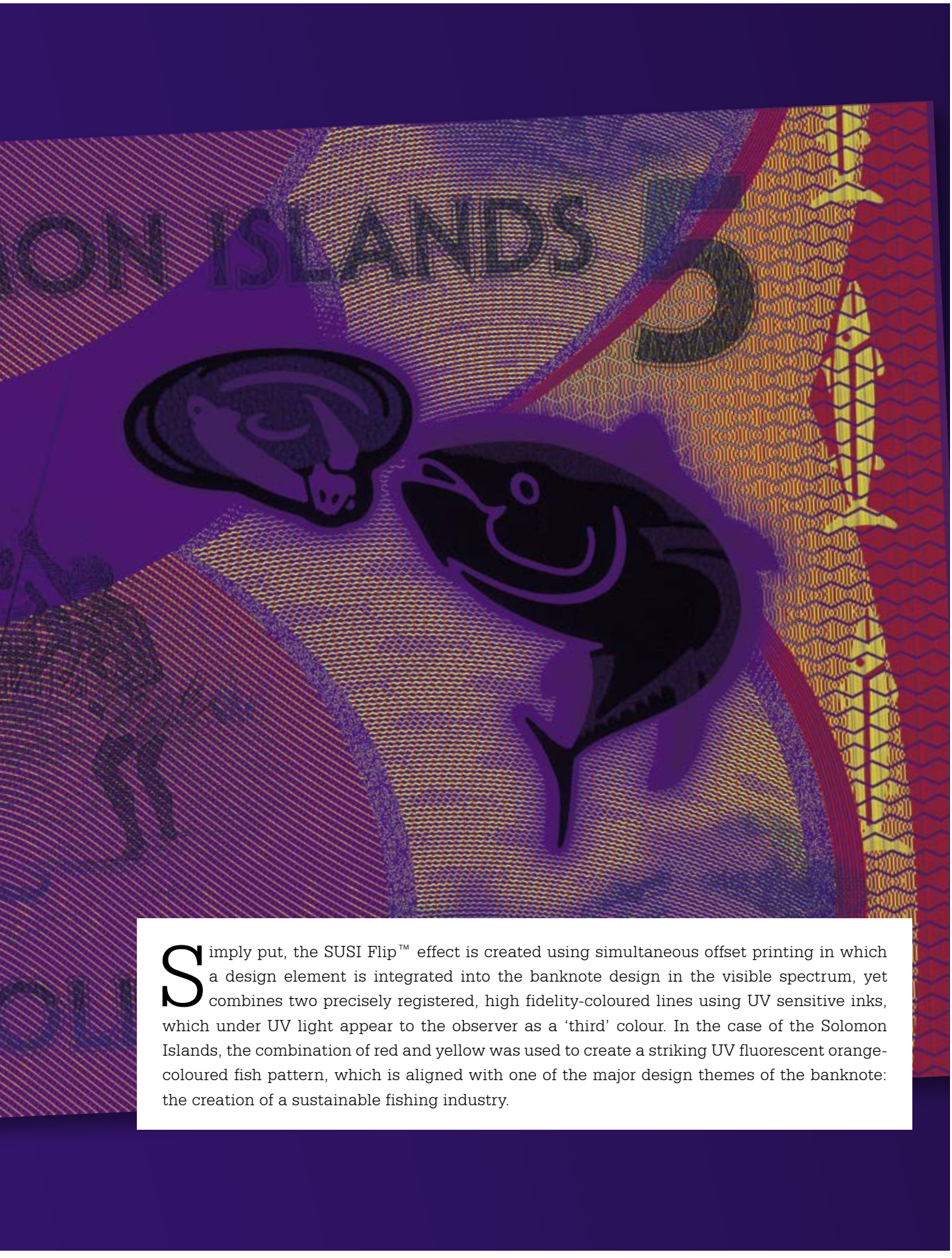
NOTE PRINTING AUSTRALIA

SUSI FLIP™: OFFSET PRINTING HITS A STRETCH TARGET

SUSI FLIP™: Offset Printing hits a stretch target

NOTE PRINTING AUSTRALIA

The Solomon Islands' polymer $5 won international acclaim when the banknote's SUSI Flip™ feature was named Best New Currency Feature or Product by the International Association of Currency Affairs (IACA). The award was one of three given out as part of IACA's Excellence in Currency Technical Awards, which is staged every two years.



Simply put, the SUSI Flip™ effect is created using simultaneous offset printing in which a design element is integrated into the banknote design in the visible spectrum, yet combines two precisely registered, high fidelity-coloured lines using UV sensitive inks, which under UV light appear to the observer as a 'third' colour. In the case of the Solomon Islands, the combination of red and yellow was used to create a striking UV fluorescent orange-coloured fish pattern, which is aligned with one of the major design themes of the banknote: the creation of a sustainable fishing industry.

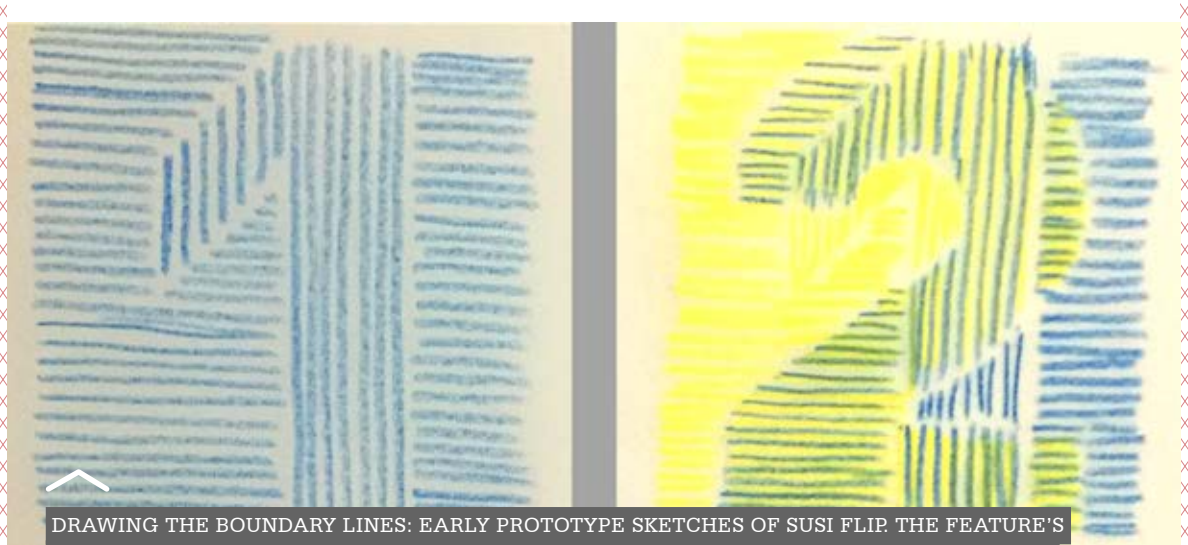
"The SUSI Flip feature has really captured the imagination because it was a genuine innovation in the way our Super Simultan IV was used to produce a feature that is viewable under UV light," says Note Printing Australia's CEO, Malcolm McDowell. "With this global IACA currency award, as well as the recent Australian printing industry gold medal award, the Solomon Islands' $5 has become one of the Asia-Pacific region's most acclaimed banknotes in recent memory."

The realisation of the SUSI Flip feature however was not immediately apparent to Note Printing Australia when it installed the Koenig & Bauer machine in 2013. While it was doing an excellent job in producing the rich and bold offset-printed colour scheme for Australia's second polymer banknote series, it was the development of the SUSI Optics™ concept note in 2016 that provided the opportunity to test the latent capabilities of the Super Simultan IV.

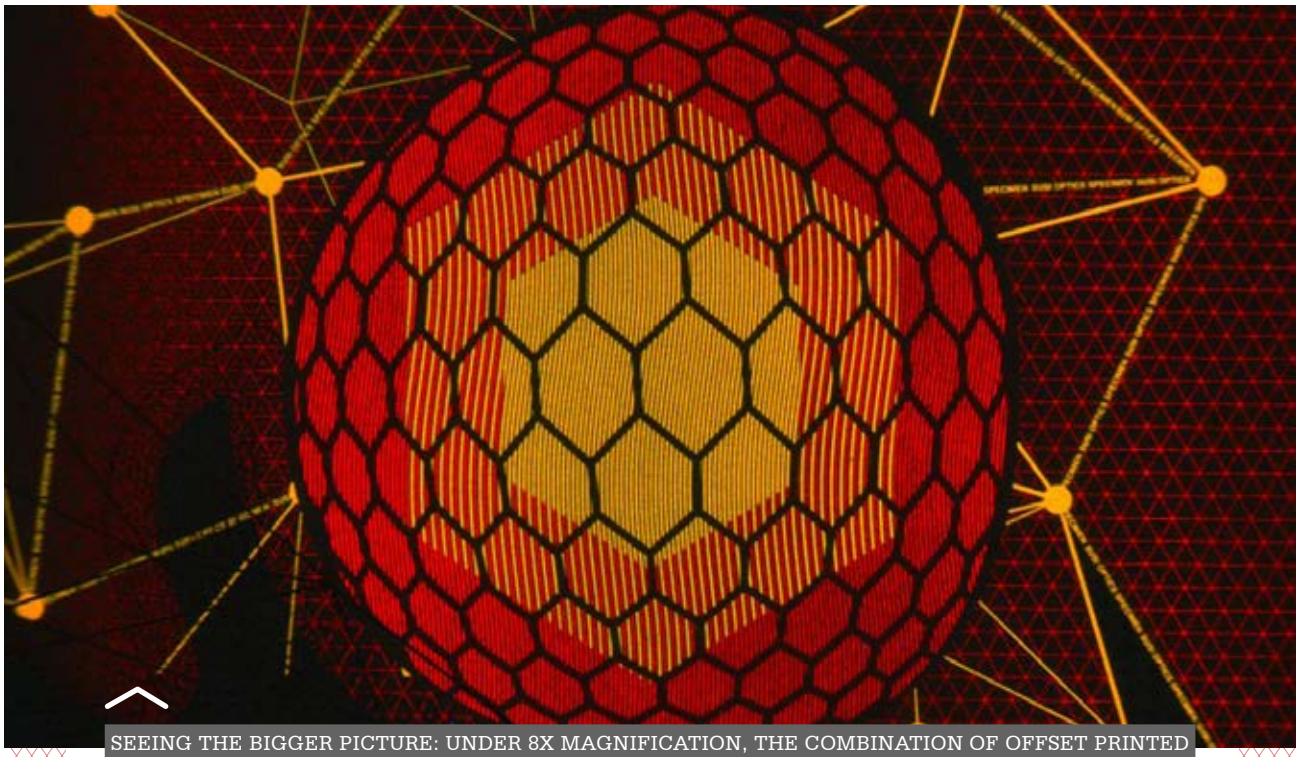
In the lead up to printing this concept note, Koenig & Bauer had been working on the idea of applying high fidelity printing in tight sequence using a combination of UV ink colours. Early prototypes in this project showed that tightly registered lines printed in two alternating UV ink colours could create what appeared to be a third colour to the naked eye.

"The first idea of the SUSI Flip™ feature came up during a brainstorming session in 2014 where a simple question was raised: What could be done to enhance UV features? It quickly became clear that the answer resided in the perfect registration between several plates that only Simultan Offset printing can offer. To create a feature that is more attractive to the public and harder to counterfeit, we decided to try combining two UV colours to create what would appear like a third one," says Hervé Guillerey, Head of Banknote Innovation & Design Services at Koenig & Bauer Banknote Solutions.

The Koenig & Bauer team dubbed this concept SUSI Flip and elected to include the feature in their SUSI Optics Concept Note. The SUSI Flip feature was demonstrated in one of the shrimp's eyes (the other eye is the SUSI Optics feature, which involves distinctive visual effects created by micro-lenses). Under normal light, homogenous in tone and colour, the eye is consistent with



DRAWING THE BOUNDARY LINES: EARLY PROTOTYPE SKETCHES OF SUSI FLIP. THE FEATURE'S POTENTIAL WAS REALISED ONCE THE RELATIONSHIP BETWEEN COLOUR, LINE WIDTH, LINE ORIENTATION, AND INK WEIGHT WERE RESOLVED.



SEEING THE BIGGER PICTURE: UNDER 8X MAGNIFICATION, THE COMBINATION OF OFFSET PRINTED LINES THAT COMPRISES THE SUSI FLIP FEATURE IS EVIDENT.

the surrounding colour scheme and appears fully integrated in the banknote's design. Under UV light however, a hexagonal pattern appears with yellow in the centre of the design and red around the outside. In between these two areas is an orange hexagon, created by the combination of red and yellow printed lines.

"One distinguishing feature we learned from this early design was the importance of designing simple bold shapes in order to optimise the effect," says Dean McGrath, Head of Technical Services at NPA. "The principle of 'less is more' certainly applies to the design of the feature and it's always tempting to try to create a feature that's more visually complex. Our advice is to keep it simple."

In taking inspiration from this work, Note Printing Australia saw the potential for the feature in a project they were engaged in at the time – the Solomon Islands' new polymer $5.

"For this low denomination note, CBSI were looking for security features that were well equipped to survive a harsh note-handling environment, and as an offset printed feature that could deliver a highly durable Level 2 feature, SUSI Flip was of immediate interest to the Bank," says Nuwan Kalpage, NPA's Head of Commercial Services. .

Designing this feature for the first time involved risks and challenges for NPA. The first was the requirement for the feature to use the same overt colour on two adjacent plates which in turn requires very precise control of ink film weights to ensure overt invisibility of the design element. Line orientation and ink take-off distribution across the note therefore needed to be considered when engineering the solution.

Another risk factor is the management of covert and overt ink shades to ensure an optimal luminescent outcome. Overt colour choices must be from colour families that are complementary to the covert colour.

ICONIC: THE BEAUTY AND FUNCTIONALITY OF THE SOLOMON ISLANDS' NEW POLYMER $5 HAS EARNED GLOBAL RECOGNITION (NOTE: IMAGE SHOWS UV FEATURE EFFECT ON FRONT SIDE OF NOTE).

If not, the overt colour compromises the strength of the UV effect.

"This is why the shade of colour we chose in the overt colour scheme was in the red-yellow spectrum," says Dean. "This can be seen in the original SUSI Optics concept note, where the design element in the visible colour spectrum is orange. For the Solomons' note we created a more earthy tone but it still complemented the covert colour scheme of red and yellow."

"NPA has a strong history in printing wet offset on polymer banknotes, so we knew going into the project that this would very likely be our favoured approach," says Dean.

The decision to print the SUSI Flip feature was also seen as beneficial by the Technical Services team because it enabled a stronger value proposition in regard to NPA's print options on the banknote. For example, had NPA printed a conventional one or two colour fluorescent patch this would have used additional printing units that would have limited NPA's design options.

To assist banknote designers in understanding how to integrate this feature into a design, the latest KBA-One software has a SUSI Flip design module.

Due to the fact that SUSI Flip™ is a product of design know-how and machine capability, it is significant that the feature comes at no additional cost to the customer, a truly remarkable value-add.

In articulating the role that banknote design and security plays in growing the confidence of a society, Malcolm says:

"Our Design team went through many iterations to arrive at this final design which I think what we see today is an important symbol for this courageous nation – a brand new substrate, portraying strong messages for the future, and the world's first application of a new security feature that can be used by retailers and authorities to authenticate the note quickly and easily."

At home, the Central Bank of Solomon Islands regards the new polymer $5 banknote as the nation's 'silent ambassador' in signalling the important themes of economic sustainability through the creation of a sustainable fishing industry, as well as the importance of community and social cohesion. The Bank's decision to issue the note on UN World Tuna Day (2 May) was an inspired choice that certainly strengthened the message that the Bank and the Government are sending to the public about the future of the Solomon Islands.

The fact that the banknote includes the world's first application of the SUSI Flip™ feature has also given the public a tangible way to appreciate the advanced technology used to produce the banknote, which is a point of tremendous pride for the Central Bank of Solomon Islands.

CEO MALCOLM MCDOWELL (RIGHT) PRESENTS THE IACA AWARD TROPHY TO THE SIMULTAN PRINTING TEAM OF (L-R) ANGUS MCGRATH, AARON THECKSTON, RICKI CADMAN, STEVE ST.MARTIN, AND DOUG BROAD

NOTE PRINTING AUSTRALIA LIMITED

Mr. Steve Casey
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CLICK OR SCAN

Spanish Language

CLICK OR SCAN

DE LA RUE

EXPERTISE, PROGRESSION, AND CREATIVITY

CLICK OR SCAN

EXPERTISE, PROGRESSION, AND CREATIVITY

DE LA RUE

In 2020 26 new banknotes and commemorative notes were issued that were **designed**, **manufactured** or contained De La Rue **security features**. These banknotes were varied and reflected the diverse needs and preferences of their issuing authorities.

Every banknote must meet a unique combination of parameters. Specification needs evolve over time and different combinations of different security features are required in different circumstances. We explore here the need for expertise, progression and creativity to ensure that banknote issuing authorities obtain the best banknotes for their needs.

PUREIMAGE™ ADVANCED HOLOGRAPHICS BRING ICONS AND SYMBOLS TO LIFE WHEN TITLED ON ANY ANGLE

THE BEST BANKNOTES

Banknotes represent highly advanced, technically sophisticated products. They can be used for thousands of transactions during their lifetime. They store value for as long as they are kept. They are available and free-to-use for virtually every person in the world.

Last year the banknote specifications that were designed and manufactured by De La Rue included the both the major banknote substrates (paper and polymer) and all three main security feature platforms (colour shift, holographic, micro-optic technologies, as well as combinations thereof). 38% included a **holographic patch or stripe**. 2/3rds were polymer banknotes. The 26 different designs and specifications met the 26 bespoke needs of their issuers.

Given the range of environments different banknotes circulate in and the varying needs of the banknote issuing authority, the definition of the "best banknote" varies by country and banknote denomination.

MULTIPLE FACTORS TO CONSIDER

The level of durability required will be influenced by factors such as the circulating environment and banknote handling habits. Functional requirements depend on how automated the cash cycle is and may consider specific user groups, such as the partially sighted. The importance of cost, environmental factors, aesthetic themes and the extent to which dual supply matters all need to be considered. For central banks with a secure print works the ease of manufacture and potential capital expenditure is also a factor.

The best route to achieve appropriate counterfeit resilience also varies by country, denominational value, public engagement, cash cycle attributes, the type and level of counterfeit threat. There are many instances where a simple windowed thread or a secure polymer window are more than adequate to protect a banknote.

Global banknote **counterfeit** rates remain so low that levels are typically measured in parts per million and the cost of counterfeit

banknotes is significantly lower than that of alternative payment fraud. Banknote issuing authorities are good at upgrading their banknotes frequently enough to stay ahead of the evolving counterfeiting threat, thus maintaining public confidence in the financial systems. The low counterfeiting levels are seen for banknotes with a range of specifications, suggesting there are multiple ways to secure a banknote, with several security feature technologies and substrate types proving to be successful. There is no single security feature that provides complete protection for every banknote. Instead counterfeit resilience is built up by layering security through the entire banknote.

