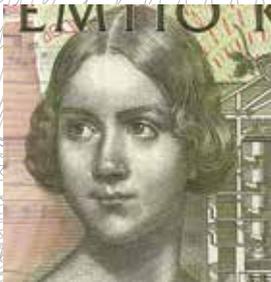


INFOSECURA



Faces on our money

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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It is a popularity contest



This issue of InfoSecura is about this year's Security Printers Conference and Exhibition, which took place in Copenhagen/Denmark, April 22-24. It was an excellent event from just about any angle, so said many delegates. Quite a number of technical papers in both the banknote and ID document areas presented genuinely new ideas and others described improved ways of doing things.

But the nagging thought at the back of the mind of your correspondent was: will all this improvement in security and the increased efficiency in production make cash more popular? Yes, the use of cash is still growing and the number of notes in circulation is increasing, but there is no doubt that non-cash payments are increasing even faster, especially among the urban young. If using cash becomes a question of generation, we have a problem. And we can be certain that an honest person who hands a counterfeit banknote in to the police and thus loses the money, will in future pay by card as much as possible, because the loss in case of a card fraud is borne by the bank and not by the individual. This is of course an additional argument in favour of making banknotes even more counterfeit resistant, but it is not an argument for making banknotes more popular.

We have to find ways to interest people in the money they handle every day. The story about the campaign to put a woman on the face of the US \$ 20 is a case in point. The process itself can engage the public, whether it wins or fails. The Bank of England has just announced a new democratic process to choose the image on future banknotes. It will, with luck, excite the interest of men and women across the British Isles.

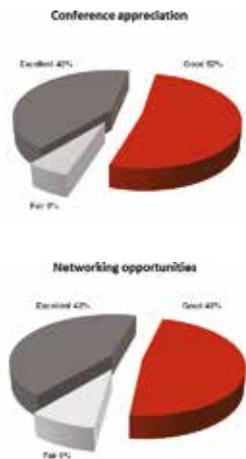
The Euro will have a harder time to engage its users. The design of the notes is anodyne on purpose, no national sensibility is to be offended nor favoured. Not many people in the 19 countries of the Euro zone will get angry about the design of the new Europa series. But no one will get very excited either.

Euro coins come in national variations and circulate freely in the whole Euro area without anyone objecting. Why not have nationally identifiable Euro notes with the image of an outstanding national personality or monument issued in one country and circulating freely in all others? Would a Lithuanian really be offended to see a Euro note with the portrait of Spain's Miguel de Cervantes on it, when he can expect to see a note with his national hero on it the next time he uses cash? Would it not be a little bit of a European education? Of course there is the question of counterfeiting. Various examples of the same denomination with different designs (at least on the face side) pose an increased risk of counterfeiting. However, there are now very well known, primary examples of security features that definitely signal that a note is genuine. The Spark feature is one, but there are others. There could also be a common watermark. Perhaps this is a silly idea, but it just may give citizens in the various countries of the Euro area a sense that they have a currency that respects their national identities and at the same time shows that they are part of a larger community.

Editor

The gathering of the industry

It was wonderful in wonderful, wonderful Copenhagen. Spring had arrived, around Rosenborg Castle the trees and flowers were in full bloom and along Nyhavn one could sit in the sun and admire the quaint sailing boats and drink beer. Many Copenhageners and foreigners did. But that was not the reason, security printers, their suppliers, delegates from Central Banks and law enforcement organisations had come to Copenhagen in the fourth week of April 2015. Their reasons were solidly professional.



The 26th edition of Intergraf's Security Printers, Conference and Exhibition, started on Tuesday April 21st, as always with the 'invitation only' High Security Printers Meeting. After a common plenary meeting, featuring presentations by, among others, the ECB and Interpol, it divided into a meeting focussed on banknotes and another one concentrating on identity documents. Each of the meetings was attended by close to 100 delegates. The subjects in the banknote meeting ranged from presentations on the design of the new Norwegian, Kuwaiti and New Zealand banknote series to talks by Orell Füssli, KBA Notasys, De La Rue, Gieseke & Devrient and Louisenthal, that focussed on banknote design, new security features and issuing subjects.

As banknote production is now defined by three factors, substrate, print and surface security elements, a panel discussion at the end of the programme, moderated by G&D's head of Banknote Printing Division, Bernd Kümmerle and with the participation of Hugues Souparis of Hologram Industries and Jean-Yves Ray of Sicpa explored the subject of cooperation or competition between substrate, print and OVD.

