

# INFOSECURA

## ID document and banknote production: The technology of trust

A magazine for the security printing industry worldwide, published four times a year by Intergraf in Brussels and mailed to named members of the security printing community, such as security printers, their suppliers, banknote issuing, government and postal authorities as well as police forces in more than 150 countries.

**INTERGRAF**

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## Trust is our business: spread the word



The security printing industry is forever fighting against threats. Threats from counterfeiting mainly, and consequently the industry spends millions to develop ever more fiendishly difficult security features, which come often very close to the unreachable ideal of uncounterfeitable. As the very low number of counterfeits compared to the number of banknotes in existence shows, these features work. Do they work because they are technically so advanced that no counterfeiter in his/her right mind would attempt to produce a credible copy? Or do they work because the really clever counterfeiters and money-conmen have found easier pickings? Possibly a bit of both.

At the last Security Printers Conference by Intergraf, a document examiner from Interpol showed your correspondent a counterfeit Euro note that had been drawn by hand. It was almost perfect and it was also almost charming in its naivety. The counterfeiter could have made more money selling his handiwork as a work of art than passing it off as a banknote. If counterfeiting is becoming the domain of romantic or old-fashioned conman and the ones that really want to get rich fast with as little risk as possible have moved to defrauding the electronic means of payment, then perhaps the threats to our industry have moved as well. With very few exceptions, counterfeiters do not want to ruin the economy of a whole country. They want to make money. So they go to the weakest link in the money chain. And that link is increasingly electronic. However, it is one of the ironies of our business that we will never be able to stop producing banknotes with security elements that are nearly impossible to counterfeit. If we would do so, banknotes would become the weakest link. Banknotes are the most trusted of all payment instruments but they are not the only ones. Electronic means of payments are here to stay and they will gain in importance. Modern economies rest on an equilibrium of two "payment legs", cash and electronic means of payment in all its different forms. We should maintain that equilibrium by continuing to show the trustworthiness of cash - and we should proclaim this confidently to all who use cash.

This issue is also about identity subjects, and here the situation is both similar and different. The industry has created a plethora of security features for passports and ID cards and will continue to do so, but there is an important threat from genuine documents obtained fraudulently, usually through forged breeder documents. And the pressure of desperate people wanting to enter safe and prosperous states makes this an urgent and international problem. The issues of migration and immigration - legal and otherwise - which are behind the efforts to have secure and verifiable means of identification, are immense and can - if at all - only be solved on the highest political level. But the efforts of our industry to create systems of verifiable identity that can be used, not only in developed countries, nevertheless give hope to many people to lead a normal life with access to all the benefits citizenship has to offer. Verifiable identities will not solve the problems of desperate people needing a save heaven, but it may help in separating those that are in real need from those that merely want better opportunities or from those that have very sinister goals. Both in the banknote and the ID arena, our industry is doing its part to create trust. We should spread the word.

Editor

# Fighting document fraud

**Counterfeiting is an expensive business but the profit margins are high and the risks are - so counterfeiters think - bearable. As in any manufacturing business, there has to be a supply chain and supplying an illegal business also means high profit margins. But such suppliers should not forget that there are also risks and in the UK they have just become much higher.**

**A**t the end of March 2015, the UK Parliament passed the "Specialist Printing Equipment and Materials (Offences) Act 2015". This law provides a special legal tool to prevent counterfeiters from obtaining their specialized equipment and supplies by making supplying such equipment "to be used for the purpose of criminal conduct" a criminal offense. Although the law applies specifically to England and Wales, there is a clause that makes it internationally applicable as well. The maximum penalty the law provides for is "imprisonment for a term not exceeding 10 years.

Police forces in the UK now have a new sharp weapon in the fight against counterfeiters and one force in particular is especially active, as it is responsible for the forgery and counterfeiting hotspot in the UK. This is the Metropolitan Police in London, the Met. The Met is operating three anti-counterfeiting schemes, Project Genesis, FALCON and Amberhill. Project Genesis is an ongoing liaison with the printing equipment industry to prevent specialist equipment and ancillary supplies falling into the hands of criminals involved in making false identity documents. The Met has close contacts to printing equipment and supply companies, and it trains these companies in spotting orders that may point to criminal intent. Among these tell-tale signs are cash payments for goods, residential or changing delivery addresses or collection of goods, no invoice required and no company name.

While Project Genesis aims to prevent the manufacture of counterfeit documents and is therefore difficult to quantify, the project Amberhill, which is the Met's programme to hinder the use of false Identity documents by sharing compromised identities discovered on computer hard drives at forgery factories, can point to very important quantifiable

successes. The Met claims that the scheme prevented fraud, which would have netted £9m and identified fraud cases worth £ 20m. There is a Dedicated Amberhill Database (DAD) with data from 89 operations, of which 56 were large scale, criminal "document factories". The Met recovered 98,748 documents, including over 50,000 images and has over 20,000 named linked images on file.

## COPYING A GOOD IDEA

The success of Project Genesis prompted law enforcement organisations in the USA in 2009 to start a very similar project, called "Operation Genesis", a nation-wide programme by the US Immigration and Customs Enforcement (ICE), the largest investigative agency in the Department of Homeland Security (DHS).

Document fraud is a gateway crime that paves the way for additional criminal offenses, including identity theft, human trafficking, financial fraud, terrorism, etc. as well as illegal immigration. Criminal and terrorist organizations pay top money for quality counterfeits, to facilitate their illicit activities.

The agency found that increasingly document fraud operations acquire professional printing equipment and supplies for their criminal activities, to produce near-perfect counterfeits of official ID documents. Especially in demand are plastic ID card printers, blank card stock, hot foil stamping units and embossers and ultraviolet inks.

As the problem of document fraud is nearly universal, it is hoped that the practices developed in the UK and in the US for closer cooperation between the printing industry, its suppliers and law enforcement agencies will be copied by many police agencies the world over.



## NEWS

The three new members of the Intergraf Committee of Experts: (from left) Bernd Kümmerle, Georg Hasse and Dr. Dieter Sauter.



**Intergraf** has added three new members to the Committee of Experts that organizes the content of the Security Printers Conferences. The place of Wolfgang Knörrle, who has retired from the committee, has been taken by **Bernd Kümmerle**. Bernd Kümmerle comes from a sales background and has 20 years of working experience in banknote printing and government business at Giesecke & Devrient. Since April 2015 he is Head of Operations of the Banknote Solutions Division of G&D and member of the G&D global management team as a Senior Group VP.

Switzerland will be represented by **Dr. Dieter Sauter**, Chief Executive Officer and Chief Technology Officer of the Division Security Printing of the Orell Füssli Group. Dr. Sauter studied Physics in Tübingen und Stuttgart and after a stint in academia, worked for Bundesdruckerei GmbH, Robert Bosch GmbH, Giesecke & Devrient GmbH and finally as head of research and development at Orell Füssli Sicherheitsdruck AG, becoming CEO of the company in 2014.

The eID area at Intergraf will be strengthened by **Georg Hasse**, Head of Consulting, Division Homeland Security – secunet

Security Networks AG, Berlin. Georg Hasse has over 10 years of experience in biometrics and eIDs and he was involved in projects such as ePassport Germany and Thailand, eVisa Germany and Sweden, Automated Border Control EasyPASS in Germany and EasyGO in the Czech Republic.