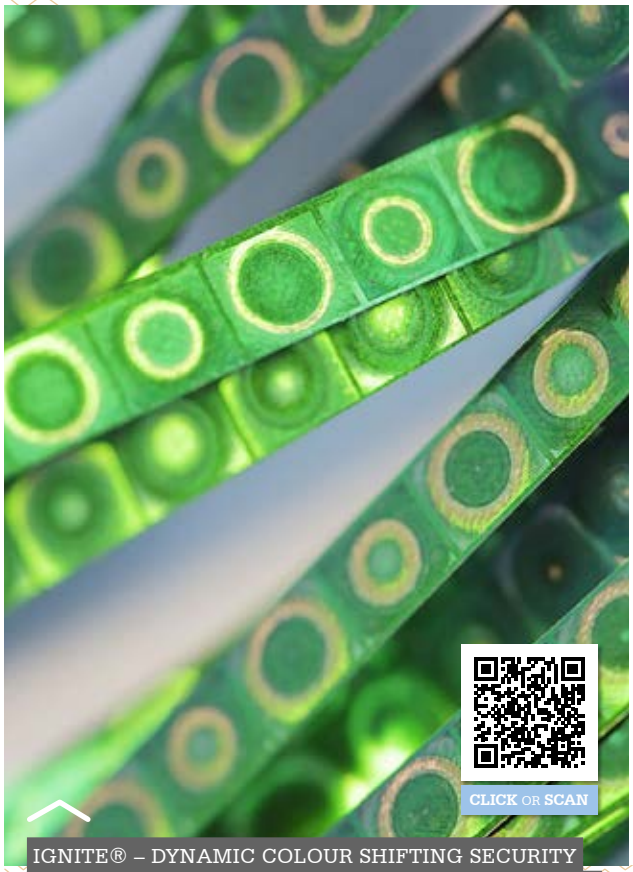
TECHNOLOGY AGNOSTIC EXPERTISE

Launching a new series of banknotes can be a once-in-a-career project. This project is often carried out in addition to the day-to-day activities of the issuing department. It is described as an extremely rewarding and memorable experience that can also be hard work. Technologies progress and the macro-economic environment changes with time and may differ since the last series was launched (for instance sustainability may be a higher priority than it previously was). There is often a lot for an issuing authority to consider.

In contrast to banknote issuing authorities, who refresh their banknote series every 7-10 years on average, De La Rue is continuously supporting multiple new banknote issuing authorities on such projects. Half of all currency issuing authorities around the world use a currency product from De La Rue. One third of all banknotes in circulation have been designed by De La Rue. Our experts continuously support new technology introductions globally. As an example, **SAFEGUARD®** polymer substrate has been successfully introduced into 15 external commercial printers and state printing works. Whilst new banknote series project only happen occasionally within an issuing department, De La Rue supports such projects on an ongoing basis.

NEXUS™ – THE WORLD'S FIRST MICRO-OPTIC EMBEDDED STRIPE, COMBINING THE EMBEDDED SECURITY OF A THREAD WITH THE HIGH IMPACT AREA OF A STRIPE

SAFEGUARD® ARGENTUM™ – HIGHLY REFLECTIVE INK INTEGRATED INTO THE POLYMER SUBSTRATE



IGNITE® – DYNAMIC COLOUR SHIFTING SECURITY THREAD, COMBINING TWO SECURE TECHNOLOGIES

The support available from De La Rue covers everything from concept designs and business case modelling through to banknote end-of-life recycling logistics. We use knowledge of global best-practice to help ensure projects run seamlessly. The design team brings the vision of the currency issuing authority to life, capturing the needs of the banknote and designing with manufacture and cash cycle performance in mind. Our counterfeit analysis highlights strengths and weaknesses of the existing banknote series and make recommendations in the context of the global trends and counterfeiting threats. Technical support is available throughout, covering everything from manufacturing trials to public education campaigns and **cash cycle analytics**.

Importantly, as a supplier of polymer and paper features De La Rue´s advice is technology and substrate agnostic, focussing on helping the currency issuing authority deliver their end vision and supporting decisions with appropriate analysis. Many central banks have begun to transition to polymer, citing is as cleaner, greener, more secure and more durable than paper banknotes. For others paper or a combination of polymer and paper remains the best solution for the foreseeable future.

PROGRESSION IN BANKNOTE SECURITY

Some of the fundamentals of banknote security remain unchanged over time - security is layered throughout the banknote and delivered via different combinations of features. A good security feature is easy for people and machines to authenticate but very difficult to replicate. It isn't enough to see 'something' that changes when tilting

a banknote – the public need to know precisely what to look for and so it needs to be easy to describe and remember.

Polymer and paper substrates both come with a good base level of security and are both manufactured in secure environments, requiring highly specialist skills and equipment. With polymer there are specific security inks and complex window formations that are integrated into the substrate and create new barriers to the more standard reproduction techniques. With paper banknotes even basic threads provide security because they are embedded in the paper (i.e. the paper forms around the thread during the paper-making process). Applied features, the effects within threads, integrated polymer substrate features, layers of secure print and additional machine-readable functionality further enhances the security.

Where the value of the banknote is low or where the currency is not a major target for criminals then a secure polymer window or a simple colour switch in a thread is more than enough to secure the banknote. However cost and environmental impact have become an emerging concern in recent years. SAFEGUARD® has helped here, with banknotes that last 2.5 times longer than paper on average and are readily recycled.

De La Rue's advanced threads use combinational technologies to increase the counterfeit resilience of banknotes. IGNITE® provides the ultimate dynamic colour shifting effect, with a wide viewing angle. KINETIC STARCHROME® provides a truly bespoke thread design for each denomination, with visible colour switch and holographic effects.

SAFEGUARD® HOLOGRAPHIC STRIPE, COMBINING CLASSICAL AND DIGITAL HOLOGRAPHY

Stripes have also progressed. For paper banknotes NEXUS™ is the first micro-optics stripe and combines the benefit of a large effects area with the embedded security typically associated with a thread. For polymer banknotes holographic stripes provide more secure and engaging art with effects that now allow users to engage with their smartphone torch and are highly responsive as the note is tilted.

DELIVERED WITH CREATIVE FLAIR

British innovation and design can be seen throughout De La Rue's products and services, especially the banknotes in circulation. It is why the **GEMINI™** security feature integrates into the banknote print and instantaneously brings an image to life under UV light. It is also why Argentum™ mirror-like shapes were developed for the SAFEGUARD® substrate.

Creativity goes beyond product design though. It is apparent in every improvement made and every problem solved. For instance, SAFEGUARD® has been upgraded to make it even easier to print on. We're also working to help central banks solve the challenge of small volume banknote waste recycling. Look out for more examples of De La Rue creativity in 2021.

DE LA RUE PLC

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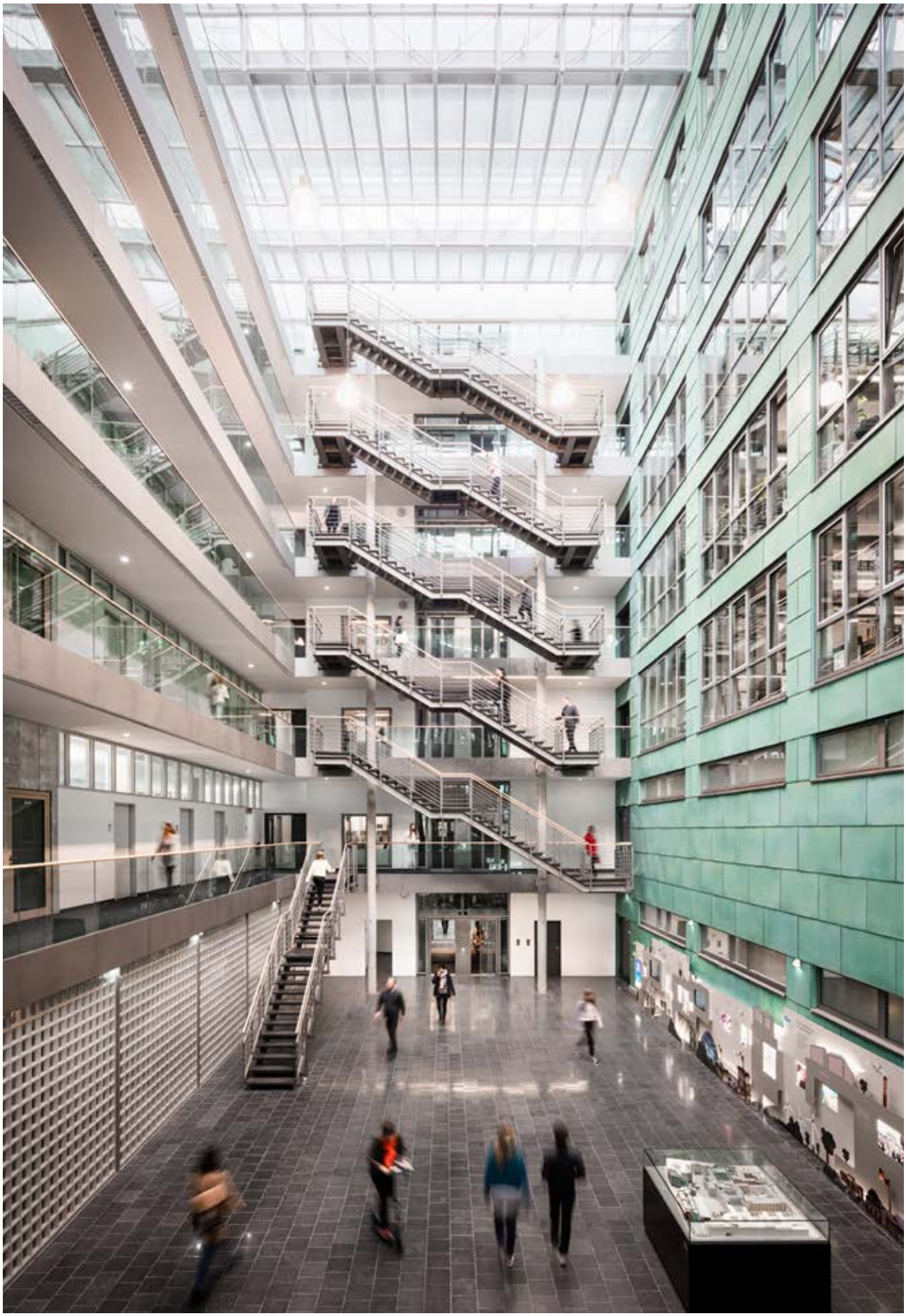


BUNDESDRUCKEREI

MADE IN GERMANY, WITH INTERNATIONAL TALENT AND SKILL: THE BUNDESDRUCKEREI EMBRACES THE FUTURE OF BANKNOTES

Made in Germany, with international talent and skill: The Bundesdruckerei embraces the Future of Banknotes

BUNDESDRUCKEREI

Berlin's Bundesdruckerei is a forward-looking fully state-owned digital operation delivering top-level secure data, identities and infrastructures, all opening up new markets – and it prints currency, too.

But in a digital era even the ink that makes contemporary cash banknotes is no simple affair. Banknotes are developed and produced at the Bundesdruckerei in a constantly-evolving, high security environment, where change demands precise planning and a relentless view to the future. This is so even as everyday users – the construction workers getting a coffee in the morning or the motorist paying a toll – look at these notes as a reassuring norm, grounding them to the past.

Making these materials and satisfying both security and user needs in an increasingly competitive and uncertain field is the challenge facing this 260-year old company, one of 11 European certified banknote manufacturers. As it molds itself to meet the future, the Bundesdruckerei can draw from its history and from weathering and reinventing itself through times of great disruption and hardship.

That this is happening during a time of global pandemic is no reason to stop – and in fact, this great social strain makes it clearer in some ways why it is important to keep going. Some 85 percent of all payments around the world are made using cash, with a little under 600 billion banknotes in global circulation.

A REGAL TRADITION AND CONTEMPORARY DESIGNERS

Even during these current pandemic times, the Bundesdruckerei has managed to remain forward-thinking and innovative while keeping its plates printing. It is able to take advantage of foresight shown over the last two decades as the institution acquired pieces to bolster digital services and security capacities. One example is its ability to produce advanced security documentation, such as biometric passports and electronic identification cards, enabling holders to securely identify themselves in both digital and analogue instances. The Bundesdruckerei Group holding company has a subsidiary in the trusted services line of business, which lets customers engage in legally-compliant exchanges using electronic signatures and seals. Other services feature such products such as self-service terminals for registration offices, which let consumers make their own identification cards, and trusted data solutions protecting the "cyber-sovereignty" of citizens, companies and public institutions. All the while, the Bundesdruckerei is inking and printing millions on millions of secure, counterfeit-resistant banknotes for circulation.

As the Bundesdruckerei looked ahead, it brought back Dieter Sauter in 2019 to become Senior Vice President of value and security printing. Sauter is a natural researcher and has an inquisitive mind, and over the course of his career, he has seen rapid developments affect the banknote printing and high-security documents field.

It's all of a piece: the introduction of new inks, readers and other technologies; the encroachment of potential new competition, such as cryptocurrencies and mobile phone cash transfers; or the public penchant for card-based contact transactions at point of sale at the shop or on public transport. But

Sauter means to keep the Bundesdruckerei keeping pace with market demands, even as it produces one of the oldest tools that markets know: banknotes. As Sauter the physicist knows, chemistry, physics and materials influence research and development in the field, and a banknote must withstand extreme conditions like boiling water or acids. And a printer must be able to withstand, adapt and thrive in the digital world.

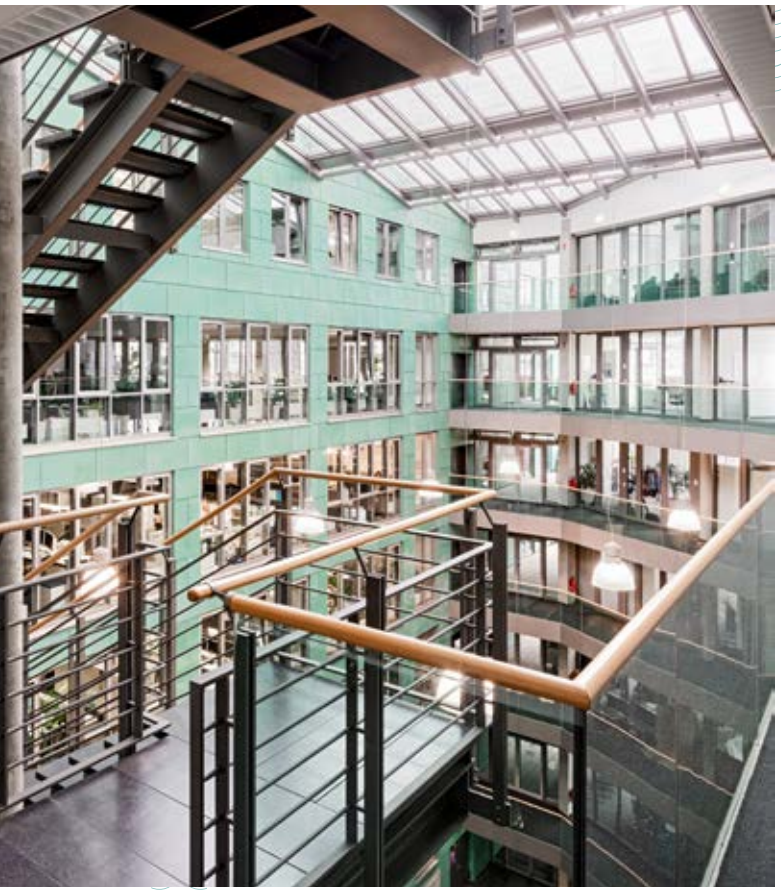
"I have a vision of how I can make our current pure banknote printing sustainable, together with my team," he told the Bundesdruckerei's Einmalig magazine. "In the next five years, I want to have made that vision a reality."

Sauter does not explicitly outline the steps needed to accomplish what needs to be done – those are by nature competitive – but it will involve expanding product and solution portfolios in the areas of secure identity and infrastructures, as well seeking solutions to bridge the gap between cash and digital money. And it will mean using the Bundesdruckerei's deep understanding and competence in one of its core businesses – banknotes – to meet the highest security standards while shaping the banknotes of the future. "It will have new functionalities, a new look, and still be of high quality," he told Einmalig.

Sauter will have many tools and talents at his disposal: his team now includes a new dedicated in-house sales staff who will be specifically focused on banknote services, such as developing high-level security features and ink manufacturing and expanding into new international territories. Team members were added even as 2020 posed unique challenges due to the pandemic. The Bundesdruckerei has a history of making marks in banknote design — Reinhold Gerstetter, a Bundesdruckerei postage stamp and banknote designer, participated in the design competition for the launch of the euro note and his designs won for the euro's second series issuance — and, under Sauter, the new team will be well poised for further international projects and the expansion already in the pipeline.

SECURITY AND INNOVATION, IN-HOUSE

The European Union through European Central Bank (ECB) certifies 11 secure printing houses, with the ECB allocating production of banknotes to national central banks according to demand forecasts and to manage the number of fit banknotes in circulation. New banknotes meet seasonal peaks, security demands and replace cash that is torn, spindled or otherwise mutilated. Of course, the euro is just one kind of banknote. New banknotes, either for design or replacement, are issued around the world: the International Banknote Society has two dozen banknotes introduced into circulation in 2020 that it is considering in its annual Banknote of the Year competition. It is an active field.



Each note that leaves the printer is a remarkable combination of security features and sophisticated design that can be held in the palm of your hand. As one of the ECB-accredited manufacturers of euro-secure items, the Bundesdruckerei team engages with a full set of tools, techniques and materials to deliver the highest quality product available and is able to produce secure banknotes with its "360-degree" approach: the facility itself features a high-security storage vault with fully automated stock management and operation. It can employ the technology weaving foil stripes and threads through mixed and polymer substrates, which is a complex operation requiring special machines.

The Bundesdruckerei supplements high standard inks with its own special high-security features and uses its own printing plates, again applying contemporary, state-of-the art technologies and techniques. Housing and keeping the essential elements for modern high-security printing all under one roof – production capacity, design team, stock management, material expertise – means the Bundesdruckerei can customize its portfolio to meet the needs of its clients in international markets, and do so by drawing on its deep institutional memory.

COMPETITIVE FIELD FOR THE FUTURE

For an ancient and enduring method of human transaction, cash in recent decades has come under increasing pressure from competition and a move to more digital transactions. Banknote volumes are still rising in many countries, although in some, especially northern European countries, they are falling. Keeping cash in circulation is expensive, especially in large countries with smaller populations, as cash must be made accessible to all. Of course, this is a limited picture. In vast parts of the world, even through the developing world, people are "unbanked" or otherwise without access to digital currency. In times of upheaval or even crisis, the natural instinct is for cash banknotes or coins: through 2020 as the coronavirus spread, the U.S. Mint, for example, was unable to keep up with demand for gold and silver bullion.

Non-cash payment systems are not yet robust nor ubiquitous enough to replace cash yet, especially in times of trial. Some digital competitors are considering physically printing account access codes back on security paper. "Like a kind of banknote," Sauter says. "People yearn for security." Banknotes are also more anonymous than digital will ever be. And they are physical objects. A banknote may have other risks in terms of retaining

its valuation, but a banknote will not disappear, >poof< if the power goes out. Digital currency is also made of ones and zeros, with the most anodyne institutional weight imaginable, the equivalent of a bar code as compared to a stamp. A banknote, however, tells the story of a place and people. Users expect that.

That said, competition is constant and the world is a challenging place at the moment.

The Bundesdruckerei was able to keep operating during the pandemic only because it was able to juggle shift schedules to keep production going while guarding staff safety.

Cryptocurrencies, and more importantly the digital society and high-tech trends, are here to stay, so the Bundesdruckerei – as a printmaker and custom high-security digital service supplier – must remain innovative. "As a manufacturer of cash, we must of course also develop digitally," Sauter told Einmalig. "Exciting technologies, such as nanomaterials and artificial intelligence, will present us with new challenges—and inspire us. I'm looking forward to that!"

BUNDESDRUCKEREI GMBH

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Website: www.bundesdruckerei.de

THE BANKNOTE CONFERENCE

The Banknote Conference is the industry's technology-focused event and has a long and rich history of hosting the world's technology experts from central banks, printing works and industry suppliers and providing unparalleled opportunity to discuss emerging trends and leading innovations. The current state and future of the industry is examined and influenced through the important expertise shared, through the new ideas developed and through the collaboration that begins and happens here.