Fighting counterfeiting and new technical developments in passports, ID cards, identity management and even ID documents on smartphones characterized the programme of the ID section of the 'High Security' conference, with speakers coming from the International Centre for Migration Policy Development, the Dutch Police, De La Rue, the Government of Gibraltar, the Nigerian National Identity Management Commission, Austria Card, the US Department of State, as well as from Gemalto, OeSD, Iran's Matiran Company, and Oberthur Technologies.

THE CONFERENCE

The general conference, which unfolded in three days, from Wednesday to Friday, brought together 850 delegates representing issuing authorities and governments, the private sector, and law enforcement organisations from over 65 countries worldwide. Over 10 per cent of the total number of delegates represented central banks, ministries and police forces.

The structure of the conference illustrates Intergraf's thinking. Security Printers is an event that brings together the whole industry, banknote printers



as well as producers of ID documents and their respective clients from national central banks and the ministries in national governments that are charged with issuing passports and other official ID documents. And of course the suppliers that support either or both areas. While the client side

Both interest groups (Banknote & ID) meet in the joint plenary session at the beginning of the event on Wednesday, in the breaks, in the conference and the individual company stands in the exhibition hall and the social gatherings that take place along the three days. And with delegates from all

"The participation in Copenhagen was a big success for us. It was a good framework to discuss interesting projects with our clients and suppliers and a great venue to expand our network. For OVD Kinegram and Kurz, Intergraf is one of the most important events." OVD Kinegram AG

may be well separated, banknote issuers on one side and ID document issuers on the other, the ideas that foster progress in either area often come from private suppliers that are active in both sectors as well as from reports of experiences made by clients. Both sides have much to gain from listening to what the other sector has to say.

over the world, this makes Security Printers not only international but interdisciplinary. The prospects for cross-fertilisation are great.

There is a constant cross-currant between the presentations in the conference hall and the individual company stands in the exhibition. Both are of

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





The Sound and the Fury - The Copenhagen Drummers

equal importance for the information that the event aims to impart. Consequently, the first conference day offers presentations only for half of the day, the other half is reserved for visits to the exhibition. The second day is a solid conference day, as is the last one, with separate sessions for banknote issues and passport/ID documents.

Throughout the conference, 67 expert speakers discussed innovations, trends and new technologies in banknote and ID document production. The last session united both sectors again in a debate entitled 'from counterfeiting to cyber crime', moderated by Claudia Schwendimann, member of the Intergraf Committee of Experts and CEO of OeSD International. Discussing the dangers facing both ID documents and banknotes were Scott Gee of the US Secret Service, Georg Hasse, Head of Consulting, Division Homeland Security at secunet, Germany and Martijn Pluim of the International Centre for Migration Policy Development in Austria.

Delegates came from over 65 countries



HAVING FUN

Any conference needs content, but what adds hugely to the value of the event are the social occasions. The first chance to meet fellow delegates - and their partners - was the "Exhibition Aperitif" in the exhibition hall. Often, conversations at the stands effortlessly merged into talks

over a glass of wine or beer at the reception. But all talk came to a halt when the "Copenhagen Drummers" took to the stage with a spectacular performance of synchronized drumming, which even included pyrotechnics and aquatics. Drumming through water? Yes, its possible.

Even more spectacular was the Dinner Party, which was held in the historic Wallman's Circus Building, combining exquisite food with extraordinary performances by a troupe of talented circus artists, some of whom even doubled as waiters and waitresses. And after the food and wine and the stunning acrobatics and dance routines, the delegates took to the dance floor themselves with great enthusiasm. According to ad hoc sampling of opinions, they all loved it.

NEWS

Koenig & Bauer AG is turning itself into a management holding, spinning-off four operating subsidiaries including KBA-NotaSys. The four spun-off companies will have a German legal status of an AG & Co. KG (limited partnership) with the parent and holding as a public limited company and sole general partner. This means that the KBA employees who work specifically for the security printing division will become part of KBA-NotaSys entities in Lausanne, Würzburg and Mödling, gathering 680 dedicated specialists under one single brand.