**Oesterreichische Staatsdruckerei (OeSD)**, the Austrian State Printing Works, has won the contract to print the EU laissez-passer, a state-of-the-art travel document for European Union officials on official business. OeSD will be the prime contractor for this 9-year project, working together with Vision-Box from Portugal and X-Infotech from Latvia. The project comprises the production of high-secure travel documents with complex security features, capturing of biometric data, personalisation based on latest EU-standards and issuance of the laissez-passer from several locations in Europe.

**Bundesdruckerei GmbH** in Berlin has acquired a majority share in the German IT security specialist, **genua gmbh**, based in Kirchheim. genua specialises in network security and focuses on customers with special IT security requirements – above all mechanical engineering companies and public authorities. Its product range includes firewalls, virtual private networks (VPNs) for secure data exchange on the Internet, remote maintenance solutions for machinery and IT systems, as well as solutions for mobile security.

### DATES TO REMEMBER

**05/09/2015**

Call for papers

**15/09/2015**

Plan your participation leaflet (first info and pricing)

**05/10/2015**

Start of exhibition sales

**15/11/2015**

Deadline call for papers

**05/05/2016**

Start of registration

**05/08/2016**

Last day of early registration fee

**12/09/2016**

Deadline registration

**05-07/10/2016**

Security Printers International  
Conference and Exhibition in Seville, Spain



De La Rue has launched DLR Identify, a new citizen centric web based software solution, complemented by three new physical document security features and two new thin film laminates for passport bio-data page protection. DLR Identify seamlessly integrates the digital system that manages a citizen's identity with the physical document itself.



Modern urban populations, especially in the developed world, are becoming increasingly mobile. They want the ability to cross borders quickly and with as little hassle as possible, but they also want to feel secure within their own borders. The conundrum is therefore, how to have intentionally open borders that are at the same time very secure. The answer lies in verifiable identity - you can come and go freely and effortlessly if you can prove who you are and that you have all the rights to stay or go and to use all the services of the country you are in.

This also implies that the country of which you are a citizen or resident must have a lot of data about you and you must trust the state to use this data responsibly and to give access only to a limited part of it that is necessary for a specific purpose. E.g. the border guard at the airport does not need to know which car is registered to your name and the policeman giving you a speeding ticket does not need to know if you are on the voter register. The totality of personal data should thus be separate from the application. Such an identity management approach puts the citizen's needs and fears at the centre, creating trust, helps to establish ownership and enables inclusion in civil and government programmes. And it relies to a large extent on secure documents linked to equally secure digital solutions.

#### SECURE DOCUMENTS IN IDENTITY MANAGEMENT

Identity documents are still at the heart of managing citizen identity, but they have to comply with up-to-date international standards. The International Civil Aviation Organisation (ICAO) has set compliance deadlines to ensure global standardisation and interoperability of travel documents at borders. But secure identity documents are no longer stand-alone documents. They are backed up and complemented by digital systems.

De La Rue has just launched a new comprehensive identity management solution called DLR Identify - the company calls it the next generation of ID management systems - that integrates the

digital system that manages a citizen's identity with the physical document itself. As every country has different circumstances and therefore needs, the different components can be tailored to the specific requirements and challenges of a country.

#### THE DIGITAL COMPONENT

DLR Identify is a web-based software solution for the secure management, personalisation and storage of citizen identity data. Built using De La Rue's MIDIS technology to power its personalisation module, DLR Identify allows governments to record, validate, retrieve, update, certify and issue documents to citizens. This simplifies what was previously a series of highly complex work streams, into a single sophisticated but user-friendly system. It provides the functionality for operating all eGovernment and eCitizen applications, as well as border- and document-control functions and gives citizens access to rights and entitlements. It also enables access to unique credentials, across multiple applications, from a single foundation, that is to say, biographic and biometric data have to be recorded only once. The package consists of six core elements; ID Register, ID Enrol, ID Verify, ID Perso, ID Issue and ID Control. The system is fully compliant to ICAO and ISO requirements, and delivers integrated reporting with strong proven security credentials.

#### PERSONALISATION

DLR Identify offers governments a comprehensive menu of bespoke solutions for the personalisation of ID documents, be it for manual or automated production, small or large-scale delivery, or whether it's personalisation at a small embassy or a multi-site operation. DLR Identify also helps manage the data preparation for a variety of eID documents. This enables the issue of multiple individual documents using data from a central, secure source.

DLR Identify uses PKI (Public Key Infrastructure) and other cryptographic techniques for chip encoding. Other encryption solutions are also used for a range of eID applications, including travel documents and driving licences. The various



stages of encryption used in ePassport documentation allow for different levels of personal data configuration, encryption and locking, depending on the degree of security and access required.

#### NEW DATA PAGE PROTECTION

In addition to their new digital solution, De La Rue launched a series of physical product innovations as a direct response to a number of specifically identified security threats to the bio-data page for passports and ePassport documents. (left column)

#### SKYLIGHT

A complex watermarking feature, where small areas appear lighter and thinner than their background, positioned across the sheet to prevent the splitting of paper, the lifting of the laminate and its reassembly with fraudulent data.



#### CONTINUOUS BIO-DATA PAGE

A new patented method of book construction where the bio-data page continues across the spine to also form the rear end page of the book. This technique greatly hinders the removal of the bio-data page; the prime target of most fraudulent attempts of document alteration.



#### SPECTRUM

Spectrum is a colour changing print feature with "movement" and "on/off" effect using proven latent image technology providing a sophisticated anti-copy feature that is resistant to colour copiers, scanners or attempted desktop reproduction.



#### NEW THIN FILM HOLOGRAPHIC LAMINATES

De La Rue also launched two new thin film holographic laminate patches, the first result of their recently announced partnership with Dai Nippon Printing Co Ltd for cooperation on the development of new anti-counterfeit technologies to be used in secure identity document solutions.



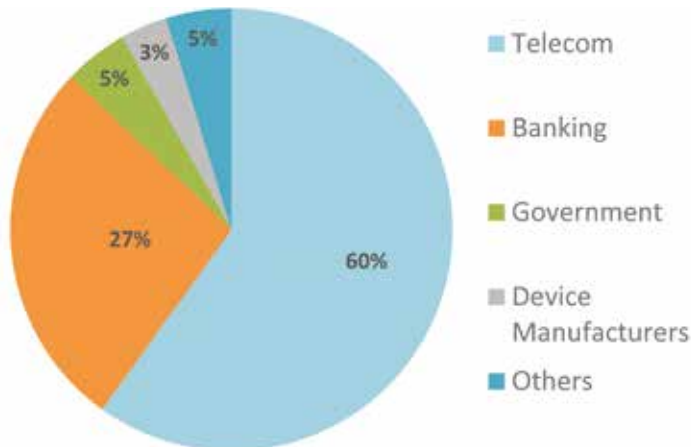
The holographic laminate **SHIELD EMBOSSED** is a high-gloss thin film laminate protection solution created using e-beam technology to deliver the highest resolution and definition of quality. A striking use of complex 3-dimensional models ensures immediate recognition and provides a powerful verification feature. (images above)

The holographic laminate **SHIELD VOLUME** uses Lippmann holographic technology to display a strong monochrome image with high movement and exceptional depth with 3D models that transition in both the horizontal and vertical directions and can be easily viewed under a mix of different lighting conditions (below: Shield Volume foil).