THE CURRENCY CONFERENCE

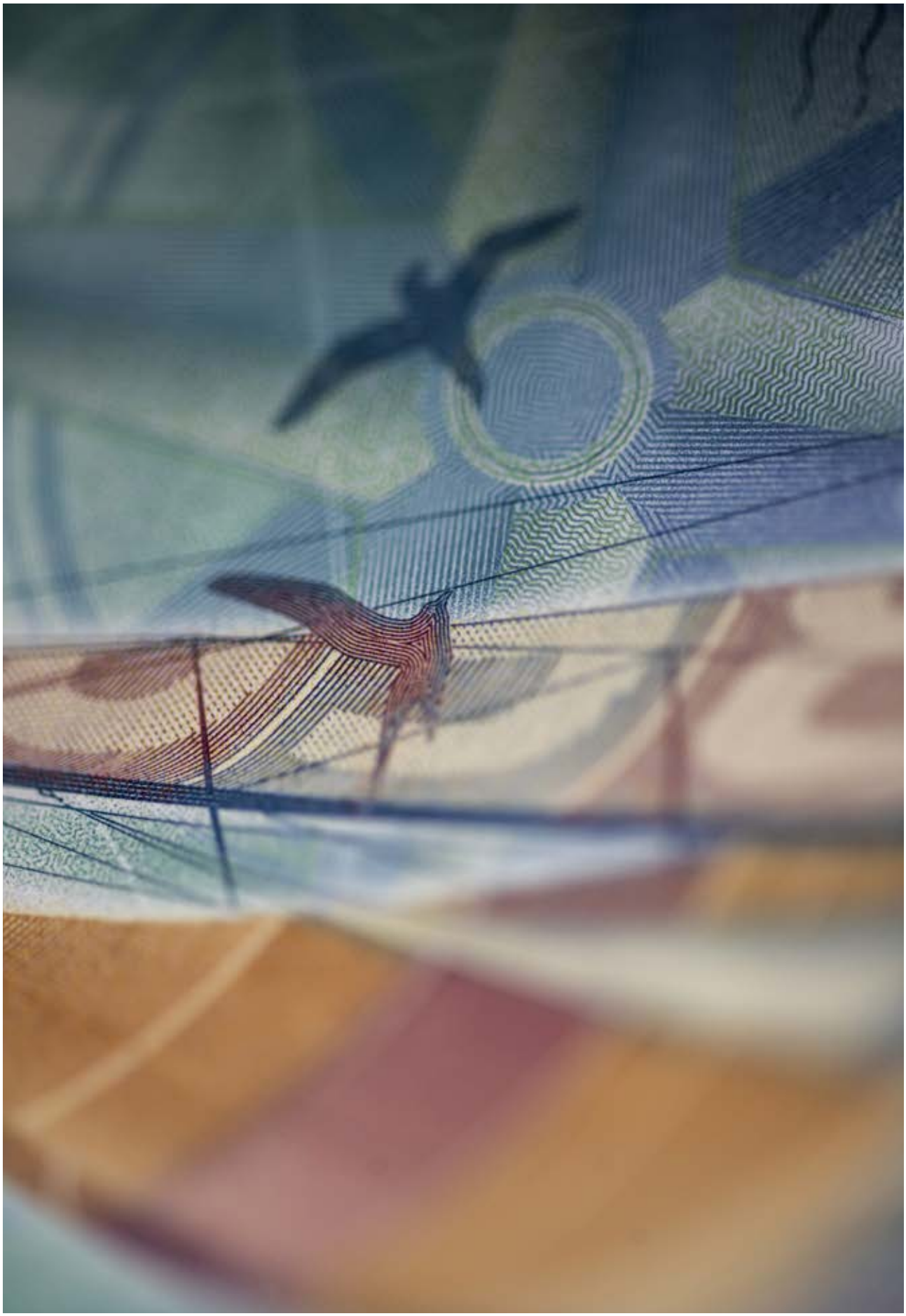
The Currency Conference is the industry's premier event which brings together prominent leaders in the currency issuing and distribution departments of central bank of monetary authorities from around the world to discuss the most pressing policy and strategy matter affecting the Currency Function. Printing works and leading currency industry suppliers support and join the conversations providing insight and latest technologies and solutions that benefit the industry.

TOGETHER AS ONE

Together As One; Given the global disruption by coronavirus in 2020 prompting the postponement of the Banknote Conference, for the single unique occasion these two leading industry events will come together as one for 2022 in Washington DC. This will be a one-of-a-kind event providing the rich policy/strategy discussions and memorable experiences that the Currency Conference is known for while also bringing the critical technology insights from the industry experts found at the Banknote Conference.


INK
TECHNOLOGY


INK
TECHNOLOGY



LUMINESCENCE SUN CHEMICAL SECURITY

SHIELD ANTI-SOIL COATING, IMPROVING YOUR CASH-CYCLE

SHIELD Anti-Soil Coating, Improving Your Cash-Cycle

LUMINESCENCE SUN CHEMICAL SECURITY

WHY USE A COATING

As banknotes are regarded as a nation's calling card it is of the utmost importance that, during their useful life, they are clean and well presentable. Also, since there is an increased level of automation at Point of Sales with the general public using banknote acceptors to pay for their shopping or depositing their savings through an ATM it is instrumental that banknotes function as expected in these circumstances. Torn, soiled or otherwise damaged banknotes could cause significant issues and frustration.

Since banknotes tend to damage more easily when they are soiled (as described in "Durable banknotes: an overview, Paper by Hans De Heij for BPC Paper Committee 2002") it is important to keep banknotes “clean” for as long as possible. This is one of the reasons why many Central Banks have adopted so called “Clean Note Policies” clearly stating the required quality level of a banknote in circulation.

Applying a coating, also known as overprint varnish, has a significant effect on the quality of a banknote over a longer period of time. Secondly, the introduction of new, durable substrates have increased the need for coatings to be applied to protect the inks from being removed from the substrate during circulation. And finally, the cost of cash has never been under such scrutiny as it is today and coating banknotes clearly reduces the need for reprinting and thus the related costs to the Central Bank.

A SHORT HISTORY

The history of banknote coatings starts in May 1953 when the Dutch Central Bank De Nederlandsche Bank (DNB) began a circulation trial of the 1 guilder banknote coated with the so called Ultramid or UMC (polyamide) coating. In 1955 it was reported that the lifetime of the coated notes had increased by approximately 15% and in 1957 the DNB were the first central bank to issue coated banknotes in order to increase their circulation lifetime.

This coating was applied by the Dutch banknote printer Joh. Enschedé until 1987 when it was replaced with the "Dirt and Abrasion Resistant" (DAR) solvent based varnish following another circulation trial in 1982.

In the mid 1990's the DNB started work on the last series of Dutch guilder. Cost savings, quality improvements and VOC reduction were key design goals for the coating, therefore alternative products were identified, and a circulation trial was planned. During these trials water and solvent based as well as UV cured technologies were tested but DNB decided to stick to the solvent based product.

Since then many offerings have entered and left the market and a clear shift was noticed, due to new regulations, towards UV curable coatings which are now the dominant choice.

MORE THAN 20 YEARS' EXPERIENCE

Our first experience with Anti-Soil Coatings started in the late 90'ies early 2000's when Sun Chemical (Coates Lorilleux) started the development of a UV curable product. Various trials were undertaken and the first supply started in 2005.

The development work on the product never stopped and once Coates Lorilleux was acquired by Sun Chemical it was further intensified thanks to the work of the development team at Sun Chemical's dedicated coatings site in Yate, UK. Since the acquisition of Luminescence in 2018 and SELLERINK (see insert) we restructured our coatings offering into our SHIELD series of Anti- Soil Coatings (ASC).

INTRODUCING SHIELD ASC

Ironically, the most important property of any anti-soil coating is that the general user does not notice it is actually there. It is imperative that the coating does not impact the production process nor the final look of the banknote. The SHIELD Anti-Soil Coatings offered by Luminescence Sun Chemical Security defines itself by its interoperability with the other printing inks used and the general printability on all currently installed coating equipment at banknote printers around the globe.

In the development phase our technical teams have focused on the increased durability of the coated banknotes which has been proven by the many tests we have carried out internally and with customers as well as by UGRA, the Swiss Center of Competence for Print and Media Technology.

Banknote printers and Central Banks can be assured that our SHIELD coatings offer similar, if not better, levels of durability as their current coating and we invite print works to test this for themselves.

SHIELD COATINGS WERE TESTED INTERNALLY, AT CUSTOMERS AS WELL AS UGRA USING INDUSTRY SET TESTING METHODS. HERE YOU CAN SEE THE OUTCOME OF ONE OF THESE TESTS SHOWING A PRISTINE COATED BANKNOTE AND A COATED AND UNCOATED BANKNOTE AFTER THE TEST WAS COMPLETE.

FREE RADICAL AND CATIONIC

As mentioned earlier, in the past decade the market has shown a clear shift towards UV curable coatings for banknotes. Whether this shift was pushed by market demand or by the available application technologies is a matter of debate although there are clear benefits to using UV curable coatings over their water- or solvent based counterparts. One of them is the lack of VOC' which offers strong environmental and health and safety benefits. Secondly there is the enhanced durability of the coatings which has a great impact on the quality of the banknote in circulation.

UV curable coatings are available in a Free Radical or Cationic formulation which both offer their own sets of benefits in terms of versatility, cost and resilience. It would take an article in itself to explain these in detail but most important for our customers is the fact that SHIELD Anti-Soil Coatings can be formulated either way, offering full flexibility and a solution that fits our customer's specific needs.

CONCLUSION

To all Central Banks who currently are not coating their banknotes we would strongly suggest considering doing so. Our specialists are ready to work with you on evaluations and trials which will show that, even in case your cash-cycle might not be the most demanding, there are still tangible benefits to coating your banknotes.
For those who are already coating their banknotes it is always good to consider alternatives in terms of product quality, technology as well as overall costs.

LUMINESCENCE SUN CHEMICAL SECURITY

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CLICK OR SCAN

LUMINESCENCE SUN CHEMICAL SECURITY

Luminescence Sun Chemical Security is the global security business unit of Sun Chemical, combining the great innovative strength of a focused, agile group with the strong corporate culture and power of our multinational parent. Through our parent we have access to over 20'000 specialists in inks, pigments and coatings based all over the globe. With more than 17 highly specialised Research and Development centres from which we can draw resources and knowledge, we are continuously on the search for the latest technologies to help you stay ahead of counterfeiters or other threats to your secure documents.

WHAT DEFINES US

Providing excellence is our core belief in everything we do and has resulted in the fact that you can find our innovative high security inks, pigments and components in security documents like banknotes, passports or tax stamps in over 130 countries.

We believe in the continuous training and development of our staff and pride ourselves in the high number of long-term colleagues. They give us the base knowledge and experience to bring up a new generation of experts and contribute to the longevity of our organisation.

WHY YOU WANT US AS YOUR PARTNER

Apart from a healthy and long-term business relation we value the personal contact with you, our team of specialists is continuously travelling around the globe to support our customers whenever needed. You will find our reactivity and delivery times exceptional and unparalleled in your industry.

We understand that it can be daunting to change supplier or to introduce new security technologies or features but you can rest assured that we will be there all the way through the process, as your preferred partner and friend. Your success is of the utmost importance to us.

"A GROWING GLOBAL FOOTPRINT"

For Luminescence Sun Chemical Security 2020 was a year of expansion, despite the global pandemic which hindered many businesses we saw a strong growth which allowed us to expand our global footprint. In September we announced the acquisition of SELLERINK, a well-known security ink manufacturer based in Sao Paolo, Brazil. Through the acquisition we have not only gained a high quality manufacturing site but also a team of experts that will help us offer even better service and solutions to our customers in South-America. The Free Radical formulation of our SHIELD Anti-Soil Coating has been developed by the technical team in Brazil and has been utilized by various banknote printers in the region.

Closer to home, we opened a dedicated production site for our liquid ink product group (including flexo, gravure, screen and ink-jet inks) in Harlow, UK in November last year. This facility increases our production capacity as well as laboratory space for further developments. At the same time it frees up space at our long-time headquarters for the laboratory and production of paste inks (intaglio, offset and numbering) in order to keep up with market demand.

Together with our production site in Thourotte, France we offer worldclass production facilities on two continents with further expansion hopefully announced soon.

GLEITSMANN SECURITY INKS GMBH (GSI)

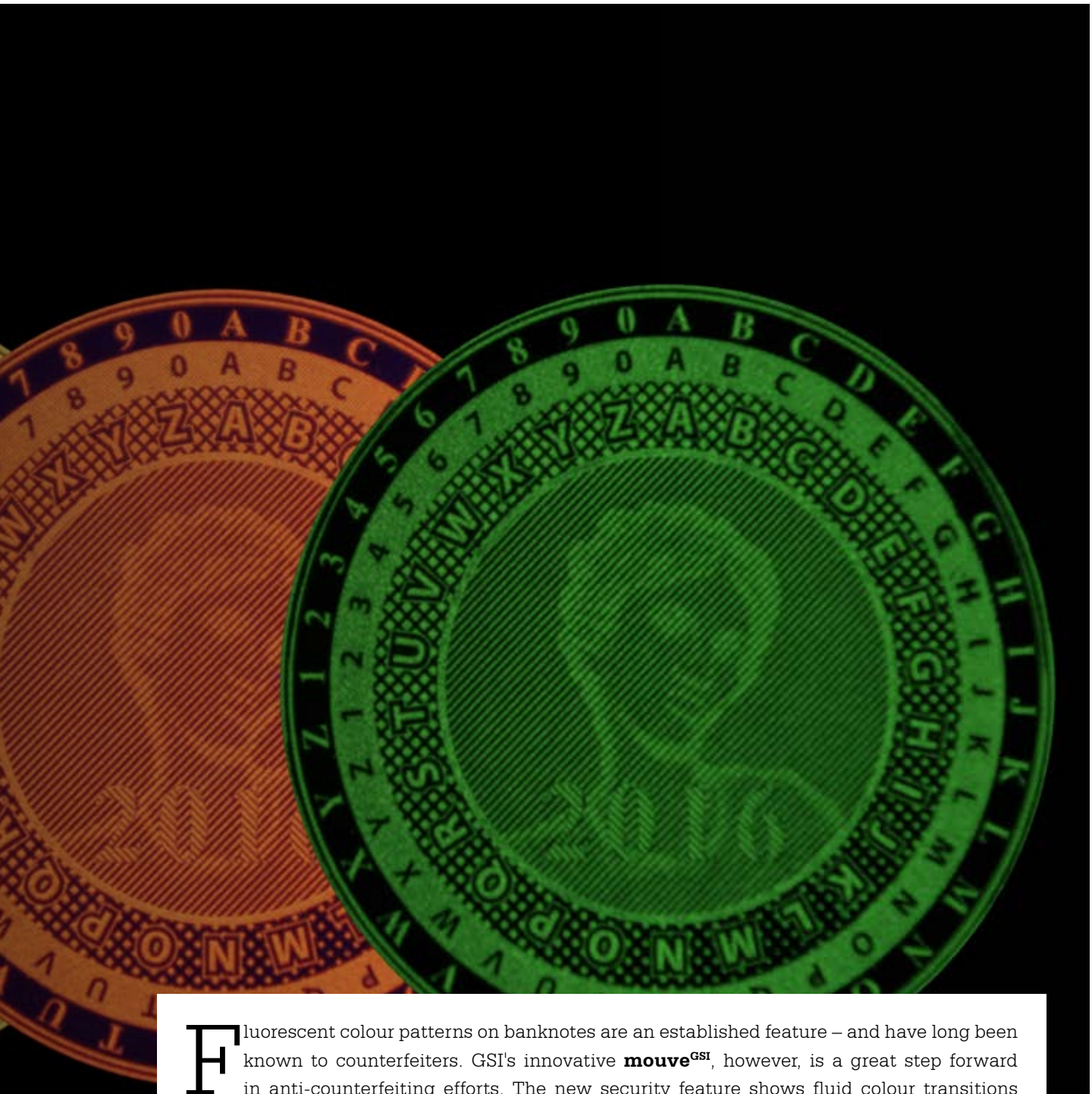
WORLD'S FIRST TRAFFIC LIGHT FOR BANKNOTES – GSI DEVELOPS INNOVATIVE SECURITY FEATURE FOR CASH AND SECURITY DOCUMENTS

World's first traffic light for banknotes – GSI develops innovative security feature for cash and security documents

GLEITSMANN SECURITY INKS GMBH

Luminescent colour effects in red, yellow and green offer fourfold security

Unique and counterfeit-proof: That's the new "**mouve**^{GSI}" security feature for banknotes and security documents which Gleitsmann Security Inks is launching in 2021. Displaying a dynamic luminescent effect in different colours, the feature also exhibits a clearly recognisable afterglow. GSI and its cooperation partner Leuchtstoffwerk Breitungen GmbH (LWB) are breaking new ground.



Fluorescent colour patterns on banknotes are an established feature – and have long been known to counterfeiters. GSI's innovative **mouve**[GSI], however, is a great step forward in anti-counterfeiting efforts. The new security feature shows fluid colour transitions ranging from red to orange and yellow when the banknote is placed underneath an ultraviolet lamp. Following activation by UV light, a green afterglow effect appears when the light source is switched off. With its combination of machine readable and seemingly fluid colour effects, mouve offers the highest possible security available on the market today. It cannot be imitated using commercially available inks or foils, in part because counterfeiters do not have access to the special pigments that are used. Overall the feature is not only suitable for use on banknotes, but is also ideal for all types of high-security printing, such as revenue stamps or governmental identity documents

DEVELOPED IN LESS THAN A YEAR THANKS TO SPECIAL KNOW-HOW

The **mouve**[GSI] feature was jointly developed by GSI and its cooperation partner Leuchtstoffwerk Breitungen (LWB) in Thuringia, and is therefore 100% "Made in Germany". Both companies are long-time partners and suppliers to European customers. LWB manufactures luminescent materials, special chemicals and unique types of pigments for GSI's security inks. The new security feature required a completely new kind of pigment, which was designed by a project team comprising eleven members from both companies. GSI's excellent ink know-how is not only helpful, but fundamental to the development. Following months of development work, the colouring effect has been optimised so that a change in colour as well as an afterglow effect visible in daylight are clearly seen. "Both cooperation partners are convinced by the results of their collaboration and the properties of this counterfeit-proof, high security feature. Due to the adaptable luminescent effect, a lot of joy was created during the relatively short development period of less than a year," says Dr. Katharina Huth, GSI's project manager for **mouve**[GSI].

A UNIQUE COMBINATION

The result has been an innovative and highly counterfeit-proof, dynamic colour effect. Under UV excitation, the feature exhibits three different fluorescent colours starting with red initially continuing to orange and yellow, as well as a long-lasting green afterglow.