"Our money does say something about us, about what we value. So together let's make our money egalitarian, inclusive and an affirmation of American values! Our hope is to generate an overwhelming people's mandate for a new \$20 bill, to be issued in time for the 100th anniversary in 2020 of the Constitutional amendment guaranteeing women the right to vote." (US campaign group "Women on 20s" - Womenon20s.org)

The faces on our money

The new Swedish Kronor Series is serious about gender equality, there are three notes showing women and three showing men. (Image: Sveriges Riksbank)

In a recent article on the BBC website (Magazine, 13 April 2015) the author, Elle Metz asked, which country has the least sexist banknotes. Sexism, here short for forgetting that women make up half of the world's population and are usually ignored when it comes to "serious issues", such as a nation's identity, seems indeed to be rife in the domain of banknotes. There are some countries that make an effort, and some even succeed, but in the biggest currencies in the world, e.g. the US Dollar, the Euro, the Indian Rupee and the Renminbi, women have not yet been noticed. For the Euro, this may be understandable, as picking one person to portrait on a note would upset the citizen of the 18 other Euro countries who's national champions have not been chosen, not even thinking about the headache, gender equality would cause. We are better off with architectural styles, the ECB probably thought.

But in some countries that have portraits on their banknotes, the gender of those honoured in that way has become an issue. The UK pound has had the Queen on all Sterling issues for much of her reign, as had the currencies of a number of

Commonwealth countries. But in the eyes of many, that almost doesn't count, as she is there as a symbol of the state, not because of some personal achievement or merit, almost like the mystical Britannia or Marianne in France. It is, however, a little more personal than that, as her portrait is regularly updated.

Until 2016 the UK will have the portrait of philanthropist Elisabeth Fry on the £5 note, but she will lose her place to Winston Churchill, when the note is reissued on polymer. The announcement of this made quite a furore in the press and after a public consultation the Bank of England decided to issue the next polymer note after the £ 5 with the £ 10 portrait of the 18th century English writer Jane Austen. In itself, not a very important story, but it shows that the public cares what is on their banknotes.

This public involvement in the looks of banknotes was echoed in Canada, when the "Canadian Journey" series of 2001 was to be replaced by a new series. The Canadian Journey series, which is still in circulation alongside the new polymer series,



Fair exchange? Canada swapped the picture of the monument to the “Famous Five” feminists and the medal of Thérèse Casgrain in the \$50 “Canadian Journey” series with that of an ice breaker in the new polymer series.

had a very modern design and featured a variety of Canadian themes, including “first Nation” art, but the only - indirect - representation of women other than the queen, is an image on the \$50 of a sculpture of the “famous five”, a group of early 20th century feminists in Alberta and of a medal showing the face of Quebec feminist Thérèse Casgrain. And even this almost imperceptible nod towards representation of historically important Canadian women was lost in 2011 to an icebreaker on the \$ 50 polymer note.

Meanwhile British Columbia writer Merna Forster has started a campaign to include Canadian women of historical importance on the face of Canadian banknotes. Referring to the current polymer series, Merna Foster said: “When we open our wallets and see the faces of four male prime ministers and Queen Elizabeth, the subtle message is that Canadian women aren’t worthy of being celebrated.” “Sexist banknotes are unacceptable in a country that boasts of being a world leader in promoting gender equality... If women are equal to men in Canada, they should be equally represented on our banknotes.” So far more than 54,000 people have signed a petition to put a woman on a banknote. The timing of such a move is significant. At the end of 2014, the Bank of Canada announced that it would issue a commemorative banknote marking the 150th anniversary of Confederation in 2017. The

bank invited Canadians to propose ideas for the design of the new note. “The commemorative bank note will be broadly available by 1 July 2017. Details on the denomination, the number of notes that will circulate and the means to obtain them will be made public closer to the issue date” the Bank said. However, as the design is to represent the specific theme for this special note - the 150th anniversary of Confederation - there is just a possibility, but no guarantee, that the next Canadian commemorative bank note will feature a woman. While the design of the current polymer series was decided internally, in 2014 the Bank of Canada has released a set of principles for banknote design which includes public consultation and for the planned commemorative note there is even a dedicated website where Canadians can make design suggestions.

UNSEATING ANDREW JACKSON

In the USA, women are totally absent from banknotes, face or back. To grace a dollar bill with your portrait, you have to be white, male and dead. The Department of the Treasury, that issues the US currency, obviously likes playing things safe. But even restricting the choice to founding fathers and presidents can cause offense. There is Ulysses Grant on the \$50 note, who was a president, but before that, he defeated the Confederate States in the Civil War. Abraham Lincoln’s on the \$5 was probably not the most loved portrait in the south

American reality and the American dream: Andrew Jackson on the current US\$ 20, perhaps to be replaced by Eleanor Roosevelt or any of the other women candidates, suggested by Women on 20s. (Image on right: Women on 20s)



either. But more contemporary anger is directed at the fact that all persons depicted on the US banknotes are male. With equality, be it racial, sexual or any other kind, one of the most dominant political forces of the current and of past decades, this policy is being questioned now. A campaign group called Women On 20s has collected 609 000 votes online to convince President Barack Obama to put a woman's face on the US paper currency, specifically on the £20, which currently bears the portrait of Andrew Jackson. Women On 20s proposed 15 inspiring American women and the online voters chose four of them to go to the final round of voting.