# Strong market growth in secure elements

Worldwide secure elements shipments by sector



"The markets grew by over 12% in 2014, and we expect to see a similar growth in 2015 when the market should cross over the 9 billion devices mark", said Timothée Mangenot, Eurosmart's newly elected President. "All figures are up from 2013, with financial services being the most notable growth drivers. The hyperconnected world is fast becoming reality. Eurosmart has long been promoting trust as well as the protection of data and privacy as key issues for secure transactions in this hyperconnected world. It is good to see the many initiatives and agendas that have been established to that effect in the European Commission

The trade association Eurosmart released the 2014 figures for the worldwide secure elements shipments and the smart secure contactless markets as well as the corresponding 2015 forecast. The data provided by Eurosmart consist of the consolidated figures supplied by its member companies which comprise all major players in the industry. They are the reference point for information on and in the industry.

in the past year. We welcome especially the inter-group of the European Parliament that has been set up to work on the Digital Agenda for Europe."

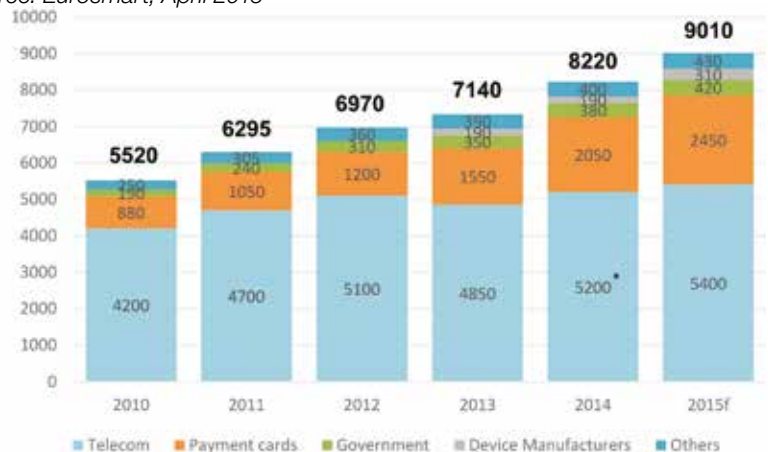
As evidenced by the European Digital Single Market Strategy released in early May, the European Commission will also increase efforts and launch new initiatives to build the necessary trust for the development of electronic services, to reinforce online privacy, and to ensure strong cyber security. "All of these topics have been addressed by Eurosmart for years. It is good to see them becoming a core issue at the European Commission," Mangenot stated.

## GROWTH DRIVERS IN THE MARKET

The continued migration to LTE networks drives the use of multiple connected devices – including smart phones and tablets, equipped with a secure SIM card – and allows the SIM card market to be back in full force, with 5,2 billion units shipped in 2014, as recently announced by the SIMalliance. The increasing connectivity caused by the internet of things and machine-to-machine applications reinforces this trend. The announcement of Apply Pay boosted the NFC market to an all-time high with 350 million NFC secure elements shipped in 2014. "We expect the growth in NFC secure elements to continue", said Mangenot. "This particular technology is finally taking off."

Shipments of secure elements by issuing entity:  
 -Telecom = Mobile Network Operators, -Banking = banks, -Government = public authorities, private healthcare organizations  
 -Device manufacturers = Original Equipment Manufacturers of mobile phones, tablets, navigation & other connected devices  
 -Others = shipments from entities issuing Transport, PayTV and Physical and logical access cards  
 \* Source SIMalliance

Evolution of Secure Elements shipments from 2010 to 2015 - (Million of units)  
 source: Eurosmart, April 2015





The main growth driver for payment cards was and is once again the migration to EMV cards – cards equipped with a chip instead of a magnetic stripe only. Mangenot commented: “The Smart Security Industry has long recommended the switch from magnetic stripes to chip cards as it is empirically proven that there is a direct correlation between the use of a chip and the security of the card. Almost 70% of all payment cards shipped are now equipped with a chip.”

With regard to the traditional third growth driver, the digitalization of government services, Mangenot expects governments to speed up both their legislation and the implementation of the corresponding technologies: “Secure and convenient identification

and authentication in mobile telecommunications, payment, identity, healthcare or transport are indispensable. It is key for citizens to trust their government’s e-services such as electronic passports, electronic vehicle registration cards and electronic driving licences, electronic health cards and electronic ID cards”, said Mangenot.

The Eurosmart president urged governments to establish standards for the secure electronic authentication and signature. “Citizens must be able to rely on the protection of their data and privacy. The Smart Security Industry offers products, solutions and services that enable governments to provide secure e-government transactions.”

Worldwide secure shipments - 2013 & 2014 and 2015 forecasts (million of units)

\* Source SIMAlliance

\*\*Others include Transport, PayTV and physical and logical access cards.

WW shipments forecast	2013	2014	2015f	2015f vs 2014 % growth
<b>Telecom</b>	<b>4,850*</b>	<b>5,200*</b>	<b>5400</b>	<b>3,8%</b>
<b>Banking</b>	<b>1,550</b>	<b>2050</b>	<b>2450</b>	<b>19,5%</b>
<b>Government</b>	<b>350</b>	<b>380</b>	<b>420</b>	<b>10,5%</b>
<b>Device Manufacturers</b>	<b>190</b>	<b>190</b>	<b>310</b>	<b>63,2%</b>
<b>Others**</b>	<b>390</b>	<b>400</b>	<b>430</b>	<b>7,5%</b>
<b>Total</b>	<b>7,140</b>	<b>8,220</b>	<b>9,010</b>	<b>9,6%</b>

Worldwide smart secure contactless market figures - 2013 & 2014 shipments and 2015 forecasts (million of units)

\*Others include Transport, PayTV and physical and logical access cards.

Of which contactless	2013	2014	2015f	2015f vs 2014 % growth
<b>Financial services</b>	<b>590</b>	<b>880</b>	<b>1050</b>	<b>19,3%</b>
<b>Government – Healthcare</b>	<b>200</b>	<b>230</b>	<b>260</b>	<b>13,2%</b>
<b>Transport</b>	<b>160</b>	<b>180</b>	<b>210</b>	<b>16,7%</b>
<b>Others*</b>	<b>70</b>	<b>70</b>	<b>70</b>	<b>0%</b>
<b>Total</b>	<b>1,020</b>	<b>1,360</b>	<b>1,590</b>	<b>17%</b>

WW shipment forecast	2013	2014	2015f	2015f vs 2014 % growth
<b>NFC Secure Elements</b>	<b>270</b>	<b>350</b>	<b>550</b>	<b>57,1%</b>

## EUROPEAN COMMISSION DECIDES ON NEW DIGITAL STRATEGY

Many companies in the secure document field are active in the digital economy. A new Digital Single Market Strategy, adopted by the European Commission in May, will make it easier to do business in this field by streamlining rules and levelling the playing field.