Thereby the GSI feature offers, as it is, a fourfold security. UV security features are as such nothing new and have been used in security printing for years. What makes the GSI feature unique, however, is the combination of effects:

a) an initial red colour when the feature is activated

b) three fluorescent colour tones which are excited at different UV wavelenghts (UV-A/B/C),

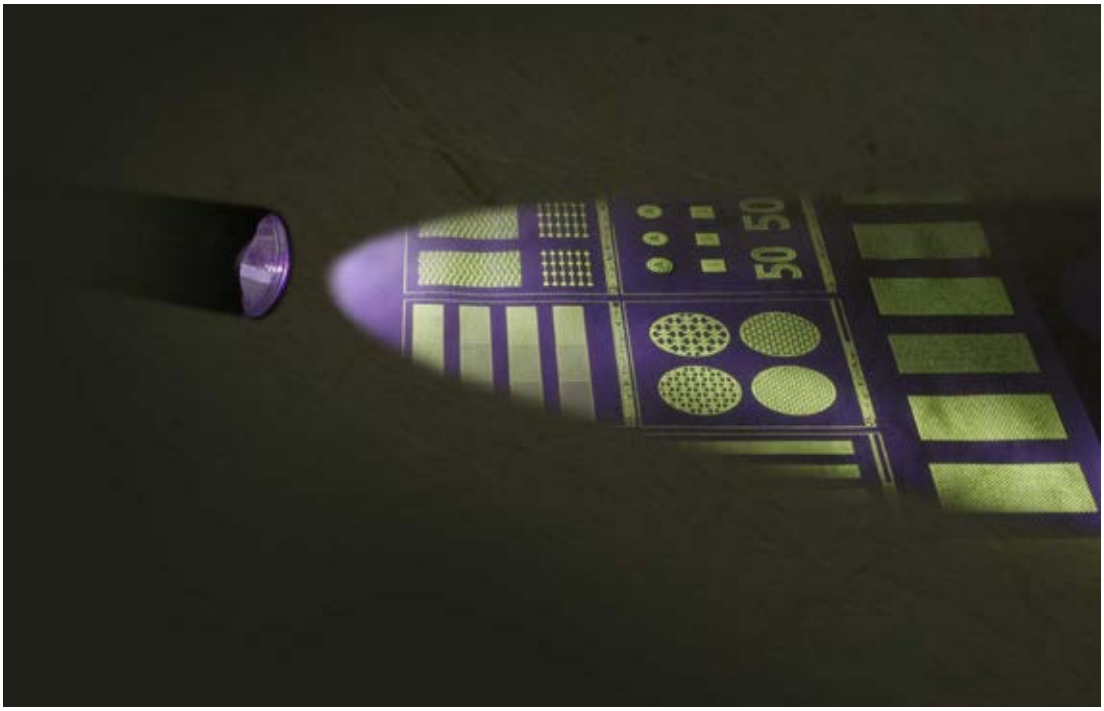
c) colour transitions when the feature is revealed and covered,

d) and a clearly visible, long afterglow (phosphorescence).

"It's distinctive traffic light colour combination makes **mouve**[GSI] a unique feature. The multi-coloured fluorescent reaction itself is already a high-quality security attribute, which becomes even more resistant to forgery through the afterglow effect", says Dr. Katharina Huth.

COLOUR TRANSITION EFFECT AS A TRAFFIC LIGHT DESIGN

This allows supermarket cashiers, for example, to check a banknote very easily using a conventional UV lamp. When they place the UV light source over the **mouve**[GSI] feature on the banknote, a red, orange or yellow colour appears depending on the UV light source that is being used (UV-A/B/C). Once the UV lamp is switched off, a clear, sustained green afterglow effect lasting for several seconds becomes visible



in daylight. Phosphorescence effects have been used industrially for many years to read watch faces in the dark for example or recognise the arrow markings pointing to the next emergency exit on the floor of an aircraft when the lights are failing. With its new feature, however, GSI is turning night into day, so to speak: since the afterglow remains visible for a few seconds even in daylight.

MOUVE^{GSI} IS AVAILABLE FOR TWO PRINTING PROCESSES

mouve^{GSI} was designed for use with various printing systems. The first product generation is available for intaglio printing, common in security printing processes, as well as for silkscreen printing on both banknote paper and polymers. Other processes such as offset printing and numbering will follow in the near future. LWB and GSI are also already working on additional product variants of the feature.

ATTRACTIVE BENEFITS FOR BANKNOTE ISSUING AUTHORITIES

The new security feature offers banknote issuers many benefits. The ink develops its special properties under UV excitation and is itself transparent. Under normal lighting conditions the feature remains invisible. This allows banknotes that are already in circulation to be enhanced further and made more secure using **mouve**^{GSI}. The feature can be incorporated into existing note designs as the visible (daylight) image of the banknotes is not "disturbed". National banks can therefore introduce it whenever they wish without the need to wait until a new series of banknotes is issued or a denomination is completely redesigned.

Existing scanning aids can additionally be used to check banknotes simply using a standard UV lamp. This makes the security feature recognisable under everyday conditions. Any banknote user

can check the feature themselves. The luminescence signals can also be detected by conventional sensors installed in ATMs and sorting machines.

A NEW APPROACH AT GSI AND LWB

Both GSI and LWB are breaking new ground in their development of **mouve**[GSI]. "Until now we have focused on producing security inks for state-of the- art value printing," explains GSI Managing Director Ulrich Walter. "With **mouve**[GSI], we are bringing a both innovative and unique product onto the market which is not available from other manufacturers." To ensure that this does not change for many years to come, GSI and LWB filed a patent for the security feature in 2020. Both partners are already continually working on further developments of the material, new colour combinations, and customised and extremely promising product variants,

„The partnership is also new territory for LWB. Until now, we have usually developed our security pigments for just one customer and for a very specific application. The partnership with GSI enables us to cover a broader range of applications and consequently to expand our customer base," explains Wolfgang Eisenberg, CEO at LWB.

With **mouve**[GSI] GSI is able to pursue a new sales strategy. While GSI has so far focused on its contacts at governmental and commercial banknote printers worldwide, it can now also directly address the national banks and ministries responsible for selection of security features. "Until now we have only had a low profile with these decision-makers. With the dual marketing approach that **mouve**[GSI] offers, we can and want to change that," says Ulrich Walter. "In addition, **mouve**[GSI] is explicitly of interest not only to issuers of banknotes, but also to producers of security printed products such as revenue stamps, identity documents or other official documents."

GLEITSMANN SECURITY INKS GMBH

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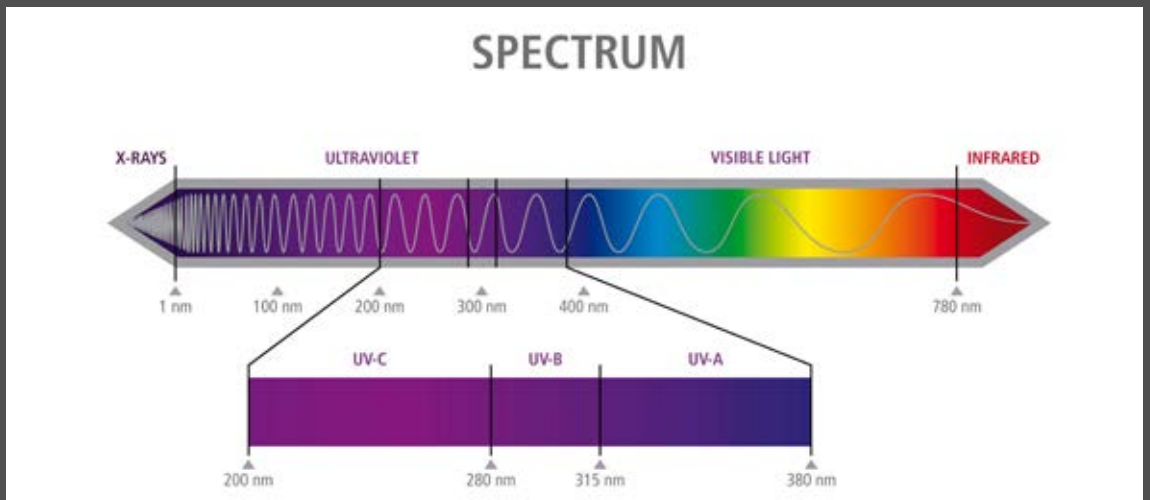
Watch video showing **mouve**[GSI]

GLEITSMANN SECURITY INKS


LEUCHTSTOFF BREITUNGEN GMBH



UV light has a wavelength spectrum of 380 to 100 nanometres (nm) and is divided into UV-A, UV-B and UV-C ranges. UV-C covers wavelengths from 200 to 280 nm, UV-B from 280 to 315 nm, and UV-A range wavelengths from 315 to 380 nm.

LUMINESCENCE, FLUORESCENCE AND PHOSPHORESCENCE

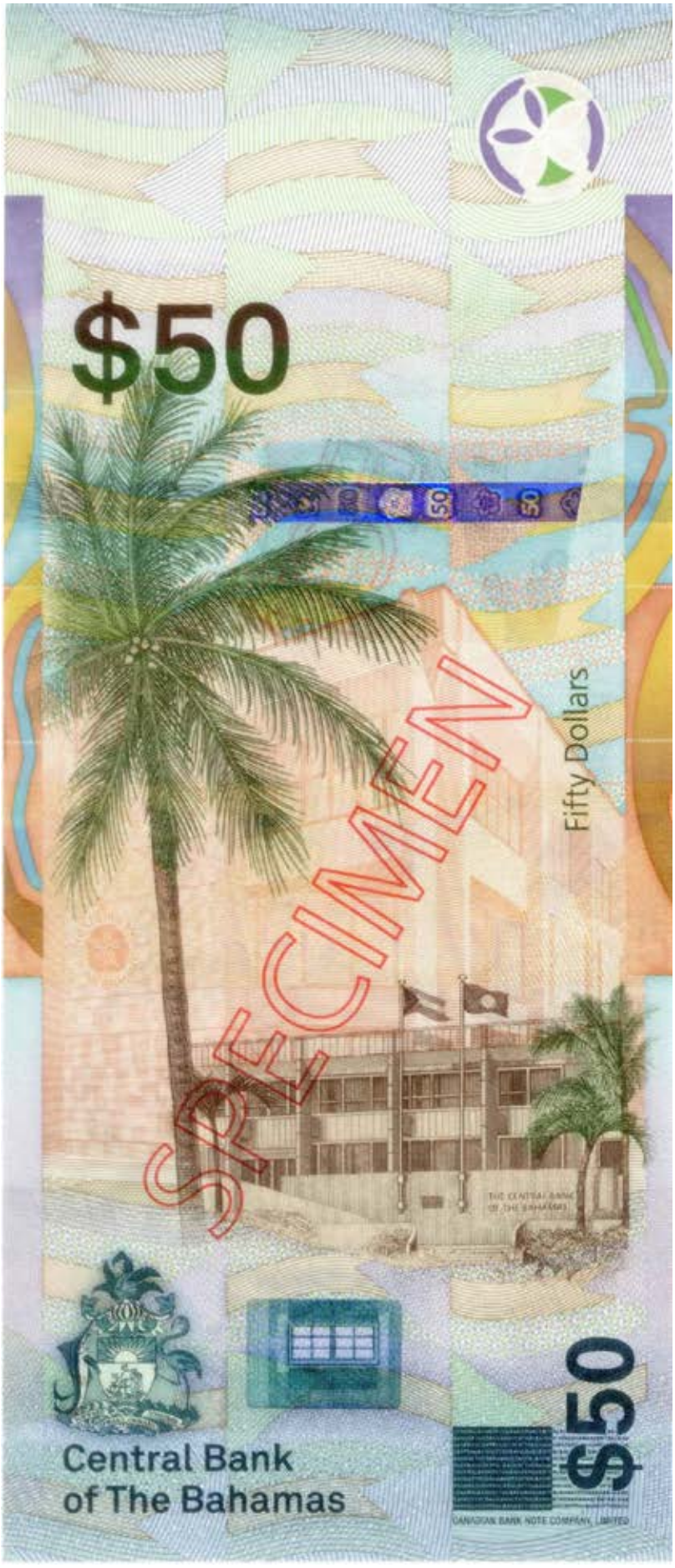
LUMINESCENCE: Fluorescence and phosphorescence are both forms of luminescence and are photophysical processes. Energy is absorbed by a material and emitted again on a different wavelength. Fluorescence and phosphorescence differ significantly in the duration of the luminous effect.

FLUORESCENCE transforms the light energy of the excitation into a different wavelength range. It is characterised by the fact that it rapidly stops after the irradiation ends – usually in less than one millionth of a second. The luminescence therefore ends instantaneously when the excitation source is switched off.

PHOSPHORESCENCE is the characteristic of a substance which causes it to continue glowing in the dark after irradiation. It is similar to fluorescence but is subject to special quantum physical processes. The afterglow can last from fractions of a second through to hours.


COMPOSITE
SUBSTRATES


COMPOSITE
SUBSTRATES



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LANDQART AG

WITH DURASAFE® BIGGER REALLY IS BETTER

With Durasafe® Bigger Really is Better

LANDQART AG

Security threads today are highly sophisticated inclusions in banknotes. With a wide array of visual effects to choose from, many based on cutting edge optical technologies, they can also incorporate functional, machine-readable attributes, often coupled with a design personalized to an individual denomination. As a prominent multi-level feature, they help cash handlers to authenticate notes, enable cash handling equipment to validate notes and, of course, make it very difficult for counterfeiters to simulate a genuine banknote.

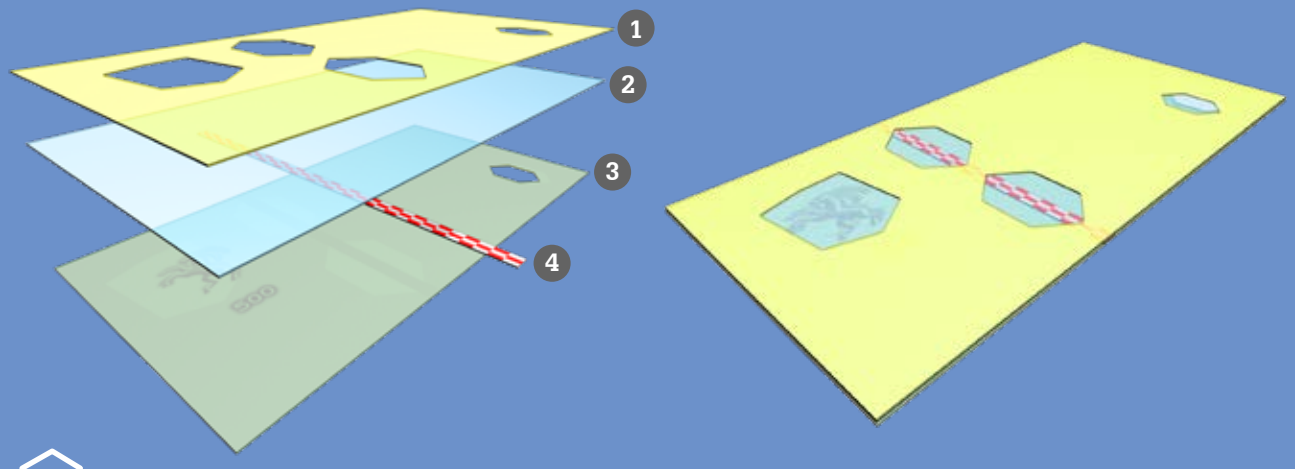
MALAYSIAN RM600 COMMEMORATIVE BANKNOTE – HOLDER OF THE GUINNESS WORLD RECORD FOR THE LARGEST CIRCULATING BANKNOTE.

Early security threads appeared as a narrow, unbroken line in the note, a reassuring sight, but hardly engaging. Over time these became a bit wider and gained some text, often referencing the denomination. Later they became windowed, allowing some of the thread to be visible on the surface of the note, and giving the appearance of being woven into the structure of the banknote. At the time of writing, nearly 650 circulating denominations include a windowed thread. The use of this fully visible part of the thread opened the doors to different effects, serving the purpose of making them harder to copy and counterfeit, and to further engage the public's attention as they looked at the notes. As the eye-catching technologies evolve – from a change in colour as the user tilts the note, to complex holographic effects, to lenticular technologies – more space is needed.

Modern, sophisticated security threads benefit from greater surface area for the various optical effects to be easily viewed. But the approaches to integrating such threads have reached a practical limit: the length and width of the thread windows in traditional cotton paper are constrained by the need to ensure that the thread remains integrated and durable in circulation and by the need to maintain the strength of the paper itself. Simply put, today's threads demand more from the substrate to achieve their true potential.

Fortunately, there is substrate technology to meet this challenge of needing a greater surface area being visible to the public. This next frontier in the evolution of threads being integrated into banknotes is one that Landqart has tackled with relish. The joy of working with a composite material like Durasafe® is that it isn't necessary to adhere to the traditional way of doing things. When inserted in Durasafe®, the thread is encapsulated by the polymer and, to make it visible, an aperture is die-cut on the paper surface, exposing the thread which remains behind the polymer. The die cutting allows the window shape to move away from the small rectangle of traditional paper and to instead take a form that fluidly harmonizes with the overall design language of the banknote. Window shapes can range from the organic to the geometric, from triangles to flag shapes to flowers to fish. Yet this not only enhances the aesthetic of the design, it also enhances the function: Durasafe® windows can be both long and wide to maximize the reveal of the security thread without any compromise to the durability or function of the thread itself. Indeed, Durasafe® substrate represents an evolutionary step in the integration of modern security threads into banknotes, a natural progression to maximizing the amount of thread that is visible to the public.

This was the nature of the challenge set by the Central Bank of the Bahamas when preparing the $50 banknote from the CRISP Evolution family, which was printed by the Canadian Bank Note Company Ltd. Admiring the look and feel of the 9th Series of Swiss Franc banknotes printed on Landqart's Durasafe® composite substrate, and recognising the powerful effects created with Crane Currency's micro-optic



THE STRUCTURE OF DURASAFE
1. PAPER SURFACE WITHOUT WATERMARK, WITH WINDOWS DIE-CUT / **2.** POLYMER
3. SECURITY THREAD / **4.** SECOND PAPER SURFACE, WITH WATERMARK AND WINDOW

20,000 TENGE BANKNOTE, KAZAKHSTAN

25 DIRHAM BANKNOTE, MOROCCO

thread technology, they asked that the two be used together for the new $50. The combination had never been contemplated before, and bringing the two technologies together required a lot of development work, that was ultimately successful. The result was a world first: RAPID™ thread in a Durasafe® banknote, and a single thread window that is more than half the height of the banknote – by far the largest of any banknote in circulation.

This approach is a perfect way to optimise the user experience for the public when interacting with the security thread: there is more thread visible and it is more prominent. Because the thread is safely encapsulated by the polymer, it is protected from the elements during circulation, so it doesn't get dirty or scratched, and there is no risk of it coming away from the note. It will be firmly in place for the life of the banknote, always visible and ready for the public to recognise. This protection also enhances the security of the note. If an attempt is made to remove it, the surface paper has to be broken, and in trying to separate the thread from the polymer, the top layer of the thread becomes irreversibly damaged, so it cannot be re-used. In trying to replicate the note, the counterfeiter has to find a way to mimic the thread effect, and the impact of the polymer on top of it, something which cannot be printed, and is very hard to replicate without the original Durasafe® manufacturing system.

LANDQART AG

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BANQUE DE FRANCE
Protective mark
Longevity
Durability
Limitless
500 million pass
EVERFIT®
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BANQUE DE FRANCE

EVERFIT® - BANKNOTE MADE DURABLE

Soiling, ink abrasion, colour fading, mechanical resistance – EVERFIT® solving durability issues.

BANQUE DE FRANCE

There are several ways to define the lifetime of a banknote. It is generally accepted that a banknote has reached the end of its life when its physical integrity becomes too impaired for it to be authenticated, thus lowering trust among users. Managing the quality of banknotes in circulation is a major issue for the image of any central bank: how can a banknote substrate help?

EverFit® paves the way to a new generation of banknotes that offers outstanding durability in circulation thanks to a final laminated protective layer.

Most banknotes currently circulating in the world are printed on paper substrate, although the market share of polymer substrate is on the rise. Standard paper substrate has a surface that facilitates ink adhesion and, consequently, soiling. Polymer substrate offers an answer to soiling with a nonporous surface, but also lower ink adhesion. Under harsh conditions of circulation, both of these substrates therefore tend to show either heavy soiling or ink abrasion in the short term. Composite substrates improve all mechanical properties, but with paper or polymer used as external printed surfaces, the above mentioned ink abrasion and banknote soiling remain an issue.