The four candidates are :

- Eleanor Roosevelt (1884 - 1962). She redefined the role of First Lady. She used her newspaper column, radio and speeches to champion civil and women's rights, often in opposition to her husband FDR's policies. As the US delegate at the UN, she drafted the Universal Declaration of Human Rights.
- Harriet Tubman(1822 - 1913). She was born a slave, and fled North to freedom, later making 19 trips back to the South as an Underground Railroad conductor, leading some 300 slaves to freedom. A nurse during the Civil War, she served the Union army as a scout and spy. She was active in the women's suffrage movement after the war.
- Rosa Parks (1913 -2005). Saluted by Congress as the "first lady of civil rights," she challenged racial segregation by refusing to give up her bus seat to a white man. Her arrest, and the ensuing Montgomery bus boycott, became symbols in the struggle for racial equality and civil rights in the United States.
- Wilma Mankiller (1945 - 2010) was Principal Chief of the Cherokee Nation and first elected female Chief of a Native American nation in modern times. Her 10-year administration, from 1985-1995, revitalized the Nation through extensive community development, self-help, education and healthcare programs for the Cherokee Nation's 300,000 citizens.

In a final election in May, Harriet Tubman was chosen as the favourite for the \$ 20 note. It was a good and noble choice. However, it would have been an especially apt act of historical revenge to have Wilma Mankiller replace Andrew Jackson on the \$20 note, as Jackson was the instigator and main enforcer of the Indian Removal Act of 1830, which "ethnically cleansed" native Americans, among them the Cherokees, from the American south east. The most infamous episode of this

policy was the "Trail of Tears" from Georgia and Alabama to (now) Oklahoma, on which an estimated 2000 to 6000 native Americans died.

On April 15, the Washington Post wrote that the Senate will consider whether to support the campaign to put a woman on the \$20 bill, after Sen. Jeanne Shaheen (D-N.H.) introduced a measure that would require the Treasury to "convene a panel of citizens" to discuss the idea.

"The incredible grassroots support for this idea shows that there's strong support for a woman to be the new face of the \$20 bill" Shaheen said in a statement. If passed, the committee created by Shaheen's bill would then advise the Secretary of the Treasury on its findings. The senator's office said the bill is a "complement" to a grassroots campaign that raised the issue of women on currency earlier this year.

SOME TRY AND SUCCEED

One way of escaping the need to balance gender on banknotes is to do away with portraits of real people altogether. Norway will and Denmark has gone this way, although Denmark had a very good record with the 1972 series featuring five women portraits among the six denominations and the last 1997 series being exactly balanced with two women, two men and one couple. The current series of Norwegian Kroners features two women and three men. The next Norwegian series, still in the design phase, will do away with portraits and concentrate on Norway's connection to the sea. Sweden has decided to stay with portraits on banknotes and to support gender equality.

Considering women make up about half of the population in all countries, having only one note featuring a woman smacks of tokenism, at least that was what Sweden's Riksbank thought. Consequently women appear on the 20 and 50 Kroner notes, while the 100, 500 and 1000 notes feature men. There is a commemorative note, honouring papermaker Tumba, which features a woman, but this is an allegorical figure representing Sweden. The new series of notes, which will be issued in 2015, will add a 200 Kroner note to the line-up and will feature three women and three men.

Australia has solved the gender question in an obvious but - for banknotes - original way, by putting a woman on one side and a man on the other on four of the denominations. Only the lowest one, the £ 5, features the queen and the Parliament Houses on the back. As the Reserve Bank of Australia is now planning a new series, it remains to be seen whether this admirable even-handedness will remain, but all indications are that it will.

The years 2013 and 2014 were difficult for the security printing industry in the whole of Europe but annual reports for 2013/2014 and for 2014/2015, where available, show that there are also encouraging signs. The three companies looked at here have energetically implemented reorientation programmes, which are beginning to show results.



Are the numbers getting better?