When Jean-Claude Juncker took over as head of the European Commission in May 2014, he promised to make a fully digital single market one of his top priorities. As the market data by Eurosmart shows (previous article) in some industries such a digital single market already seems to be a reality. But according to the European Commission, there are still too

many industries and areas where national barriers and regulatory differences hamper transnational access to digital commerce and services by people and businesses. Only 15% of EU consumers shop online from another EU country, only 7% of SMEs sell cross-border and businesses and governments are not fully benefitting from digital tools. The Commission thinks that a fully functional Digital



Single Market could contribute €415 billion per year to the EU's economy and create hundreds of thousands of new jobs.

The Digital Single Market Strategy, which the European Commission adopted in early May this year, aims to remove these impediments. It includes a set of targeted actions to be delivered by the end of next year. It is built on three pillars: (1) better access for consumers and businesses to digital goods and services across Europe; (2) creating the right conditions and a level playing field for digital networks and innovative services to flourish; and (3) maximising the growth potential of the digital economy. The three pillars contain a total of 16 key actions, among them the creation of rules to make cross-border e-commerce easier, enforce consumer rules more rapidly and consistently, create a more efficient and affordable parcel delivery, end unjustified geo-blocking and identify potential competition concerns affecting European e-commerce markets. It also sets out to create a modern, more European copyright law, initiate a review of the Satellite and Cable Directive and reduce the administrative burden businesses face from different VAT regimes.

The areas of the strategy that most directly influence companies working in the larger ID field are those that aim to reinforce trust and security in digital services, notably concerning the handling of personal data, including a review of the ePrivacy Directive. The strategy also proposes a partnership with industry on cybersecurity in the area of technologies and solutions for online network security. The strategy will support an inclusive digital society where citizens have the right skills to seize the opportunities of the Internet and boost their chances of getting a job.

A new e-government action plan will also connect business registers across Europe, ensure different national systems can work with each other, and ensure businesses and citizens only have to communicate their data once to public administrations, that means governments no longer making multiple requests for the same information when they can use the information they already have. This "only once" initiative will cut red tape and potentially save around €5 billion per year by 2017. The roll-out of e-procurement and interoperable e-signatures will be accelerated. Further information is available at [www. http://ec.europa.eu/digital-agenda/](http://ec.europa.eu/digital-agenda/)



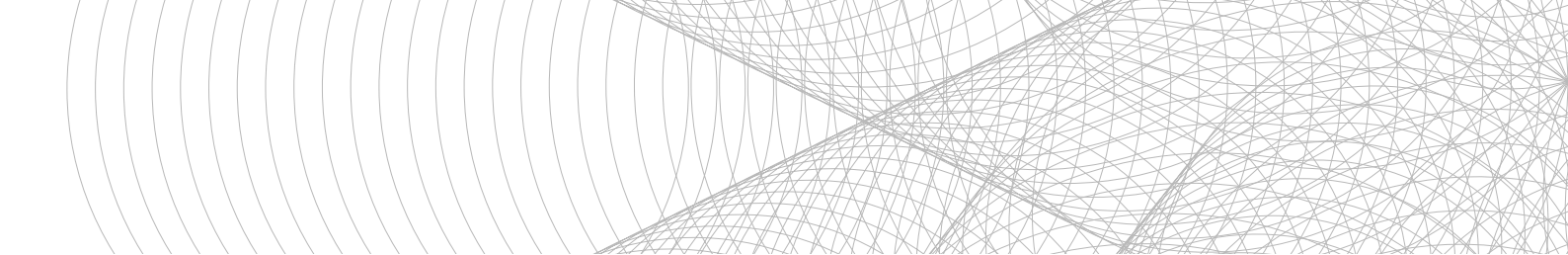
Most experts concerned with identity and security questions agree that standardizing birth certificates is a good idea. But from idea to reality is still a long way and having a good central citizen's register is as important as document standardisation.

The international community has made enormous strides in standardizing and upgrading travel documents, thanks mainly to the efforts of ICAO. But travel documents are only the last link in the identity chain and the strength of any chain is determined by its weakest link. In the case of identity management, this link is called breeder documents.

In an article in the ICAO MRTD Report 2014, Steven Griner lists seven keys to the identity management chain, which can form a basis for discussion of any standardisation of birth certificates. He starts with the universal principle that from birth, every child is entitled to a name, nationality and recognition of family relations, no matter what. However, according to UNICEF, nearly four in every ten births still go unregistered every year, contributing to the approximately 230 million children under the age of five who do not have a birth certificate. And not even nationality at birth is guaranteed for all groups in all countries.

The first of Mr Griner's keys is to narrow the time and space gap between birth and registration. The longer the distance required by the mother to travel to register her baby, or the more time that elapses between birth and registration, the more likely that this first live event will not be recorded. The second is to ensure complete and standardized collection of information. Information recorded for each birth should include the given and family names of the child, the date and place of birth and the names of the father and the mother. The United Nations Statistics Division (UNSD) has developed specific standards for information for legal identity and statistics. To guard against identity theft and exploitation, these standards recommend that information on a birth certificate should be limited to name, sex, date of birth and parents' names, addresses and citizenship.

In his third key he recommends that security elements should be included in a birth certificate,



such as those recommended in the 2012 ICAO technical document “Towards a Better Practice in National Identification Management”. In key four he said that attributed information needs eventually to be linked to biometrics when the child reaches adolescence. Biometric information includes facial features, fingerprints and iris recognition. Biometric is no panacea, but as technology improves and national legislation evolves, the use of biometrics can serve as an important, unique link between the individual and the birth certificate.

One of the most important keys is no. five, a centralized database. Civil registry structures vary considerably from country to country and many are maintained by the electoral authority or a ministry of the central government. The number of issuing authorities in a country ranges from one to several thousand, depending on the political system, population and other factors. By and large, adult identification databases, which include ICAO-compliant identification cards backed with biometric information, tend to be more accurate, dynamic and trustworthy than the paper-based civil registries.

Key six states that as a person enters adulthood, it is important to confirm that the identity is being used. Upon reaching voting age, did this person obtain a national identification or voting card? Has this person enrolled in school? Applied for a job? Collected government benefits? Just a few short years ago, civil registries were paperbased making verifying information cumbersome, if not impossible. Today, the dynamic use of these databases – with the requisite safeguards to ensure privacy and confidentiality – allow for a real time measure of the social footprint and a confirmation of the third and final principle of identity management.

And finally, key seven demands that internationally-accepted processes for civil registries need to be implemented. Technology provides a number of important tools to collect, maintain and update civil registry information. The technology is only as good as the information that it contains. The recently published electoral standard, ISO 17582, includes specific requirements for the procedural aspects related to the collection and maintenance of voter registry information and the use of national identification.

Griner days that inadequate identity management threatens to undo the important gains resulting from the ICAO standards agreed upon and implemented by 191 countries throughout the world. Improving technology, security and procedures will help accomplish both goals of ensuring the accessibility and the integrity of civil identity. The ultimate key, however, depends on the political will of

countries to strengthen identity management and the commitment of their civil registry officials at all levels to serve as the catalysts for change.