What if one could have a fully printed and secure paper banknote that is laminated with a polymer film as a finishing step? This solution would both prevent ink abrasion and offer an external soilrepellent surface. This is the core of the proven and reliable EverFit® solution!

DURABILITY BY DESIGN

With EverFit®, the Banque de France addresses markets where the conditions of circulation are harsh. Despite being varnished and/or specifically treated, paper banknotes returning from circulation show heavy signs of soiling after only a short period. These markets are very familiar with paper banknotes and their strong security features, which are easy to authenticate by the general public.

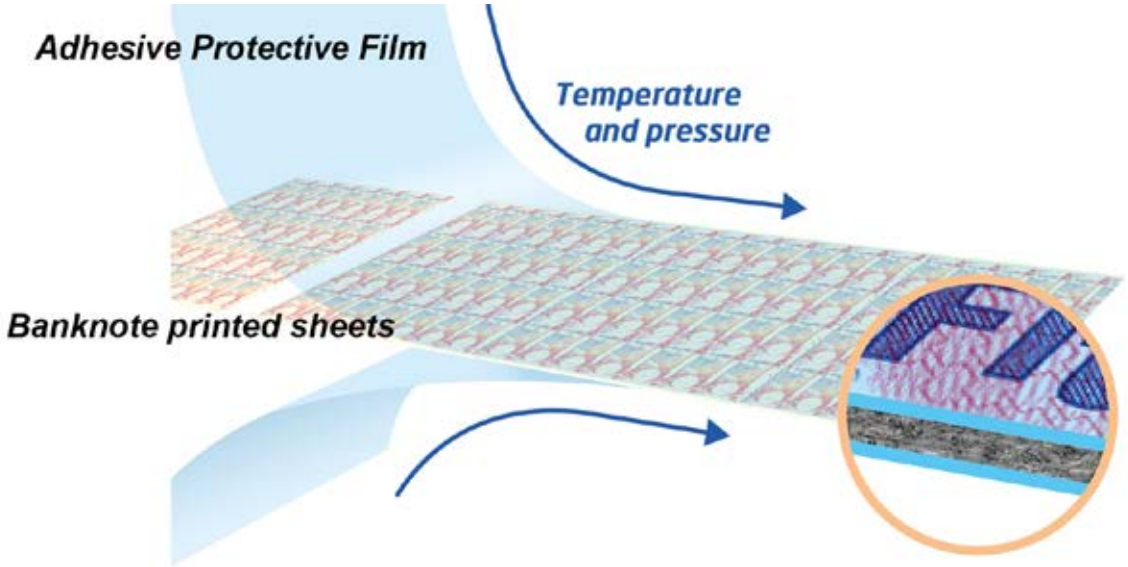
There was therefore a real need to improve the durability of banknotes without moving away from the paper substrate. EverFit® was born from this observation.

EverFit® is a fully printed and secure paper banknote on which a laminating film is applied on both sides as a finishing step. Far less brittle than a varnish, the unprinted polymer film offers an outstanding protection against soiling. Print and security features are durably protected from the environment of circulation, and ink abrasion is prevented.

This is the result of six years of R&D, as well as continuous improvements in the field.

The Banque de France has worked together with other banknote issuing authorities, in particular the Central Bank of Madagascar.

In close cooperation with this central bank, the 500 Ariary denomination was issued in the framework of a circulation trial with the aim of comparing two populations of banknotes: on the one hand, standard varnished banknotes, and on the other EverFit® banknotes. Samples were removed from circulation every 3 months from the beginning of the test, in order to compare the behaviour of both types of banknotes, under the same conditions of circulation. Once removed from circulation, the banknotes were inspected to assess their whiteness, limpness, and overall physical integrity.

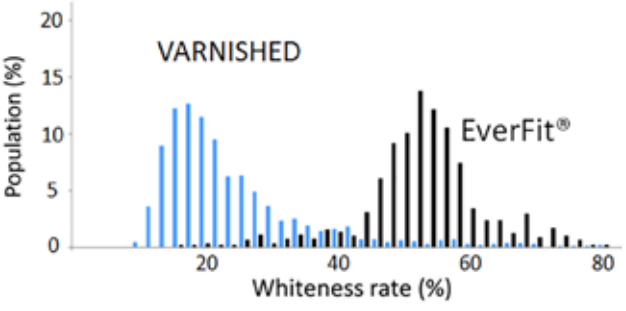


DURABILITY IN CIRCULATION

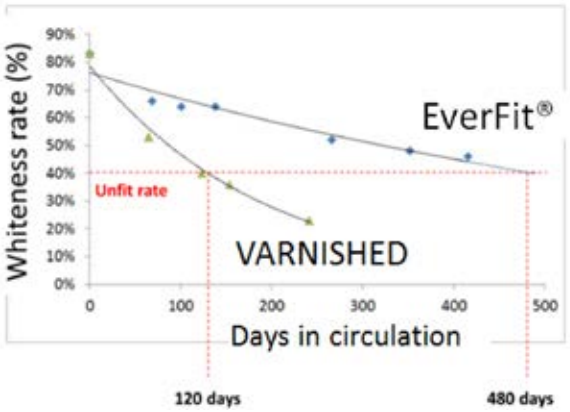
One of the main objectives of EverFit® is to increase banknotes' resistance to soiling. By analysing the whiteness rate on the watermark unprinted area, it is possible to directly assess banknotes' degree of soiling. The chart below shows a clear split in the population under trial between the varnished and EverFit® banknotes.

The average whiteness of a new banknote is assessed at 83%. On the first chart below, after 12 months of circulation, the varnished banknote population is centered at 17%, which implies heavy soiling, while after the same length of time, the EverFit® banknote population remains centered at 55%.

On the other chart, by setting the whiteness threshold at 40%, it is possible to estimate the improvement in the lifespan of EverFit® banknotes compared to that of varnished banknotes. In this study, EverFit® banknotes reach this 40% whiteness threshold after 480 days in circulation, compared with only 120 days for varnished banknotes. The lifetime of EverFit® banknotes therefore exceeds that of varnished banknotes by a factor 4.



WHITENESS AFTER 12 MONTHS OF CIRCULATION



EVOLUTION OF WHITENESS RATE DURING CIRCULATION

The picture below shows banknotes' resistance to ink abrasion provided by EverFit®. As the printed elements are beneath the unprinted laminating film, they are totally protected from abrasion.

Finally, EverFit® banknotes display improved mechanical properties thanks to their composite structure: they benefit from both the folding resistance of the polymer laminating film and the tear resistance of the paper substrate. Specifically developed for our customers with the aim of achieving ultimate banknote protection, EverFit® is the solution for harsh conditions of circulation.

On the front page of this article is our EverFit® house note featuring the Limulidae. Nicknamed Horseshoe Crab, these creatures have been crawling the Earth for over 500 million years and are an example of what nature has to offer in terms of durability. EverFit®, just like the Limulidae, is durable by design.

BANQUE DE FRANCE

Email: everfit@banque-france.fr
Website: www.banque-france.fr/en/banknotes/design-and-manufacture-banknotes/banknote-hi-tech-product

TRILUMIC®

HUECK FOLIEN

Bring the beauty to light

There are some things that should be studied in daylight: just as they are, in all their natural beauty. But some things need a second glance.
For **TRILUMIC®**, both are true: beautiful in daylight and with the hidden magic of our technology that unfolds in UV light.

www.hueck-folien.com

TRILUMIC® is a trademark resulting from cooperation between HUECK FOLIEN and Banque de France.

Ask for your free sample!

Contact us at **office@hueck-folien.com** using the header "Free TRILUMIC® Sample" and you'll be sent a free sample and a UV lamp.


POLYMER
SUBSTRATE


POLYMER
SUBSTRATE

CCL SECURE

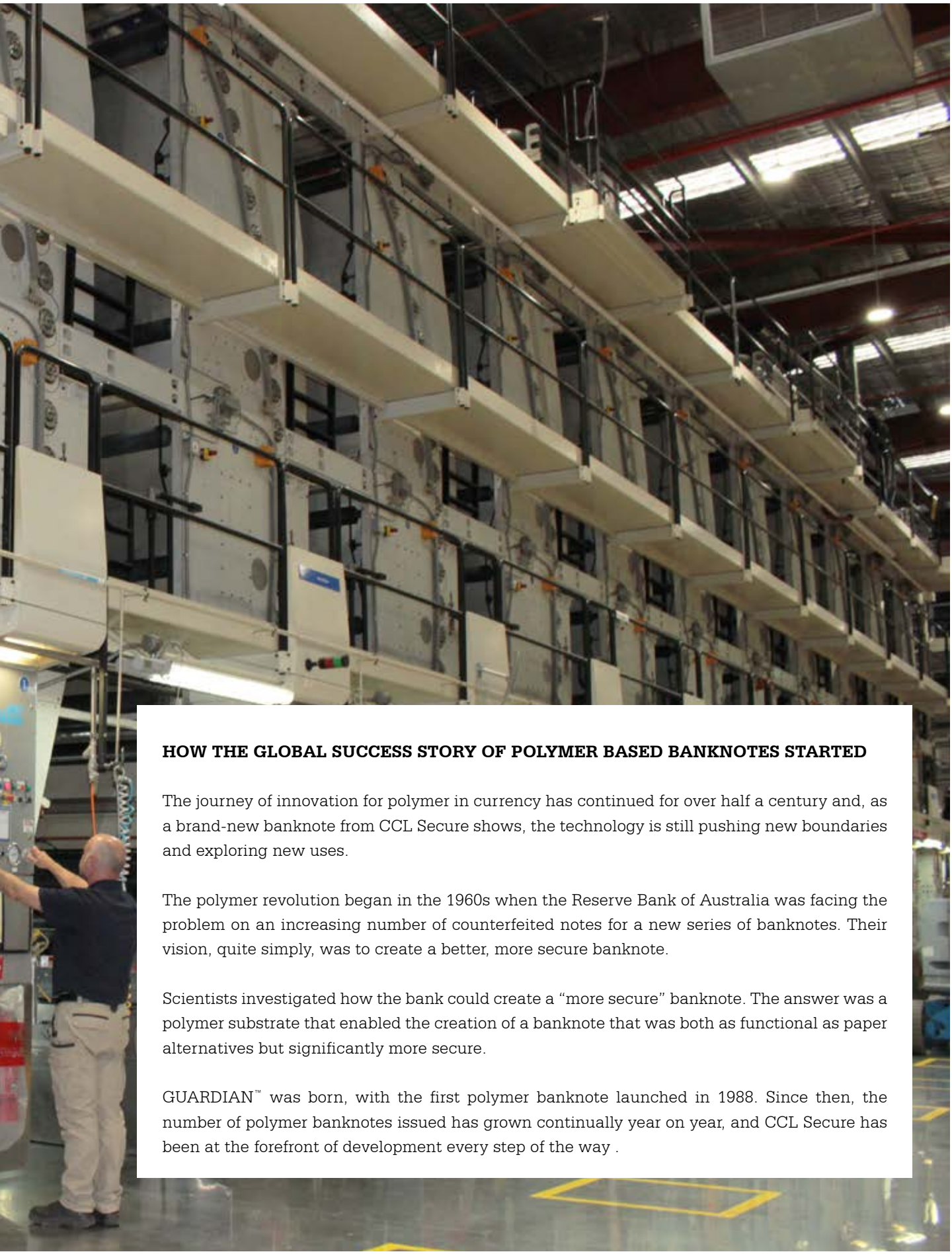
SPARTAN™: A NEW GENERATION OF BANKNOTES FOR THE NOTE/COIN BOUNDARY IS BORN

CLICK OR SCAN

SPARTAN™: A new generation of banknotes for the note/coin boundary is born

CCL SECURE

Since the launch of the first note in 1988 GUARDIAN™ polymer substrate has been used on more than 175 denominations.



HOW THE GLOBAL SUCCESS STORY OF POLYMER BASED BANKNOTES STARTED

The journey of innovation for polymer in currency has continued for over half a century and, as a brand-new banknote from CCL Secure shows, the technology is still pushing new boundaries and exploring new uses.

The polymer revolution began in the 1960s when the Reserve Bank of Australia was facing the problem on an increasing number of counterfeited notes for a new series of banknotes. Their vision, quite simply, was to create a better, more secure banknote.

Scientists investigated how the bank could create a “more secure” banknote. The answer was a polymer substrate that enabled the creation of a banknote that was both as functional as paper alternatives but significantly more secure.

GUARDIAN™ was born, with the first polymer banknote launched in 1988. Since then, the number of polymer banknotes issued has grown continually year on year, and CCL Secure has been at the forefront of development every step of the way .

Although GUARDIAN was developed to address security concerns, it soon became apparent that GUARDIAN polymer banknotes also had other benefits, including lasting much longer than paper.

Many countries have adopted GUARDIAN – on both their low and high denominations – for the durability that GUARDIAN polymer banknotes also deliver. Even in tough, hard-wearing environments, banks have seen significant improvements in banknote lifetimes and, consequently, significant cost savings compared to paper.

As central banks have become increasingly attentive to the costs associated with issuing banknotes and managing the cash cycle, focus often turns to the lowest denominations that have very high transaction velocities, but which have short working lives in circulation and can be hard to return to the central bank at the end of their useful life.

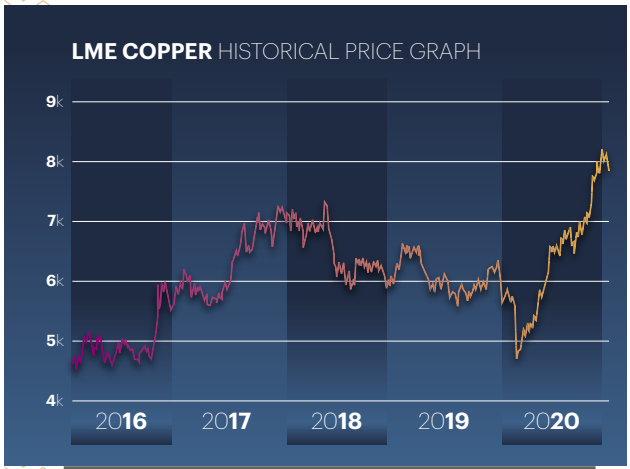
There is often pressure to coin these notes. But this pressure brings with it other challenges.

The decision to move to coin is complex and the process of coining a denomination is never a simple or quick process for an issuing authority to undertake. The decision-making process invariably involves a varied matrix of stakeholders; and complex political factors often need to be taken into consideration.

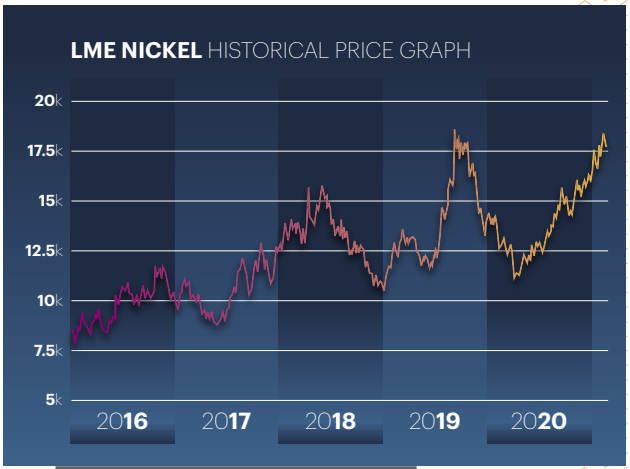
Although coin has an extended life cycle, it requires a high capital outlay in the 1st year of release and faces the very real risk of involuntary hoarding. Coins also have a negative perception with the public, especially in those regions where everyday clothing doesn't usually include pockets. And higher metal prices can make it attractive to smelt coins resulting in a financial loss to central banks.

Consequently, many banks struggle with the pressure to continue using paper, even though this results in the need for frequent renewal of notes at a high cost that impacts on seigniorage.

With these challenges in mind, CCL Secure asked itself the same question as the RBA did in the 1960s: "How do you build a better banknote?"



CUPRONICKEL - ALLOY OF COPPER AND NICKEL COMMONLY USED IN COIN PRODUCTION



A 5 YEAR SNAPSHOT OF PRICES; LONDON METAL EXCHANGE

SPARTAN – A NEW BANKNOTE FOR LOWER DENOMINATIONS

The CCL Secure research and development team created an entirely new formulation of polymer - designed to work for low denominations in the most aggressive circulation conditions and specifically for denominations that sit on the cusp of the note/coin boundary.

The new material has been designed to make durability its core feature, enabling central banks and other issuing authorities to tackle a number of common dilemmas associated with the note/coin boundary, such as: the cost of managing notes, the cost and unpopularity of coins, and sustainability.

The polymer core used for SPARTAN is different to the Clarity™ C core used in GUARDIAN. While the SPARTAN core is still produced by Innovia using a unique and controlled bubble process that provides inherent security, it also has special functionality. The film itself is thicker than GUARDIAN, making it tougher. And unlike the transparent Clarity™ C film used for GUARDIAN, SPARTAN is white.

To make the most of the new material, all the inks and protective layers used in the production of SPARTAN banknotes have all been developed from the ground up. All of this gives SPARTAN a unique character. So, although SPARTAN looks and feels very much like a traditional banknote, it has exceptional toughness and strength in circulation.

How much more durable? Well, in lab tests, SPARTAN lasts up to 8 times longer than paper, which makes it more cost effective over both the short and long term. SPARTAN also lasts much longer than other polymer notes, as the inks used to print SPARTAN and the polymer core itself have been engineered to withstand high abrasion. In addition, the non-absorbent polymer core means that SPARTAN doesn't soil like paper notes and will perform in any climatic conditions including high heat and humidity.

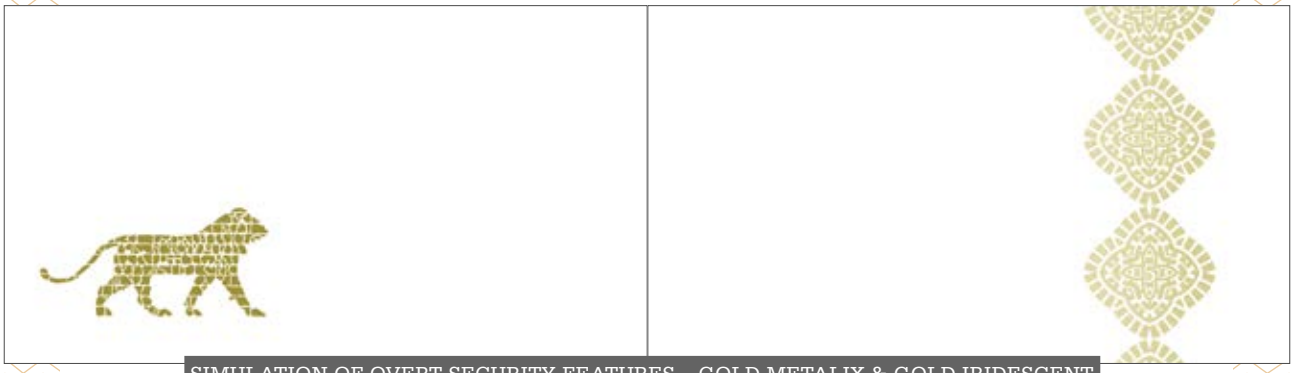
To cultivate public acceptance of the new note, SPARTAN has been developed to have the same look and feel as a traditional banknote. It can, for instance, be used with existing banknote infrastructure and processing equipment. SPARTAN banknotes can also be designed to include machine readable features that are compatible with common note acceptance equipment such as vending machines and other point of sale equipment.

To create a SPARTAN banknote, multiple printed design layers are applied, using a design that is created using traditional banknote design techniques. State of the art origination, tooling, and printing processes are then used to translate the design into the finished product. However, unlike traditional banknotes, which are printed using multiple different process in series of steps, SPARTAN is printed in a single pass.