DE LA RUE ENTERS 2015 WITH A GOOD ORDER BOOK

After an already difficult 2013, De La Rue shows in its "Full Year Results" statement for the period up to March 28, 2015, that several key markers had further declined: Revenue fell from £ 513.2m in 2014 to £ 472.1m in 2014/15. In the same time span, underlying operating profit decreased from £ 89.3m to £ 69.5m and underlying profit before tax from £ 77.3m to £ 57.7m. Dividends per share declined from 42.3p to 25.p. Martin Sutherland, De La Rue's new Chief Executive, who had joined the company in 2014, commented in a statement just before the Full Year Results: "These results are in line with our expectations and include the benefit of further operational efficiencies. However, these have been outweighed by the impact of the challenging market conditions on revenue and operating profit across the Group." He continued: "In my first seven months, I have strengthened the leadership team and restructured the organisation to better align the business with its strategic needs as well as initiating a number of actions to achieve substantial cost savings which will be largely reinvested in the business to drive growth." He said that there is now a clear Strategic Plan to deliver growth and improved profitability in the long term.

Among the successes of 2014 was the signing of a 10 year print contract with the Bank of England and the return to underlying profitability of the Cash Processing Solutions unit. Banknote print volumes

were up by 5% to 6.5bn, however, banknote paper volumes decreased by 2% to 9,400 tonnes.

The 2014 annual report already noted that the company's polymer notes are gaining acceptance. De La Rue's polymer substrate "Safeguard" was introduced in 2012 and there are now seven central banks that are using it, among them Fiji, Mauritius and most recently Lebanon. The Clydesdale Bank in Scotland recently issued a new £5 note on Safeguard.

De La Rue has two divisions, Currency and Solutions, the latter is further subdivided into Identity Systems, Security Products and Cash Processing Solutions. In the 2014 financial year the Currency division produced 66% of the revenue and 69% of the underlying operating profit and "Solutions" contributed 34% of revenue of which 15% were generated by Identity Systems, 8% by Security Products and 11% by Cash Processing Solutions. De La Rue employs approximately 4,000 people worldwide.

STILL HURTING BUT RETURNING TO HEALTH

In the press release accompanying the 2014 Annual Report, Giesecke & Devrient bluntly states that its three business units, Banknote, Mobile Security, and Government Solutions, fell short of their earnings targets, although G&D was able to increase sales and slightly increase operating income. At 62 million Euros, the company's operating income for 2014 before restructuring costs, fell considerably short of projections, as was the case for the previous fiscal year. The sales for that financial year amounted to € 1.833,1m compared to € 1.753,6m in 2013. Of this the business unit Government

ERRATUM: As a follow-up to the article "Is printing money still making money?" in Infosegura No. 63, De La Rue pointed out that it was wrong to write that "it was now the job of (new CEO) Martin Sutherland to return the company to profitability". De La Rue has always been a profitable company, as a little later the article said that operating profit for the year ending in March was expected to be £69 m. The editor apologizes for this mistake.

Solutions contributed € 168m, the Mobile Security business unit € 778m and the Banknote unit € 887m. When adjusted for exchange rate factors, sales growth amounted to around 100 million Euros compared with the previous year. The Banknote and Mobile Security business units contributed equally to this growth.

This situation is unsatisfactory, the company said. G&D therefore launched a cost-cutting program in the second half of last year, named P100 project, which aims to improve the profitability of the company by 100 million Euros over the long term. These measures include the closing of the Munich production plant in 2015, moving the Euro production to its Leipzig plant and creating a "Centre of Competence" for security solutions in the banknote domain at the Louisenthal site. The changes also mean the loss of about 950 jobs, 630 of which are to be made in Munich. G&D has currently 11 453 employees worldwide. G&D has also made structural changes to the company to enable it to better meet market and customer requirements in future.

Apart from the reorganization of the Mobile Security business unit and the realignment of the Government Solutions business unit, G&D's reorganization of the Banknote business unit, which became effective on April 1, 2015, aims to pool its expertise with regard to the two issues of "Solutions for new banknotes" and "Solutions for banknote processing." By launching Veridos GmbH – a joint venture between G&D's Government division and the German Bundesdruckerei – G&D is also bundling its international activities in the field of government security documents and ID solutions.

The company said that in addition to the implementation of the cost-cutting programme and the structural changes made to help the company move forward, the incoming orders at the end of the year, the growth markets in Asia and North America, as well as increasing sales opportunities in future fields – such as mobile payment – allow for a positive forecast for G&D. G&D is continuing to invest in all business units, in order to secure its position as an innovation leader and continue to expand its leading market positions.