#### THE EU AND SECURE BREEDER DOCUMENTS

In a paper given at Intergraf’s Security Printers Conference in Copenhagen in April, Ronald Belser, of the Dutch Ministry of Security and Justice, endorsed many of the findings of Mr. Griner. He noted that previously, fraudsters were at the end of the process, after a document was stolen, but today, with highly sophisticated documents that are much more difficult to falsify, they tend to be at the other end of the process, creating a false identity and false breeder documents to obtain genuine passports. It took him much effort to convince the authorities that this was a real issue. In developing the subject further, he drew attention to two project of the European Union, called Fidelity and Origins. Fidelity started in 2012 and ends this year, and Origins started in January, to run for two years. The general objective of Fidelity is to develop solutions enabling faster and more efficient real-time authentication of individuals at border crossings. The project also investigates how breeder documents are issued and used by the EU member states where procedures are different in each country.

While Fidelity is a broader programme, ranging from the issuing of breeder documents to the use of e-passports in border control, Origins looks only at the registration and issuing process. The main object of Origins is to analyse the current use of breeder documents, with the ultimate aim to create a harmonised standard for breeder documents across all the member states. Results of this programme will hopefully be available shortly.

Creating a common standard for breeder documents, at least within the EU makes sense, but the lifetime validity of the documents alone ensures that counterfeiting will always remain a reality. To much trust in a paper document, however many security elements it carries, will always be a problem. It seems that a country-wide central birth and death - and general civil registration - database will be necessary to back any document up. It should be accessible to the relevant authorities within the EU and carry all the necessary privacy protection features. It would then matter less how secure even an old birth certificate is.

Of course, to hope that such a database would be available world-wide would be naive and the question of the identities of the countless migrants and refugees that enter developed countries will remain unanswered for some time to come. More information on Fidelity at: <http://www.fidelity-project.eu/page/project.php>





# The question of cash

**The news that Denmark wants to enable retailers to refuse cash has lead to soul-searching among central bankers, banknote printers, businesses and ordinary consumers. What are the pros and cons of keeping or abolishing cash?**

Cash is anonymous. This is one characteristic that makes it a favourite with American - and probably also European - libertarians that fear government interference in their affairs. However it also makes it a favourite of anyone who wants to hide the fruits of crime - or of simple tax evasion - from the authorities. In everyday life, neither consideration carried much weight with the majority of cash users. They used cash because it was convenient and they trusted it. Anonymity was not the primary concern, how to stretch a limited resource as far as possible was much more important. Now there seem to be doubts.

Although over the years there has been talk to include electronic chips in banknotes, which would be technically possible, any attempt to realize such an idea has been rejected out of hand, because it would destroy anonymity. However, as already said, for everyday living, anonymity is not very important and consumers in many European countries are increasingly forsaking cash for card payments or other non-cash payments, which are usually not anonymous. This has been going on for a number of years but recently the non-cash movement got a great boost, at least in the press.

## THE DANISH AVANTGARDE

In early May, a story went through the international press that the Danish Government had proposed to do away with the legal obligation for most retailers to accept payment in cash, which would bring Denmark closer to becoming a "cashless economy", although essential services, such as hospitals, pharmacies and post offices, would still have to accept cash under the plan. This is part of a pre-election package of economic growth

measures, aimed at reducing costs and increasing productivity for businesses, which the government is hoping to get passed by the Parliament for introduction next year. The measure is not likely to meet much opposition, as nearly a third of the Danish population uses MobilePay, a smart-phone application for transferring money to other phones and shops, and Sweden, Denmark and Finland lead in credit card payments per inhabitants in the European Union. Scandinavians rely on cash for less than 6% of all payments made. Cashless payments overtook those made with notes and coins in the U.K. for the first time last year. By contrast, around 47% of U.S. payments are still made with cash, according to the Norwegian central bank. In the EU, non-cash payments rose by 6% in 2013, according to data from the ECB.

The move would also be popular among Danish financial institutions. The Danish Bankers Association, Finansrådet, said it supports the government's proposal to partially eliminate the cash rule, as going cashless would save shops money on security and time on managing change from the cash register. It would probably also mean fewer bank branches, which are expensive for the banking industry. There are already a number of bank branches in Copenhagen that carry no cash. A cashless society is "no longer an illusion but a vision that can be fulfilled within a reasonable time frame," said Michael Busk-Jepsen, executive director of the Danish Bankers Association.

However, there are some fears that a complete move to electronic payment may increase the risk of fraud. In Sweden, for example, payment fraud cases have doubled in the past decade.

Denmark's biggest bank and owner of MobilePay, Danske Bank, to prevent fraud, has linked the app to NemID, a single login for public websites, online banking and many other websites and services.

Perhaps Denmark's Nationalbank, the Danish central bank, expected such a move sooner or later, as next year it will close its banknote printing works in Copenhagen, which is one of the few that uses web printing for banknotes.

#### HOW DO BIG ECONOMIES VIEW CASHLESS?

Within the European context, Denmark is a relatively small economy and the country, alongside its Scandinavian neighbours, is usually in the forefront of sociological and technological developments. How do consumers in larger economies view the trend towards cashless payments? Already in February last year, the German newspaper "Die Welt" warned that cash and debit cards (German EC Karte) would disappear by 2018. They will be replaced by payment via smartphones, an opinion that was echoed by many other papers. In early 2014 55% of purchases in Germany were still made using cash and the German Bundesbank said that the average German carried € 103 in cash in his / her wallet, € 5.90 of this in coins. In March 2015, according to Bundesbank Director Carl-Ludwig Thiele the use of cash at the point of purchase has stabilized at 53% of turnover.

Although this shows certain conservatism towards non-cash payments, there are many schemes by large retail chains and regional banks to entice German customers to use their smartphones for payments. The anti-cash side recently found support from Peter Bofinger, a member of a committee that advises the German government on economic questions. He called cash an "anachronism" and argued for its abolition.

Although German retailers have the means to conduct most, if not all, of their business cashless, their organisation is not in favour of denying customers the use of cash. The "Einzelhandelsverband" argues that customers still prefer cash and so retailers will concur. For retailers this also happens to be the cheapest method of getting paid. Credit card payments in Germany attract a fee of 3% of the purchase, while debit cards typically charge 0.25 to 0.30%.

Although paying small amounts in cash is welcome, in Europe as a whole there is a bias against large payments in cash. In Belgium and Slovakia, the highest amount that can be paid in cash is € 5 000, in Denmark, the limit is 50 000 Krone (€6 700) in Spain € 2 500 and in Italy € 1000. France plans to introduce a cash limit of € 1000 in September.

One important argument in favour of abolishing cash is that the anonymity of cash favours criminality. Carl-Ludwig Thiele of the German Bundesbank is not convinced. "I think that if cash were to be abolished, other means would be found. Ending the black (or shadow) economy cannot be achieved by abolishing cash and organized crime would survive without Euro-cash. It would switch to other currencies, or to precious metals, etc." Even eliminating large Euro denominations, such as the € 200 and € 500 notes, would not achieve much. "I could not find a significant reduction of criminal activities in countries that do not issue large denomination notes, such as the USA" he is quoted as saying at the 5th German Congress for Cash Logistic in 2015.