This one-pass production process means that all of the various design elements, security features, numbering, and protective layers are applied in a single step which makes the SPARTAN production process both highly efficient and very cost effective.

SPARTAN still offers both covert and overt features. Production is also secure, as SPARTAN uses the same high security CCL Secure and Innovia production infrastructure as GUARDIAN.

SIMULATION OF COVERT SECURITY FEATURES – IR & UV



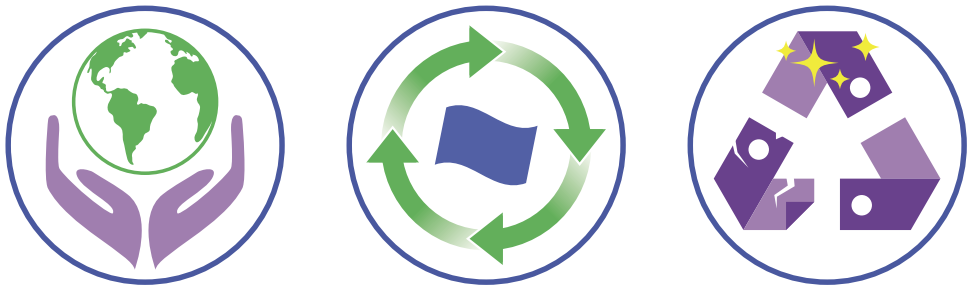
SIMULATION OF OVERT SECURITY FEATURES – GOLD METALIX & GOLD IRIDESCENT

At the end of its life, a SPARTAN note continues to be useful. In common with GUARDIAN polymer notes, it can be recycled into polypropylene pellets, which will find their way into a wide range of new products – from garden furniture to construction products.

There can be no doubt that CCL Secure's GUARDIAN polymer substrate, over the years, transformed the banknote for many central banks around the world, offering both an increased note life and enhanced security.

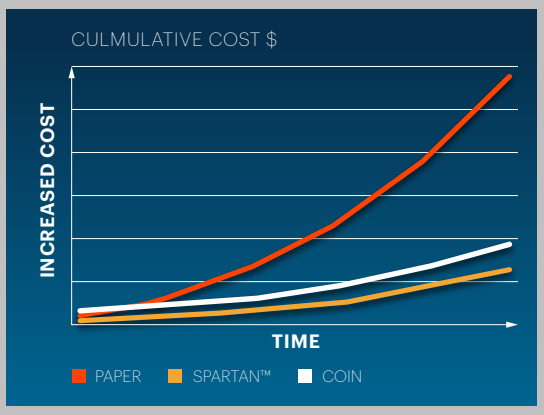
GUARDIAN also has the benefit of being a cleaner and greener alternative to paper, with GUARDIAN banknotes able not only to be 100% recycled at the end of their life but also registering a lower carbon footprint throughout the production and distribution cycle.

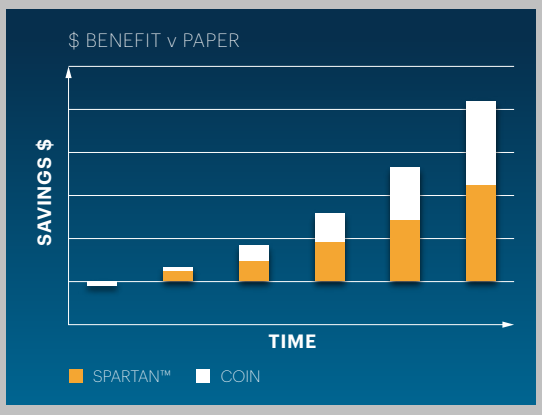
Now, SPARTAN can do the same for denominations that sit on the note/coin boundary – providing a highly durable cost-effective option for high transaction velocity notes.



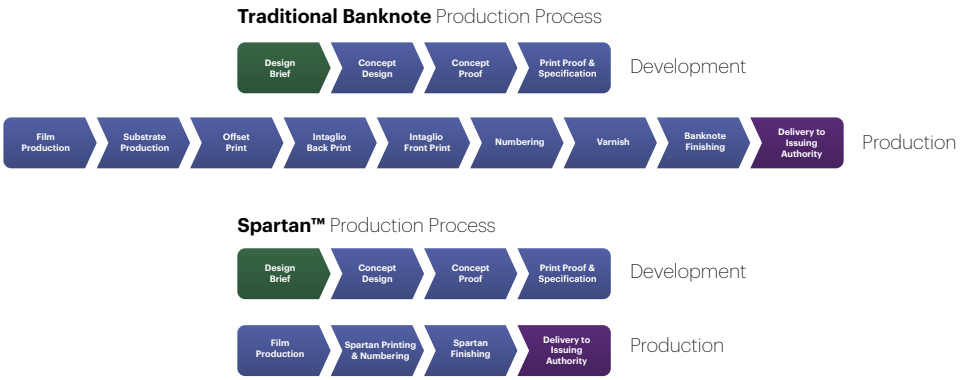
Example of Comparative Cost Analysis between paper, coin, and SPARTAN. The high durability of SPARTAN offers cumulative savings when compared against both paper and coin.

Indicative savings only. Full CBA will need to be prepared by issuing authorities.





HOW SPARTAN IS DIFFERENT FROM GUARDIAN



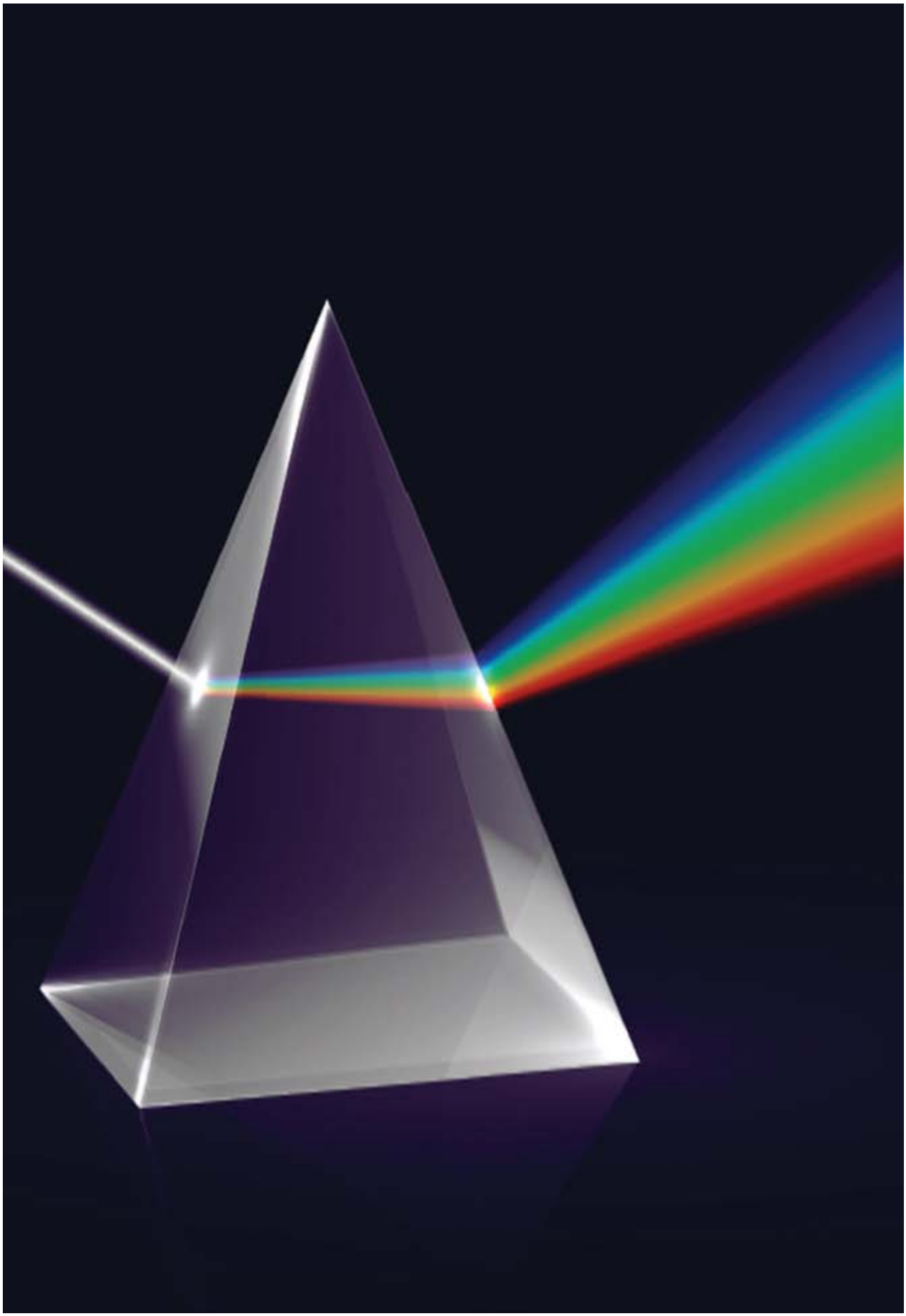
FOUR DISTINCTIVE FEATURES OF SPARTAN

CCL Secure

Ms. Michaela Glendinning
Email: MGlendinning@cclsecure.com
Website: www.cclsecure.com


FIBRES


FIBRES



SECURITY FIBRES LTD

SPECTRUM THE FUTURE OF FIBRE-NOW

SPECTRUM The Future of Fibre – now

SECURITY FIBRES LTD

Security features must be counterfeit-proof, yet identifiable beyond any doubt. It is therefore so important for security features to incorporate eye-catching colours to attract the user's attention. Security Fibres Ltd offers Banknotes and other security documents paper based security fibres with an amazing range of colour combinations.

Spectrum Fibre™ combines the whole range of spectral colours along the length of the fibre making this fibre almost impossible to counterfeit.

Yet the unique and eye-catching 'Spectrum' appearance of the fibres make it easy to describe and for the observer to determine it's authenticity. It is the semi-public security feature no one expects and yet everyone will remember.

UPGRADE EXISTING FAMILY OF BANKNOTES WITHOUT CHANGING THE DESIGN

Counterfeiters are becoming increasingly sophisticated and have a wide range of equipment and materials available to them. Particularly worrying is the number of 'security' features that can now be purchased on the internet. A potential counterfeiter doesn't even have to resort to the 'Dark Web' as these providers openly sell their wares on a number of legitimate sites. Fake holograms, patches, threads, security printing inks and even single colour fibres can all be purchased online by anyone.

Multi-colour fibres should be used in place of single colour fibres which are too easily available to a determined counterfeiter. Until now, changing or adding security features to banknotes already in circulation has been prohibitively expensive or impractical. Now you can make a rapid and highly effective upgrade to your existing banknote without changing the design and without incurring additional costs. Using High Security multi-colour fibres is the easiest and most effective way to improve the security of your banknote whilst at the same time adding an aesthetic and easily recognisable semi-public feature. They can replace existing single colour fibres or can be used alongside single colour fibres to 'future proof' security and counterfeiting robustness of your banknote series for years to come.

SPECTRUM FIBRES™ - ONE,....., SIX STEPS AHEAD OF THE COUNTERFEITERS

Comprising the six tertiary colours of the spectrum, the complexity of this fibre is easy to see; six different fluorescent colours in exact register along the length of the fibre makes this almost impossible for a counterfeiter to replicate.

Spectrum Fibres™ are introduced into the paper in the same way as traditional fibres. The arbitrary scattering of the fibres throughout the banknotes is another security characteristic that is unique to fibres and not present in other security features. This fibre randomness is much easier to see with the eye-catching multi-colour fibres compared to single colour fibres and is something that the counterfeiter can't possibly replicate in mass production.

Another example of the special nature of paper and its capacity to evolve and accommodate a range of advanced, new materials.

THE PERFECT BOND

Spectrum Fibres™ like most products of Security Fibres Ltd are made of a paper base combining high wet strength with high porosity. This allows good mechanical bonding with the paper fibres in your banknote sheet and does not affect other security features.

MULTI-LAYER SECURITY

Due to the incredible versatility of Spectrum Fibres™ and all other paper based multi-colour fibres more layers of security such as taggants and IR up-converters can be added to the same fibre. These can be added to the fibre retrospectively or they can be employed as a 'latent' feature, already within the fibre but only 'activated' in an emergency. There is no need to re-educate the public and no need to change anything else about the banknote. No other security fibre offers the same level of sophistication and versatility.

The following options can be chosen to create a truly unique fibre:

Anti Stokes | UV Fluo | Register Cut | Multi-colour | Bi-Fluo | Micro Print

IR visible | Machine detect. | Iridescent | Photo-chromic | Thermo-chromic

ADVANCED CAPABILITIES FOR A PROVEN TECHNOLOGY

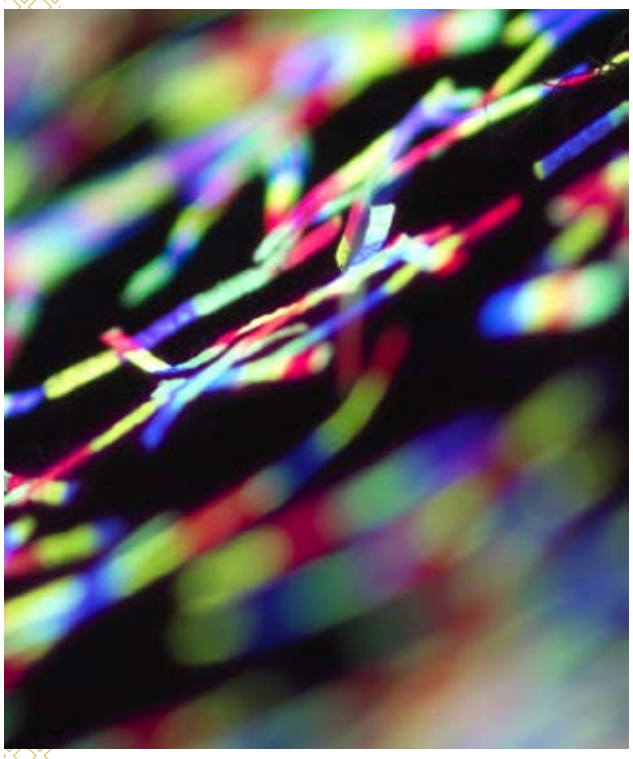
Paper has been at the heart of security documents for literally hundreds of years. According to the International Bank Note Society, the first government-issued banknotes date from the year 1023 in the reign of Emperor Chen Tsung!

The unique quality of paper can utilise advances in materials, science and optical technologies in a way many other substrates can't. These advanced and sophisticated materials can be embedded, laminated, coated or transferred onto the paper so that a 'centuries old' technology is transformed into a complex and state-of-the-art material that is difficult to counterfeit and easy to verify. The paper-making process is ideal for adding security inclusions that can be mixed into paper-pulp during manufacture. This results in the security features becoming embedded in the cellulose fibres of the paper so that they become an integral part of the sheet. This has a major advantage over other security features that can be counterfeited by being printed or stuck onto a document. Printing and laminating machines are relatively easy to come-by whereas a paper making machine is not at the disposal of most counterfeiters or forgers. This makes for an inherently secure and insurmountable barrier to the criminally minded.

One of the most popular 'inclusions' used for many decades has been thin, coloured synthetic fibres which appear scattered randomly throughout the paper. In the days before colour copying and scanning became ubiquitous, these inexpensive fibres were added to the paper to create two or three additional colours that any counterfeiter would have to reproduce as well as those colours used in the print. This was an additional aggravation and cost to the counterfeiter and it was also easy to see if fibres had been simulated by printing. Rapid advances in desk-top printing and digital reproduction techniques made simple, coloured fibres less effective and so they were enhanced with the addition of ultra-violet, fluorescent pigments and

dyes. These could not be reproduced by the scanners and desk-top printers of the day. However, with the advent of ink-jet printing using fluorescent inks, as well as the availability of commercially affordable multi-colour printing presses, the addition of a blue or yellow fluorescent fibre in a security document was no longer enough to stop a determined counterfeiter; especially if the counterfeiter was a state-sponsored entity with ample resources!

Before this problem had become widespread, Security Fibres UK Ltd had the foresight to see the potential threat and developed a unique and innovative security fibre with multi-colour fluorescence. This ground-breaking invention became a huge success and rapidly replaced conventional fibres. Today, multi-coloured fibres provide a unique and highly effective addition to document and bank-note security and are used in several major banknotes of the world such as the Euro, as well as dozens of passports and value documents. A programme of continued development and improvements has resulted in a vast range of products which use our multi-colour fibres (up to seven colours), bi-fluorescent, up-converters, machine readable and mobile-phone verifiable fibres. Security fibres are often over-looked by the counterfeiter or forger and this unobtrusive line of defence is now seen as an even more valuable tool in the fight against fakes



SECURITY FIBRES LTD

Mr. Gary Spinks
Email: info@securityfibres.com
Website: www.securityfibres.com

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EQUIP
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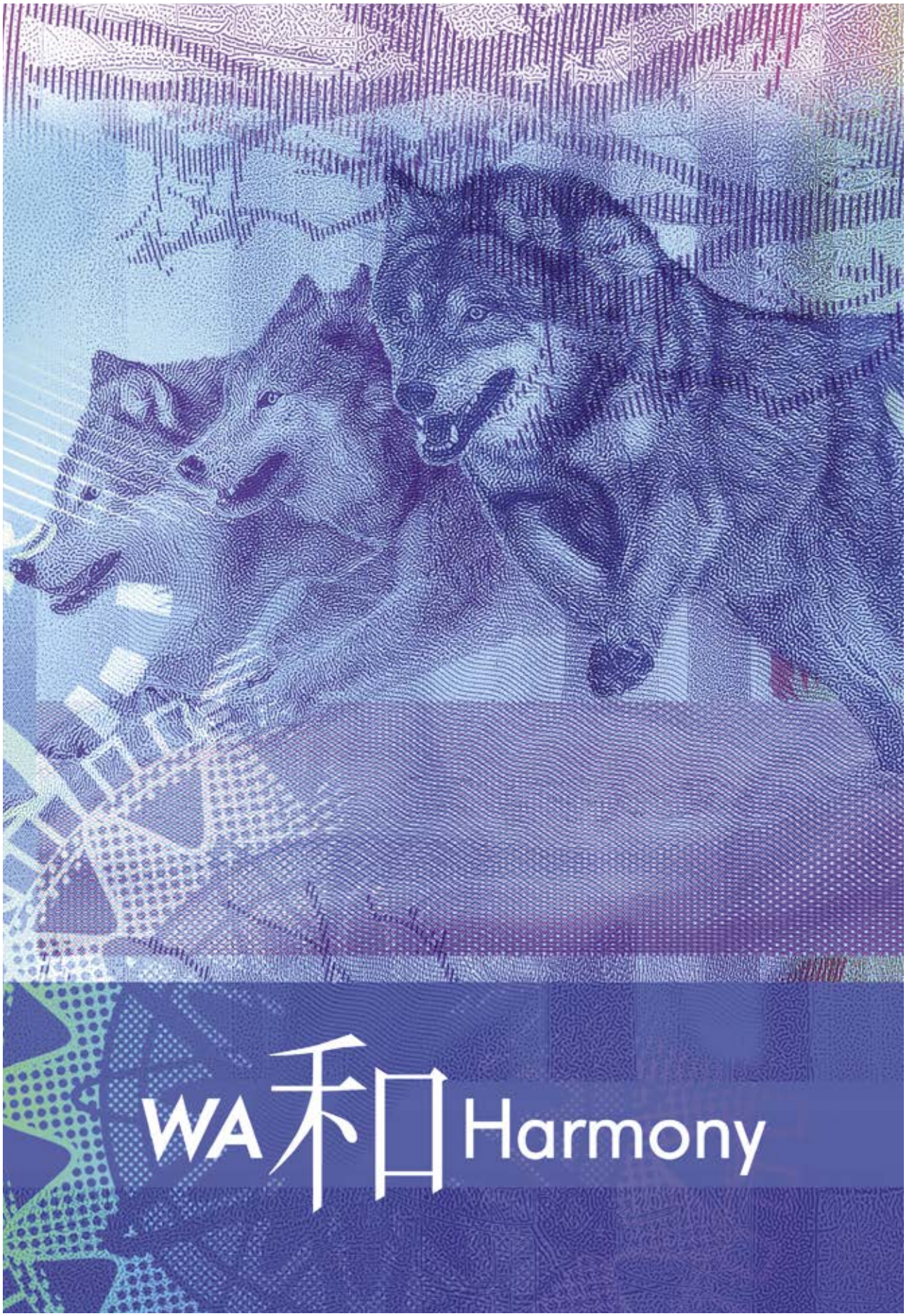
EQUIPMENT