Another argument by economists is that without a cashless society it is difficult to implement negative interest rates. Negative interest rates require a depositor to pay a bank to hold his/her money, instead of receiving interest on it, or a bank to pay interest charges if it hoards cash at the central bank instead of extending loans to businesses. Negative interest rates for banks are designed to push money - or credit - into the economy. Negative interest rates for ordinary savers have the purpose of encouraging the savers to take their money out of the bank and spend it. But this only works in a cashless economy. If people can take cash out of their accounts and put it under their pillow instead of spending it for things they may not need at that time, the negative interest rate would not have the desired effect of kick-starting the economy.

Germany is very strong in the area of data protection and this is reflected by the attitude - private and official - towards cash anonymity. The Federal Representative for Data Protection and Freedom of Information, Andrea Vosshoff, argues strongly not to deny citizens the option to use cash. "The possibility to pay for goods and services in cash and thus anonymously is an important aspect of informational independence," she told the Kölner Stadt-Anzeiger. "When all transactions have to be cashless, it would be possible to construct an information path that would show conclusively how much and for which purpose money was spent. This would enable a complete profile of movement and consumption." Although this is precisely the aim of commercial organisations, not least in order to make targeted advertising possible and effective, it is not going to happen any time soon - at least not in Germany. As a leader of the retailer-organisation "Einzelhandelsverband" puts it: "In the year 2020 the portion of cash of total transactions will be under 50 %, but not by much".



# Indigenous Rupees

To give his 'Make in India' campaign a push, Prime Minister Narendra Modi wants the Reserve Bank of India (RBI) to turn 'Swadeshi' (self-sufficient) by ensuring that the security paper and the ink used for printing currency notes are manufactured domestically.



The old lion in India's national emblem and the new lion of "Make in India" above Arun Jaitley (right).

India is a huge country and its government under Prime Minister Narendra Modi seems hugely ambitious. To kick-off his campaign to rejuvenate India's economy, curiously named "Make in India" and with this slogan superimposed on the profile of a lion, rather than the Indian symbol of the tiger, Prime Minister Modi chose banknote paper production as a rallying cry for his campaign. Still, Modi seems to have a subtle point in choosing the lion over the tiger, as the only place where Indian lions still exist is Modi's home state of Gujarat, which is often held up as an example of efficient administration and economic success.



At the end of May, Modi's Minister of Finance, Arun Jaitley, officially inaugurated a new banknote paper line at the site of the old - and still only - banknote paper mill in Hoshangabad in Madhya Pradesh, designed to produce 6000 MT per annum. At the same time Jaitley sent off the first consignment of indigenous banknote paper for high denomination notes to the Currency Note Press at Nashik in Maharashtra to print Rs 1,000 banknotes. So far this mill had only made paper for low denominations.

India is the world's second largest producer and consumer of banknotes, after China. The country has four banknote printing works, two, in Nashik in Maharashtra and in Dewas in Madhya Pradesh, are owned by the Security Printing & Minting Corporation of India Limited (SPMCIL), a part of the

Ministry of Finance and two belong to Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL), a subsidiary of Reserve Bank of India (RBI), in Mysore in Karnataka and in Salboni in West Bengal. These four printing works supply the total of India's banknote requirements, 65% of the total is produced by BRBNMPL and 35% by SPMCIL. According to "The Hindu" newspaper, in 2013 this amounted to 19.103 bn banknotes, rising to 20.918 bn notes in 2014. Although self-sufficient in banknote printing, India relies for banknote paper and banknote security elements largely on imports.

Until this year, India imported 95% of its banknote paper from abroad, producing only around 2900 tons (approx. figure for 2011) in India itself, namely in the old Hoshangabad Banknote paper mill. India was therefore an important customer for banknote paper mills in Europe and elsewhere, but banknote paper was also an equally important drain on foreign currency for the Indian government. An Indian press source names Portals, which provided the know-how for setting up the original Hoshangabad mill, Louisenthal, Crane AB and Arjo Wiggins as European suppliers of Indian banknote papers, but it is likely that there are suppliers from outside as well. Another source mentions also Fedrigoni, Goznak, Landqart and PWPW and Komsco and PT Pura as Asian suppliers. The new banknote paper manufacturing line at Hoshangabad has an annual capacity of 6000 metric tons (MT) and Indian requirements are estimated at about 25 000 MT per annum, although it is difficult to say how reliable these figures are, as official statistics on this are not available. The real demand may well be higher. The new 6000 MT line will certainly not be enough to supply India's needs but Hoshangabad is not the only banknote paper line on the horizon.

The Hoshangabad mill has been completed on time and within budget (Rs 495 crore, or €70 million). According to a government press release, the plant is environment friendly with minimal use of power and water and without taking additional water from the nearby Narmada River, and the aim for the paper line itself is to achieve zero liquid discharge. It is an integrated facility, including pulp-making operations, for which the raw materials, such as cotton comber, linter and chemicals will be locally procured. There is also a state of the art laboratory to test the paper according to international standards before dispatch to the currency note presses.

#### LARGE PRODUCTION INCREASE IN MYSORE

In 2010, about one year before the start of construction in Hoshangabad, the ground was broken on a greenfield site in Mysore in Karnataka for an even more ambitious project. The two Indian banknote producers Security Printing & Minting Corporation of India Limited (SPMCIL), and Bharatiya Reserve Bank Note Mudran Private Limited (BRBNMPL), had set up a joint undertaking, called Bank Note Paper Mill India Private Limited for the production of banknote paper. The new factory, which was supposed to come on stream in 2014 but has now been delayed, probably until the end of 2015, has been designed to house two entire banknote paper production lines. Each of the two paper machines has an annual production capacity of 6,000 tons, a wire width of 2,800 mm and produces high-quality bank note paper with a basis weight of 90 g/m<sup>2</sup>.

In a presentation in 2014, BNPMIPL revealed its plans. The new paper mill in Mysore will not only be state of the art, it will be ground breaking in terms of environmental technology and economy. The aim is to make the mill totally environmentally friendly by achieving zero effluent discharge. If this is achieved it will be the first in the country and probably in the world. Minimum use of natural resources is part of the plan with water consumption less than 75 m<sup>3</sup> per ton of paper produced. Maximum recycling of water and an advanced treatment system as well as maximum recovery of secondary fibres from the effluent before sending it to the treatment plant will also be part of the environmental design. In the field of production economy, the mill is equally ambitious. The expected cost per ton of banknote paper produced will be around RS 7 00 000 compared to RS 9 00 000 for imported banknote paper.

While many newspapers in India said that three machines will be sufficient to cover India's banknote paper needs, the government knows that this is still far from the truth. Even when all three machines work at full capacity, the annual production will only be 18 000 MTs covering less than three quarters of the Reserve Banks requirements. At

the inauguration of the Hoshangabad line, Finance Minister Jaitley said that two further paper lines with a total capacity of 12 000 MT p.a. would be set up in Hoshangabad. So far that is just a project. Building the Hoshangabad line took about four years and the completion of the Mysore installation will have taken five years or more. This means that self-sufficiency for India's banknote paper production will not be achieved before 2020.