WA 和 Harmony

KOMORI

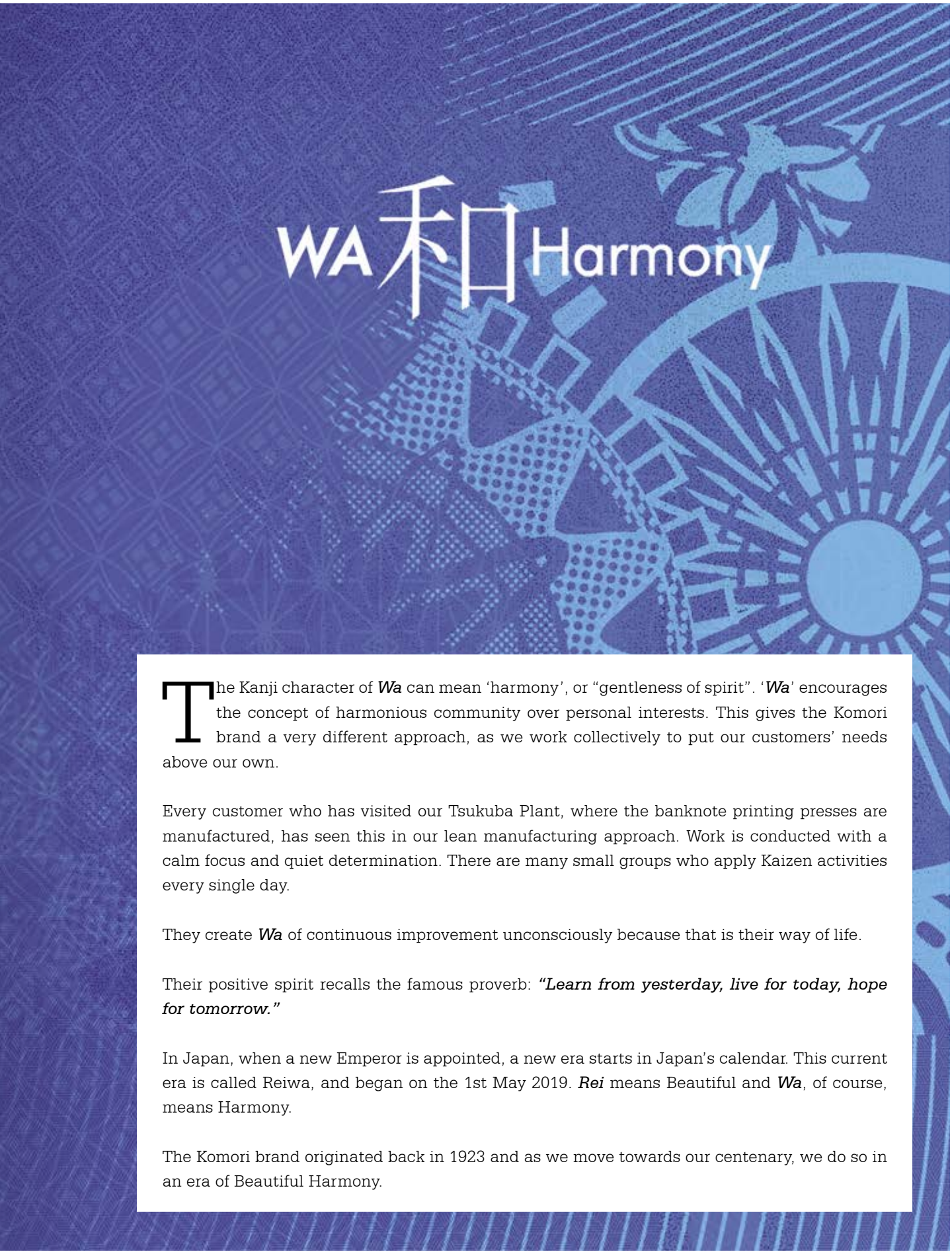
BANKNOTEOLOGY THE HARMONY OR *WA* OF MANUFACTURING PROCESSES

Banknoteology THE HARMONY or *WA* of MANUFACTURING PROCESSES

KOMORI

One of the most important words for understanding the spirit of Komori is harmony, or ***Wa***, in Japanese.

Wa is at the heart of the Komori brand; similarly, Banknoteology - the perfect harmony of both 'Banknote' and 'Methodology' - is the cornerstone of the currency technologies that we offer worldwide. Banknoteology is the science Komori applies to the study, research and development of its banknote manufacturing processes. Banknoteology encompasses a wide range of solutions including our numbering processes. Komori created its numbering presses after listening to its customers and understanding their desire for solutions to help them with their business challenges. Banknoteology has driven the design of our numbering presses, to make them the most productive and efficient banknote presses in the world today.



The Kanji character of ***Wa*** can mean 'harmony', or "gentleness of spirit". '***Wa***' encourages the concept of harmonious community over personal interests. This gives the Komori brand a very different approach, as we work collectively to put our customers' needs above our own.

Every customer who has visited our Tsukuba Plant, where the banknote printing presses are manufactured, has seen this in our lean manufacturing approach. Work is conducted with a calm focus and quiet determination. There are many small groups who apply Kaizen activities every single day.

They create ***Wa*** of continuous improvement unconsciously because that is their way of life.

Their positive spirit recalls the famous proverb: ***"Learn from yesterday, live for today, hope for tomorrow."***

In Japan, when a new Emperor is appointed, a new era starts in Japan's calendar. This current era is called Reiwa, and began on the 1st May 2019. ***Rei*** means Beautiful and ***Wa***, of course, means Harmony.

The Komori brand originated back in 1923 and as we move towards our centenary, we do so in an era of Beautiful Harmony.

DESIGN of *WA*

Komori's unique numbering press, the Currency N, is designed with the concept of *Wa*, which allows banknote printers to achieve unparalleled quality and productivity.

Using sectional drive technology, the shortest make-ready for tasks such as box cleaning, prefix changes and blanket changes can be achieved by working in parallel. The operators are able to access and work on the N1 numbering cylinder and the N2 numbering cylinder separately, without the limitations imposed on accessing the N1 and N2 cylinders of presses employing a common blanket cylinder configuration.

HIGH SPEED PRE-INKING SYSTEM

Previously, during the numbering process, if the printers required pre-inking for higher digits such as one hundred thousand and above, they may not have had enough ink on the wheels to print. They would have had to reduce the operating speed, stop the paper feeding, apply inks to the wheels and increase the printing speed again.

Now, Komori has developed a high speed pre–inking system which enables the printer to keep the operating speed at up to 12,000 sheets an hour without the need to disengage the feeder. This is because of the high speed impression on/off system.

HARMONY or *WA* OF MANUFACTURING PROCESSES

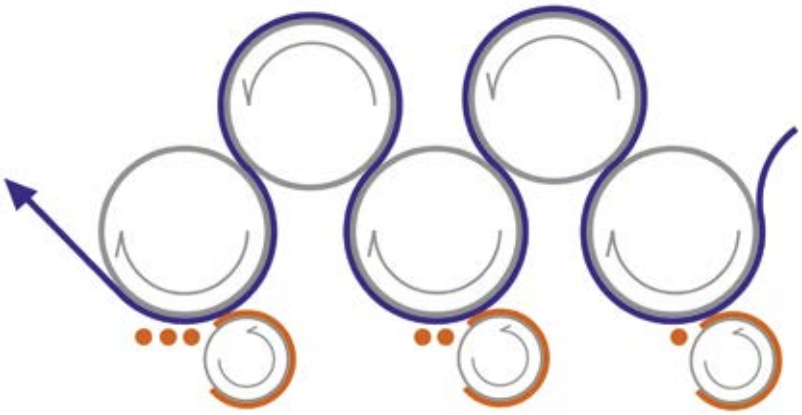
The Currency NV Combination Multi-Process Numbering & Varnishing Press has been recognized by the banknote printing industry all over the world, as the popularity of this press has increased significantly.

This press is a perfect example of '*Wa*' in design, two previously separate processes working in perfect harmony.

The Wa created by this press can reduce floor space, operators and WIP (Work in Progress).

This innovation was recognized when Komori received the IACA award for the Currency NV in 2018.

Since 1996, Komori has supplied numbering presses with a full sheet inspection camera system prior to the numbering process and a motor-driven numbering system.



CURRENCY N - MULTICOLOUR NUMBERING PRESS CYLINDER CONFIGURATION

A PERFECT EXAMPLE OF WA – TWO PROCESSES WORKING IN HARMONY.
THE KOMORI CURRENCY NV COMBINATION MULTI-PROCESS NUMBERING & VARNISHING PRESS

WA STRENGTHENS DESIGN CAPABILITY

The ***Wa*** Design Concept allows us to provide virtually any configuration that may be needed. For example, if two different varnishes are required on the front side and back side of the note after numbering, this can be designed and delivered. Especially on polymer notes, security foil requires a different varnish application compared to other areas such as offset, intaglio and number printed areas.

The Design of ***Wa*** concept strengthens customers' design capabilities and unleashes their creativity to work in harmony with Komori to develop and build new, unique features.

NOW AND IN THE FUTURE

Komori has 5 business units within the group: Banknote Printing Press, Offset Printing Press, Digital Printing Systems, Printed Electronics and now, the newly formed Post-Press Business. Incorporating the principle of ***Wa*** in an ever changing and unpredictable world, Komori remains firm in continuing to work with, and create: harmony.

WA 和 Harmony

"What is most valuable is "Wa" (gentleness of spirit). What is most essential is not to contradict others"

Prince Shotoku

Komori always goes beyond your expectations.

KOMORI CORPORATION

Takeo Uehara
General Manager – Sales & Marketing
Security Press Sales Group
Email: takeo_uehara@komori.co.jp
Website: www.komori-currency.com

HUNKELER SYSTEME AG

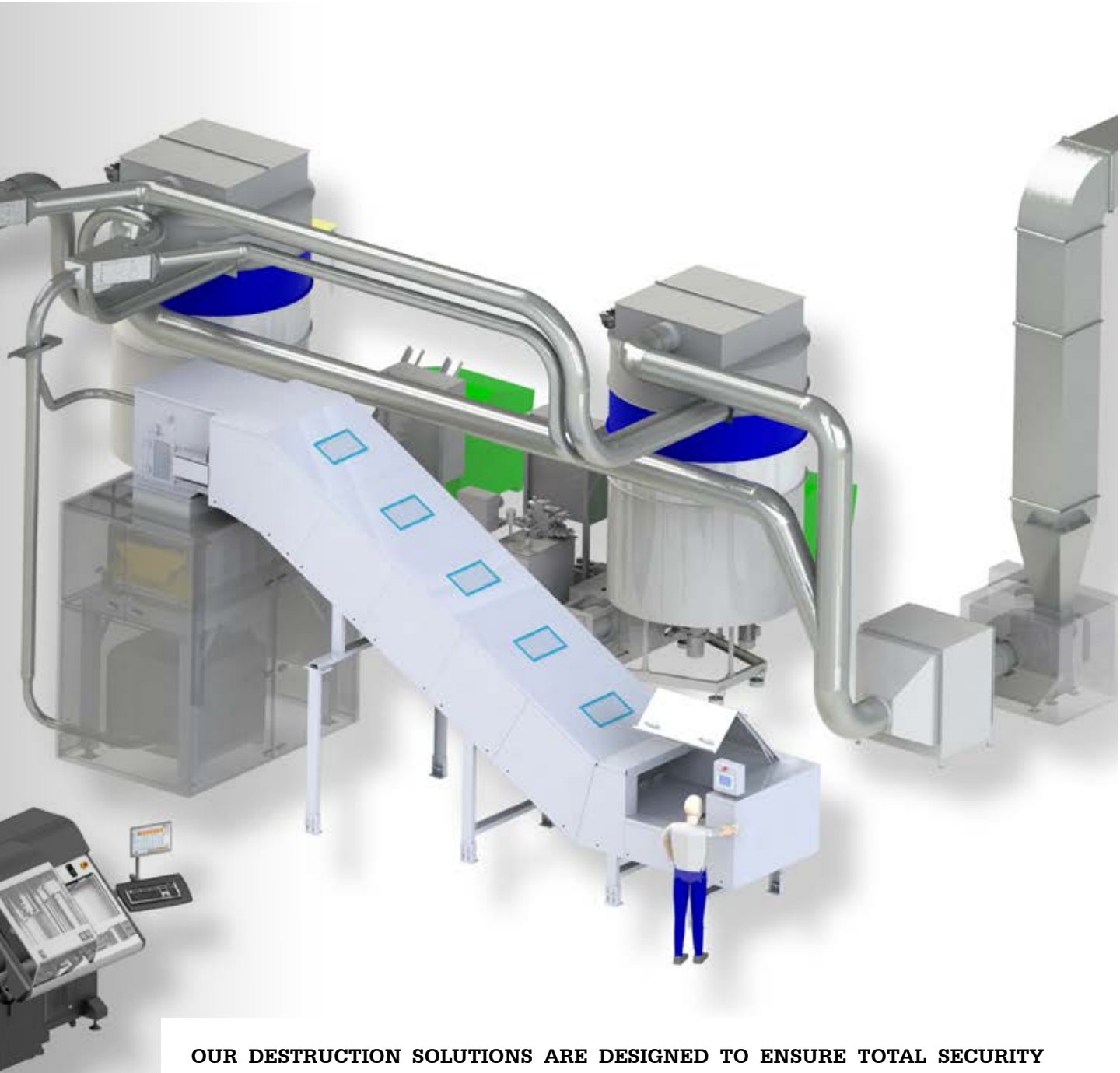
TOP OF THE PEAK SWISS ENGINEERING STATE OF THE ART

DESTRUCTION AND RECYCLING WITH A SYSTEM

Top of the Peak Swiss engineering state of the art Destruction and Recycling with a system

HUNKELER SYSTEME AG

Throughout the production process where automated waste evacuation has to take place with shredding, compacting, sorting and de-dusting of waste or even security print documents, that's where Hunkeler Systeme AG plays an important role all over the world.



OUR DESTRUCTION SOLUTIONS ARE DESIGNED TO ENSURE TOTAL SECURITY AND CONFIDENCE.

The software is being developed by our In-house IT experts and can be updated remotely from our headquarter in Switzerland at any time needed. Especially in the current times of travel restrictions, it is important to have remote access to the software and keep your Hunkeler Systems ongoing running. Every single step in the process chain is monitored. Careful logging records the process from access authorization via PIN-Code, through the automation conveyor on the ejection of the shredded material in the formof compact briquettes.

CLICK OR SCAN

The workfow management software continuously monitors the entire disposal process. The software continuously compares the feed quantities against the output quantity of shredded materials. Every step of the process is recorded in a job report and can be traced back to the start. The data is stored and displayed in a central control station and the graphical interface provides the supervisor with both live data and historical data. The visualization tool integrates to the customer systems via XML and CSV interfaces.

AUTOMATED COTTON AND POLYMER SEPARATION IN THE DESTRUCTION SYSTEM

Our range of intelligent banknote destruction solutions provides integrated destruction and collection systems. The modular design allows you to choose the components that best meet your requirements such as volume, footprint and room dimension. Each component can be used individually or as part of the fully integrated solution installed on one floor or across multiple floors. Paper, polymer or composite based substrates banknotes can be securely processed by Hunkeler Systems destruction systems. This includes the brands Durasafe, Hybrid, Everfit and others. It does not matter if you have different substrate-based banknotes cocirculating – with the technical engineering by Hunkeler Systems this is feasible. So you can use one equipment to destruct different substrates. Every suction point can be switched to e.g. cotton or e.g. polymer notes.

ALL IN ONE UNIT – NON-STOP SUCTIONPERFORMANCE FOR SHREDDED BANKNOTES

When sorting notes and shredding unfit notes it is essential to have a compact notes aspirator integrated at the end of the shredder module. Hunkeler Systems is offering an all-in- one concept with the HKU 4510.

The unit is a compact extraction unit with a material silo and a discharge device. It is well suited for the extraction of shredded banknotes. The antistatic filter elements are automatically cleaned during operation by compressed air, the filltered air flows

back into the production room. A frequency converter continuously regulates the extraction performance. Via rotary valves the material enters the containers below, each with a capacity of 0.4m3. The filling level of the bins is monitored, they should be emptied manually when necessary. The HKU 4510-RB is identically constructed and has the same technical characteristics. In addition to the bin version, the material goes directly into a briquetting press, where it is compacted and collected in a separate container.

HKU 4510 are designed for the suction of shredded banknote material up max. 400kg/h. Connections to banknote sorting machines and shredders are possible and allowing a clean production with a minimum noise level. This non-stop machine increases the performance of the sorting machines– Alternatively, there is a compact one bag system, the HKU 1500, available.

HOW ENERGY CAN BE EFFICIENTLY USED–ENERGY SAVING SYSTEM ESS

High performance standards, but modest energy requirements: these qualities characterize the disposal systems produced by Hunkeler Systeme AG. Disposal and control technology complement each other in the comprehensive engineering approach. Pneumatic suction systems are usually in a state of constantly high operation. In the morning, they are switched on with a lead time and in the evening need a follow-up time before being switched off. This requires an unnecessary amount of energy. Therefore, Hunkeler Systeme AG has developed the automatic switch-off assistant ASA. It activates a suction system as soon as production starts and automatically switches the system off during breaks and at the end of the day. The Energy Saving System regulates the performance of pneumatic suction systems according to the momentary requirements. At 80 percent air volume a fan requires only 60 percent of the electrical energy.

The mechanical load on the ducts and pipes is comparably low, and so maintenance costs are avoided. The basis of the ESS is a dfferential pressure control system where a frequency converter dynamically controls the fan performance. The Hunkeler Systeme Energy Management System shows, where and how much energy is used in the production system. From this objective presentation, an exact usage profile can be deduced. Energy flow can be precisely managed, resources efficiently used and operating costs accordingly lowered.

HUNKELER SYSTEME AG

Mr.Erich Hodel
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ADVERTORIAL: HUNKELER SYSTEME AG

AIRCLEANER - ROOM AIR QUALITY TO FFP 2-3 STANDARD

Dust, pollen, viruses and bacteria - indoor air quality is endangered by many influences. With the beginning of the corona pandemic, these devices have gained even more importance. They represent an important bastion against the spread of the virus. Eliminate dust, pollutants and viruses in your operation make your production area safe. Hunkeler Compact AirCleaners are the ideal solution for cleaning air in buildings. The HKA filters the entire air volume on average every two to three hours, day and night. The smallest particles are removed from the ambient air and leaves it appreciably improved in quality. Cleaning time in buildings is reduced by up to 60 percent, which means outgoings for cleaning are also reduced. Downtime for machines and production systems are reduced to a minimum thanks to improved cleanliness for the sensors.