#### EUROPEAN WOES

For European banknote paper producers this is not welcome news. In recent years, paper prices have been under intense pressure and, unlike in India, in Europe, the use of banknotes is not growing. European producers have an edge in not only supplying banknote paper but also a wide range of security features. In this India still lags behind but prime minister Modi had exhorted Indian manufacturers to bring the best technology to ensure that the paper as well as the ink in the currency notes is Indian. "I want the RBI to take it up as its responsibility and take leadership. This is where Make in India starts," Modi had said recently at the RBI's 80th anniversary celebrations. With the government declaring the indigenisation of currency a thrust area, it has set up a steering committee under the RBI to suggest steps for the indigenisation of security features, the objective being 50% of the requirements to be produced in India within the next three years. Currently the Banknote Press in Dewas, Madhya Pradesh, makes the offset ink used for banknote production, while the ink for intaglio printing is procured from the Swiss firm SICPA, which has a manufacturing unit in Sikkim.

According to a press report, the Indian authorities have also decided to invite new and lower-cost companies such as KOMSCO (Korea) and PT Pura Barutama (Indonesia) to tender for banknote paper supplies. This will further increase the pressure on the traditional papermakers, as will the prospect of the introduction of polymer banknotes, which has been talked about for quite some times. A number of pilot schemes for circulating low denomination polymer notes have been planned for Kochi, Mysore, Jaipur, Bhubaneswar and Shimla but, although the RBI said that such notes would be introduced in 2015, so far they have not been issued on a large scale. With large new banknote paper capacities coming on stream in the near future, a total switch to polymer notes would not make much sense. However, as low denomination notes of Rs. 5, 10 and 20 are said to have a lifespan of under one year, switching these to polymer may indeed make economic sense, but it would run counter to the idea of 'swadeshi', unless one of the two established polymer substrate manufacturers could be persuaded to set up shop in India.





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# Our business is trust. Spread the word

Some time ago, central banks changed from keeping the details of security features on banknotes tightly under wraps to informing the public about what to look for when judging whether a banknote is genuine or not. It is a good policy, but it should go even further by informing journalists who are instrumental in forming public opinion, in greater detail. Germany's Papierfabrik Louisenthal did just that with its Media Day Banknotes in July.

above: production of foil based security features. All images : Giesecke & Devrient

European banknote paper makers are facing competition simultaneously on several fronts. Some of their most lucrative large customers are increasing home production of banknote paper, as the example of India (previous article) shows, depriving European manufacturers of reliable sales of important volumes of their products. Some countries are turning to polymer as their preferred banknote substrate - although this threat has been much reported, in volume terms it is still quite modest, as only 3% of world banknote production is on polymer. Finally, payment via mobile phone and a growing range of other non-cash payment methods are threatening to reduce the use of cash considerably and in the long run to do away with banknotes altogether.

The side of the bank-note paper machine at Louisenthal.



To counter the last threat, Papierfabrik Louisenthal decided to take its message to the people whose voices are more widely heard than those of ordinary money users: journalists of the general, the economic and the trade press. And the

message was clear: cash has a good future, it is a high-tech product and it is incredibly secure, 99.999973% secure, to be precise.

## PAPER AND FOIL PRODUCTION IN GMUND

Papierfabrik Louisenthal's Media Day Banknotes in late July, saw journalists from the German general press, economic papers such as the Financial Times and a wide range of trade journals for the banking and financial industries. The idea of the event was to show on the one hand how banknotes are made, what goes into their production and how secure the method of production and the final product is. On the other hand Louisenthal's and Giesecke & Devrient's top management was eager to show that even in economies where non-cash payments are becoming more and more common, banknotes are still vital for a smooth operation of the economy.

While journalists can be expected to have a fairly sophisticated understanding of the role of money - both cash and non-cash - in the economy, none of the assembled group had ever been inside a high security paper mill, where the physical basis for banknotes is being produced. The Louisenthal paper mill in Gmund on Tegernsee, in picturesque Upper Bavaria, close to the Alps, combines high



The beginning of the paper trail: raw cotton and (right) engraving the image for a watermark, which will be stamped into the wire mesh of the mould cylinder.



The production of security foil (left) and the application of colour-shift security threads onto banknote paper.



security paper production and an equally high security and high-tech foil plant.

printed on rolls of foil supports that are several kilometres long.

As much of the colossal paper machine is made up of the drying section, which is encased in a safety structure that not only reduces the noise level but also allows for the heat from the dryers to be recovered, the only part that really differs from conventional paper machines is the cylinder mould forming unit, where the mix of cotton fibres and water is pumped over the copper-mesh cylinder mould and on to the wire section, a metal web support that successively drains and strengthens the forming paper web. In this short section, not only the watermark is formed, but the various security threads are inserted. These large cylinders, which carry three-dimensional reliefs of the multi-tone watermark, are really the defining pieces of the banknote paper making process.

While the technical installations in Gmund were without doubt fascinating for (some) journalists, the presentations in the G&D headquarters in Munich were designed to drive the point home: cash is an absolutely necessary and vital part of a modern, functioning economy. One of the two legs on which our monetary system stands. But how does it work? From creating a small piece of art that hits the right cultural spots in the population and thus becomes a national business card, banknote design is a good starting point. Designing a banknote requires extensive research and dialogue with very different sections of the money-using public. And as G&D designs and prints currencies throughout the world, this requires an unusual amount of tact and empathy. If the designer gets it right, the currency is accepted and trusted, if not it can severely damage the economy.

Louisenthal's foil plant is, if anything, even more impressive. Foil-based security elements are an important part of Louisenthal's business and the company's investments in R&D in this field are massive. In 2014 they amounted to € 120 million and 1200 employees are engaged in this area. The result is an array of magnetic and optical security features with colour shift and otherwise kinetic effects, that can be seen on a large number of national currencies the world over. They are all produced in the near clinical conditions of a highly modern plant in which large rotogravure presses churn out secure foil elements with e.g. tiny mirrors that require almost zero register tolerances but are

There are many other subjects surrounding banknotes, such as the cash cycle and the requirements of central banks. The latter was brilliantly illustrated by Antti Heinonen, who was instrumental in the introduction of the Euro. As the public now has a choice of payment instruments it is more important than ever that it is well informed about the pros and cons of these choices. And one very efficient way of informing the public, is to inform the information-multipliers, the journalists. Louisenthal's and Giesecke & Devrient's example should be followed in as many countries as possible.