The standard delivery for the HKA includes E11 filters that are identical in filter quality to FFP 2-3 face masks and filter out bacteria, smoke and viruses. This permits high level air quality in accordance with ISO 16890. The filter materials are synthetic micro spunbonded fabric, free of dye or solvent agents and are, due to their waterrepellent properties, micro-biologically resistant

The dust-laden air is sucked into the air circulatory system and cleaned of even the smallest airborne particle by the pre- and main filter of up to 99.5%. The cleaned air is then returned to the room. Thanks to the use of the most modern technology, with an very high effectivity, maximum energy savings and freedom from fan maintenance have been achieved

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HKA MODEL SERIES

HKA AIR AND VIRUS CLEANEE

since 1892

The Future needs Tradition

Gietz stands for reliability in the security industry

More than 80 Gietz FSA NOTA machines were delivered to governmental and private banknote printing companies all over the world.

Since the very first days in the hologram application history until today, Gietz is and stays your reliable partner for hologram patch and stripe application onto banknotes.

Gietz was a pioneer in the hologram transfer technology, supplying the machine to apply the very first registered hologram onto the Australian commemorative banknote „Captain James Cook“. Today our Gietz machines are state of the art in the application of security foils, delivering high quality and reliable results for the security printing industry.

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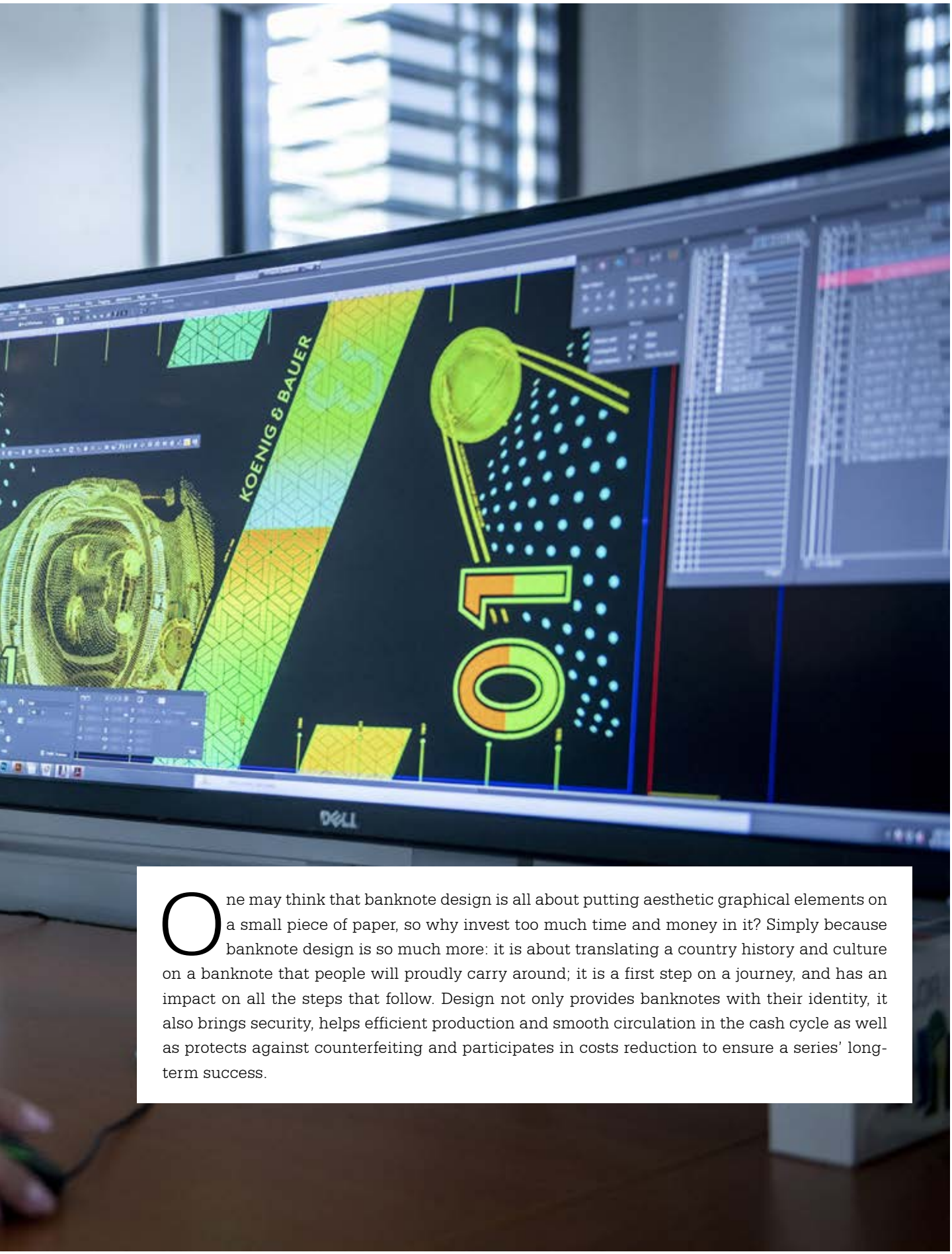
KOENIG & BAUER BANKNOTE SOLUTIONS

WHEN DESIGN BECOMES ENGINEERING

When design becomes engineering

KOENIG & BAUER
BANKNOTE SOLUTIONS

What was previously a purely artistic work has gradually transformed into a highly technical task with machine-readability and technical constraints at the heart of the designer's concerns. With this, the design phase has become an essential step in ensuring efficient production and smooth circulation in the cash cycle.



One may think that banknote design is all about putting aesthetic graphical elements on a small piece of paper, so why invest too much time and money in it? Simply because banknote design is so much more: it is about translating a country history and culture on a banknote that people will proudly carry around; it is a first step on a journey, and has an impact on all the steps that follow. Design not only provides banknotes with their identity, it also brings security, helps efficient production and smooth circulation in the cash cycle as well as protects against counterfeiting and participates in costs reduction to ensure a series' long-term success.

PROTECTING THE FUTURE OF CASH

A priori, we all want a long and bright future for cash because we believe that cash benefits people through unique attributes which justify it being an integral part of the payment landscape.

But what are those attributes exactly? Identity, security, inclusiveness, protecting privacy, to name but a few. So the question now is, how do we ensure that those attributes remain and are perhaps even reinforced? When considering the first two attributes - identity and security – we gain a clear understanding of how much importance design carries.

And if you are wondering about costs, first consider the cost of having a series that can easily be counterfeited, of a series with machine-readability features that are impossible to read, of a design that was done so quickly that it didn't take into consideration production constraints and so will trigger a great deal of waste, of a design that people will reject because it is not unique and looks like any other banknote.

Then think of the tiny part that design represents in the overall cost of the cash cycle – less than 0.01% of the production cost over 10 years – and the modest savings you could make in giving it less attention. We often talk about the last but not least step in everything we do, today let's talk about the first and not least phase of banknote creation!

WHEN INVESTING IN BANKNOTE DESIGN RESULTS IN SAVINGS

In a never-ending battle against counterfeiters, banknote complexity has continuously increased over the past decades. The number of processes involved in their production has also exponentially expanded. The work of the designer which was, in the past, limited to creating a piece of art has shifted towards the mission of an engineer putting together machine-readable Security Features in an aesthetically pleasing way.

In order for Central Banks to reduce costs, designers have been working on ever-smaller banknotes, allowing more single notes to fit on one sheet and directly and positively impacting the costs of production and consumables. A simple and logical idea that, however, makes the designer's work both more demanding and more important.

Indeed, placing Security Features of relatively large proportions on a smaller banknote is a challenge and needs to be thought through carefully. Quickly and carelessly placing machine-readable Security Features is almost guaranteed to result in them conflicting and interfering with each other, making automated reading inefficient. For example, two infrared features, one on each side of the banknote, should never be superimposed.

The designer has to ensure that all technical constraints are fully respected in the functional layout, that each Security Feature the Central Bank has paid for will bring value and not be rendered useless by a bad interaction, while at the same time keeping aesthetics and user friendliness in mind. Each time a tiny change is made,

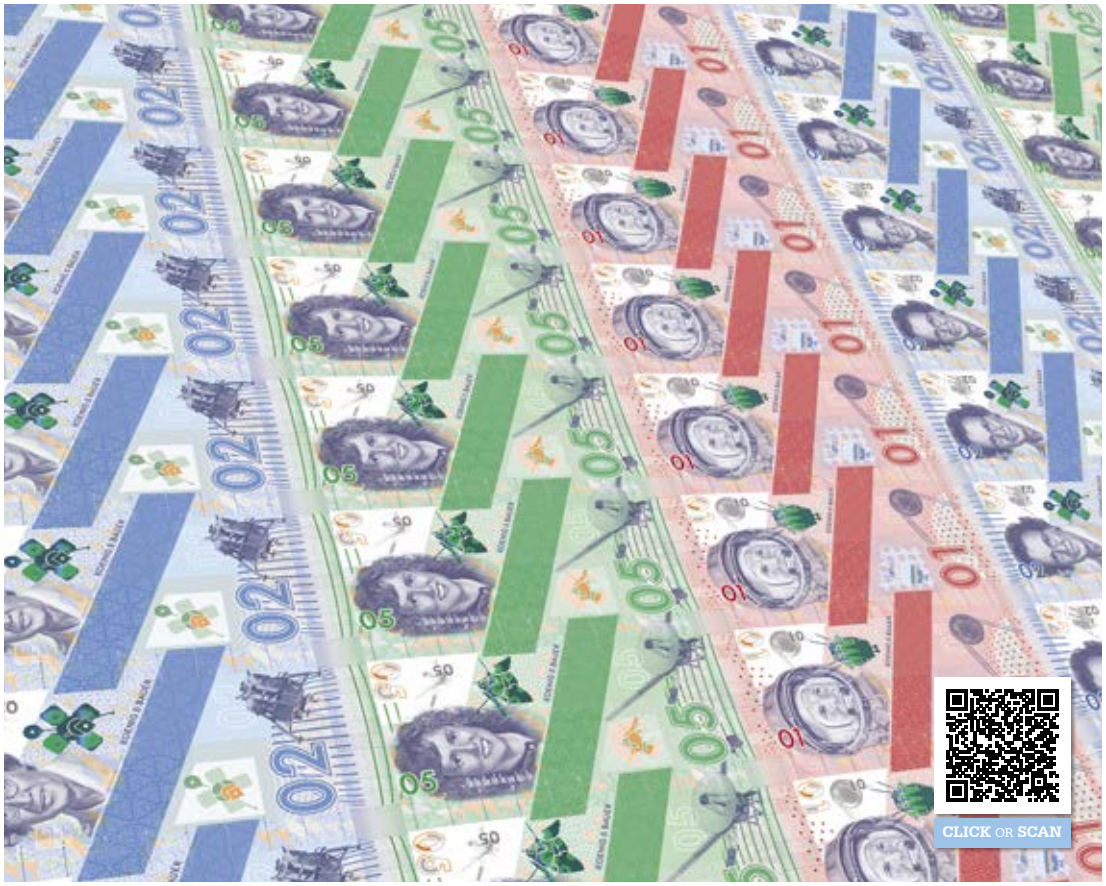
these elements will have to be checked again. A high-precision work that requires time to fulfil its single purpose: making the series a success in the eyes of the public, in the cash cycle and for the Central Bank.

Koenig & Bauer Banknote Solutions has specialists in the cash cycle who can advise you on the critical elements to consider in order to achieve a design that is both aesthetically pleasing and functional.

For countries where production is relatively low, design can also help reduce costs by deviating from the current status quo, in which each sheet comprises one denomination.

In the design of our latest Laika series, Koenig & Bauer Banknote Solutions has made it possible to produce several denominations on a single sheet: three low denominations on one polymer sheet and two high on a cotton sheet. For pre-press and production, the difference is enormous: instead of five sets of plates and five different machine set-ups, only two were needed, which resulted in major time and cost savings without compromising security.

In these two examples, we see the direct link between design, production and cash cycle. By investing slightly more time into an engineered design, production becomes more efficient and the cash cycle as smooth as it should be. As the proverb says: “slow and steady wins the race!”

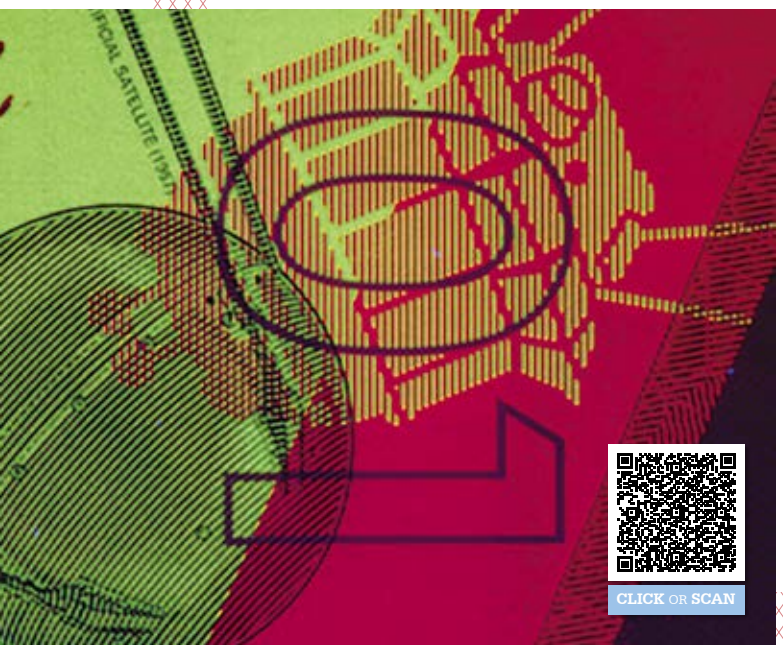


WHEN DESIGN DRIVES SECURITY BY USING THE PROCESS TO THE MAXIMUM

Design and Security Features remain the first defense against counterfeiting. With the help of dedicated design software, banknote designers will create unique form language and patterns that even a skilled graphic designer will be unable to recreate using commercially available software.

Then comes the selection of Security Features. But what makes a Security Feature secure? Of course, it needs to be difficult to counterfeit yet easy to identify, and a mix of features applied into the substrate and in the print works is optimal. Going too far in complexity may result in Security Features that people do not understand. A balance has to be found between complex design and efficient production, to make sure that design drives security by using the process to the maximum.

SUSI Flip™ and SUSI Optics™ are perfect examples of such features. They are easy for the public to authenticate and provide a high level of security thanks to full exploitation of the precision of the Simultan Offset printing process, and so are practically impossible to reproduce using commercially available technologies.



SUSI Flip™ has been awarded the IACA 2020 Best New Currency Feature on the Solomon Islands $5 note. A monochromatic design is seen in daylight, but a completely different three-colour image is viewed under UV light. Achieved using only two plates, it is more advanced than any other Offset UV feature on the market.

As for SUSI Optics™, the only multi-colour micro optic feature on the market, it combines three printing processes – Offset, Screen and Application – and uses micro-lenses which are impossible to find commercially, making it one of the most secure features created inside today's print works. With up to 19 different effects, the feature allows to transform shapes, create 3D effects, give a sensation of depth, switch colours and much more.

A specially designed proofing software produces both digital and physical samples in a matter of minutes, allowing customers to better visualize the final effect.

See-through is another feature commonly used by police forces around the world as one of the first identifiers that can distinguish counterfeits from genuine banknotes. This type of identification is more difficult for the public, as dim light is regularly not sufficient. To solve this issue, Koenig & Bauer Banknote Solutions and PurintoMark™ developed an ink applied with the NotaScreen that creates transparency where the feature is located, making it more visible and so easier to authenticate.

Improvement and new development have also recently enlarged the SPARK® family with a new generation called SPARK® Flow and its two effects: PRIME and DIMENSION, respectively allowing for brighter, more vivid colours and 3D-style effects. Present on 280 denominations, the SPARK® Security Features achieve a high level of security through combining a unique printing process only possible with our NotaScreen technology, and a strong identification method for the public.

The integration of Security Features during the design phase is critical as it will contribute significantly to the banknote's level of security and so to its long-term success. However, the number of Security Features on the market makes it difficult to select the most appropriate ones. As we do not sell Security Features, nor substrate, nor even print banknotes, Koenig & Bauer Banknote Solutions can act as a completely neutral consultant or project manager to support such selection.

In all the design projects we have worked on, we have always put the customer and their needs first, working with all suppliers and, along with the Central Bank, selecting what best fits the customer's needs in terms of budget, cash cycle and printing capability. Our focus is primarily on machine-readability and looking at the finest detail of origination and form language.

WHEN DEDICATED SOFTWARE AND WORKFLOW FACILITATE AND SPEED UP THE DESIGN PHASE

If dedicating enough time to design will unquestionably bear fruit later by achieving secure banknotes, software and workflow innovation can ease the designer's task and speed up the overall workflow. As the designer's work has gradually shifted to that of an engineer, the design tools have evolved into increasingly sophisticated software.

A proven security design software for over 20 years, ONE has continuously evolved to offer new functionalities such as smart selection or live preview. In its latest version 2.0, the ONE user interface has been improved to offer both light and dark modes; it is now also possible to open multiple documents at the same time and copy elements from one document to another. New tonal variations are also available, and elements with repetitive or random tonal values can be created.

Recently, our new data preparation workflow, Asecuri, was introduced. The all-in-one workflow allows fully automated data preparation serving any CtP output in Koenig & Bauer Banknote Solutions' portfolio.

Manual interaction is reduced to a minimum, enhancing productivity and minimising errors. Asecuri offers one powerful tool for everything from pre-flighting of the design data to proofing, rendering, imposition, distortion, ripping, and exporting data for successive steps in the print hall. The entire workflow is fully compatible with any common design software and the dedicated ONE Security Suite for banknote design. Without sacrificing security, technological advances enable savings in time and money.

More is to come, with further development of our two software tools, such as data integration and automatic data transfer.

ENGINEERED DESIGN AS A FOUNDATION

Banknote design has transformed over the years, becoming a strategic phase in banknote creation by ensuring security and considerably contributing to efficient production and smooth circulation in the cash cycle. Investing in engineered design will ultimately bring a quick return on investment. Think of it as a foundation on which you can rely and safely build.

Technical solutions, smart Security Features and innovative tools save time and lower costs. As a neutral yet expert partner, Koenig & Bauer Banknote Solutions can advise you on the complete workflow of banknote design, production and cash cycle, present right from the beginning to the end, never letting you down.

KOENIG & BAUER BANKNOTE SOLUTIONS

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www.luminescence-scs.com

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INNOVATIVE, TAILOR-MADE SOLUTIONS.

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SURYS

From science to confidence

What if you can have both security and ease of control in a stunning design?

Moov™ security thread

Moov™ is an innovative concept which blends state of the art technology with high design precision, and strengthens the ties between colors and movement for an appealing and secured solution

TriSTAR™ security thread

TriSTAR™ revisits the classic colorshift thread by proposing a unique set of features that will enhance your banknote: a unique three colorshift combined with customizable visual textures

At SURYS, we begin with science: a limitless source of incorruptible pillars for our solutions. We seek new ways to transform scientific breakthroughs into innovative security products. At SURYS, to create greater confidence in the authenticity of banknotes we begin with science and manage the journey to confidence for our clients' success.

www.surys.com

Foundation of Trust

A highly secure substrate is the essential foundation of any valuable document. Such a foundation contributes to building and maintaining the public's trust in banknotes, passports, and other secure documents. This in turn contributes to fraud prevention, and reduces the financial and social costs associated with these crimes.

We take this important message to heart in Landqart. Nestled in the safe and tranquil Swiss Alps, since 1872 we have focused on producing substrates for security documents of the highest possible quality and with unrivalled fraud protection. We continue this tradition today, supplying the substrate used by the world's most recognized and secure banknotes and passports.

Made in Switzerland
Secure worldwide

visit us at
landqart.com

Landqart