## Not new, but better

**The Polish National Bank decided on a Zloty make-over. Four denominations are done, one still to go.**

After an interruption of national existence of about 125 years and another 50 years or so of occupation and domination by Germany and then the Soviet controlled communist state, Poland had a need to reestablish a national identity and a justified pride in its history. For about twenty years now, the Polish currency has served as a kind of condensed history book for the nation. The series of Zloty banknotes that was issued after the demise of communism - it was officially the fourth Zloty series and was printed in 1995 - had a prominent portrait on the front of the notes, showing a ruler of Poland, from the founder of the country, Mieszko I (940 - 992) on the 10 Zloty note to Zygmunt the Old (1506 -1548) on the 200. On the front and back of the notes were important artistic, architectural, religious or historic artifacts, all designed to rekindle Polish national pride. The notes also had some features useful for handicapped people, such as graphic signs to identify the value of the note. And, of course the notes had watermarks, repeating the portrait of the front, a see-through feature that added up to a crown, security strips, intaglio printing, micro printing, metallic and optically variable ink, etc. Only the 100 had an additional gold foil feature, and the 200 Zloty notes had a hologram in the shape of a Renaissance cartouche, with the inscription "NBP 200", becoming visible when the note was tilted.

### A THOROUGH OVERHAUL

In 2014, Narodowy Bank Polski, the Polish National

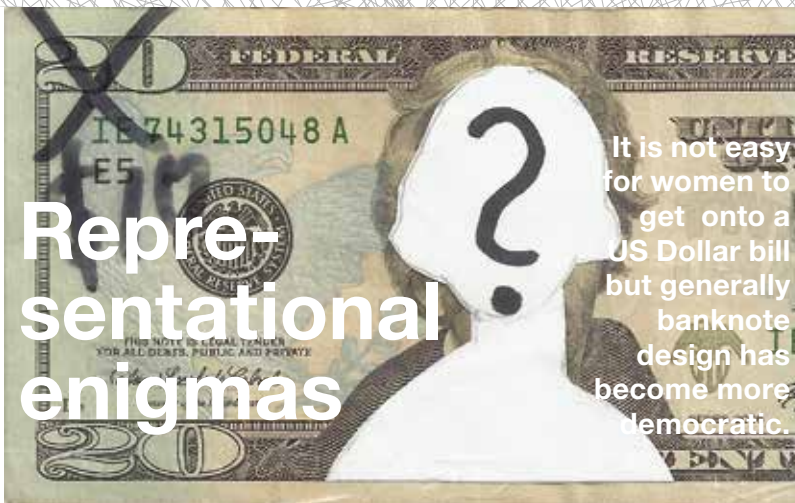
Bank, decided to upgrade all five denominations. The 10 Zloty up to the 100 Zloty notes are now in circulation in their modern form. The last note to be modernized is the 200 Zloty note, showing a portrait of Zygmunt the Old. It will be issued in 2016. The improvements can serve as a handy object lesson in the development of modern security features.

While the new version retains the watermark, the security thread with 200 ZL written on it, micro lettering, fluorescence under UV light, see-through register, a latent image, metallized ink and optically variable ink, the main visual change is in the hologram area. The hologram patch of the old version has been replaced by a wide kinetic security stripe (Louisenthal's Rolling Star) and to the right of this, a shield featuring the Spark Live element changes colour from gold to green in the same way as the security stripe. On the left and right edges of the note a number of short intaglio printed oblique lines has been added, similar to those of the coming €20 note. The triangle shape in the left corner, that serves as an identification aid for visually handicapped people, has been changed from solid lines to lines formed by dots with a cross in the middle.

While at first glance, the overall image of the note, and of the other denominations in the series, has not changed much, a number of improvements have been made. The watermark has been made much clearer, the see-through feature is now only visible as a complete crown when the note is held up to the light, and the latent image is much better defined. The changes in the last note of the series seem modest, as do the ones in the preceding denominations, but they are very effective in raising the quality of the note. And the central bank probably felt that a total redesign was perhaps not very wise in a still volatile financial situation in Europe.







The story in the last issue of Infosecura - "The faces on our money" - which, among others, mentioned the campaign by US women and Senator Jeanne Shaheen (D-N.H.) to replace Andrew Jackson on the US\$ 20 bill with the face of a woman, has had an unexpected postscript. CNN said on June 17, that US Treasury Secretary Jack Lew had announced that a woman would be featured on a Dollar note, but not on the one the women campaigners had suggested. Instead a woman's portrait would appear on a redesigned \$10 bill in 2020 - the 100th anniversary of the Constitution's 19<sup>th</sup> Amendment, which gave women the right to vote. Considering that this issue was raised in the Senate, the Treasury can hardly claim ignorance of the campaign, which explicitly mentioned the \$20 bill. By the time the Infosecura article was written, the online campaign had gathered over 600 000 votes and in April the Washington Post had written that the Senate would consider whether to support the campaign. The 'Women on 20s' campaign had voted to put Harriet Tubman's portrait on the banknote. Treasury Secretary Lew said no women had been chosen as of yet and he would announce before the end of the year which women will be thus honoured.

While there was considerable public support for the idea, there were also critics, especially of the choice of denomination. The \$10 was not good enough for many of the critics: they wanted the portrait of a woman to be on the far more numerous \$20 bills — there are nearly nine times more \$20 notes in circulation than \$10 notes, according to the Bureau of Engraving and Printing. And, many pointed out that a redesigned \$20 would leave founding father Alexander Hamilton on the US currency and displace instead Andrew Jackson, who was widely decried for "genocide" against Native American tribes and deserving of erasure, an article in the New York Times stated. "Women asked for the \$20 ... will get the \$10," one man posted to Twitter. "Even on currency women make half as much as a

man." The US Treasury said it was following advice from the Advanced Counterfeit Deterrence Project, which had recommended choosing the \$10. Whatever the outcome, there will be a woman's face on a dollar bill, after an hiatus of 134 years, when Martha Washington graced the 1 Dollar bill and she had to share the space with her husband.


#### THE UK IS LOOKING FOR VISUAL ARTISTS

Meanwhile the faces on British notes also have become a much talked about subject. For a period of two month, beginning on May 19th, the Bank of England had asked the public to nominate visual artists who they believe helped to shape British thought, innovation, leadership, values and society. In total 29,701 nominations were made, covering 592 eligible visual artists. The Bank of England's Banknote Advisory Committee will now consider all eligible nominations and, together with input from public focus groups, produce a shortlist of 3-5 names. These will then go to the Governor for a final decision. Both the Committee and the Governor will make their decisions with reference to the character selection principles announced in December 2013 and will only consider people nominated by the public. There is no guarantee nor great likelihood that the person chosen will be a woman.

The decision will be announced in spring next year, alongside a concept image showing the character's portrait as it will appear on the note. The new £20 note is expected to enter circulation by 2020. The Bank of England is also announcing that future banknotes, starting with the £5 polymer note in 2016, will include symbols representing all four of the home nations. The imagery will be taken from the Royal Coat of Arms and the Royal Badge of Wales. This follows discussions with the First Ministers of Wales, Scotland and Northern Ireland. The design will be released at the unveiling of the new £5 note next year.

Chief Cashier, Victoria Cleland said: "The Bank is delighted with the number and breadth of the nominations we have received, and we are very grateful to all those who have engaged with us on this new initiative. The fact that so many visual artists have been put forward by the public underlines the extent of British achievement in the visual arts and reinforces why this field deserves to be recognised on the next £20 note."

"During this process, we have repeatedly heard how important banknotes are as a symbol of the United Kingdom. So the Bank is pleased to announce today that after careful consideration future banknote designs, starting with the new polymer £5 note, will explicitly represent all four nations of the UK."



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