GAINING HIGHER GROUND

The Swiss Orell Füssli Group also found that it had left the depth of 2013 for a little higher ground in the financial year 2014, reporting higher net revenues and positive operating earnings after the heavy loss in the previous year. The implementation of the reorientation initiated by the company and the focus on improving business processes thus showed initial positive effects. The improvement in stability and productivity at Security Printing made a significant contribution to this outcome.

The group's Security Printing Division, headed by Dr. Dieter Sauter and Philipp Seewer, posted net revenues of CHF 92.7 million, an increase of more than 23% compared to the previous year (CHF 75.1 million). This was achieved primarily as a result of generally more stable production and high output in the final quarter. Production capacity is fully utilised for 2015. Operating earnings before special items amounted to CHF –1.0 million in 2014 (CHF –12.9 million in 2013), and operating earnings (EBIT) to CHF 0.6 million (CHF -25.0 million in 2013). Compared to 2013, the productivity was raised and initial print runs of new series of banknotes for two key customers commenced in 2014. Additions to the machinery portfolio eliminated major bottlenecks from the past and additional process engineering specialists were recruited.

Orell Füssli owned Atlantic Zeiser, under CEO Manfred Minich, with its business segments of banknote serialisation, card systems and packaging, reported net revenues of € 60.9 million in 2014 (€ 63.8 million in 2013), equivalent to a decline of 5%. Operating earnings before special items amounted to € 1.8 million (€

3.4 million in 2013), and operating earnings (EBIT) to € 2.1 million (€ 3.4 million in 2013). The reasons for this development were on the one hand lower sales in card systems, while at the same time the development of the market for systems solutions for Track & Trace for the pharmaceutical industry was less dynamic than had been forecasted. In Europe this was due to uncertainties over the timing of the effective date of a relevant EU Directive regarding anti-counterfeiting security and serialisation of drugs. In conjunction with the rising order intake in the closing months of the year under review, the foundation has therefore been laid for a positive development of sales and profits in 2015.

THE BATTLEGROUND

To put the subjects of the annual reports into context, here is a short overview of the banknote market. Worldwide, the demand for banknotes is increasing by about 4% p.a., however demand growth in Europe seems to be lower. The majority of banknotes and banknote substrates are manufactured by state owned printing works and state owned paper mills. If either of these are unable to meet their own production quotas, they may turn to private banknote or substrate suppliers to make up any shortfall. This is known as "overspill".

The main factors governing the production of new banknotes are firstly the replacement of notes "unfit for circulation", followed by economic changes affecting GDP and the use of cash as means of payment. The retirement of notes is affected by, e.g. changes in note design, e.g. issuing a new series or changing the denomination structure, changes in cash circulation policy and technology, introduction of new security elements, increased use of ATMs, which may require notes to be in good condition, and changes in 'clean note' policy.

According to figures given in the De La Rue Annual Report 2014, about 157 billion banknotes are produced worldwide. Of this state printing works produce about 85%, with an overspill of 2%. The commercial print market amounts to 13% of the total. (The ECB orders between 6 billion and 8.5 billion notes to be produced annually, by state printing works as well as by private banknote printers. The execution of the print orders is the responsibility of the National Central Banks of the members of the Euro area.)

The global substrate market amounts to about 157 000 tonnes p.a. of which state paper mills supply 48%. The 'overspill' from state paper mills is 6% and the commercial paper market is 43%. Polymer banknote substrates amount to 3%, all supplied by private companies.



A Polish salute to spring

Although spring comes a little late to Warsaw, Polish security printer Polska Wytwórnia Papierów Wartościowych came with a spring offering to the Intergraf Security Printers Conference in Copenhagen, where at that time in April, spring was in full swing with flowers and blossoming trees. PWPW's offering was its new sample note, a beautiful and highly romantic design harking back to the arts and craft movement of the late 19th and early 20th centuries. The story behind the design was the despair of Demeter, the Greek goddess of fertility, earth and abundance over the abduction of her daughter Persephone by Hades, the god of the underworld. The poppy that dominates the face of the note is the symbol of Persephone, while the iris, the main image of the back of the note, is connected to the goddess of the rainbow, Iris. These two flowers are the main focus and also the principal message of the sample note: the possibility to

print highly complex and aesthetically very beautiful images in three-colour intaglio.

The sample note displays a range of printing techniques and security features. The face side, the one with the poppy, shows the words Polska Wytwórnia Papierów Wartościowych, a scientific drawing of the poppy and its seed pod and its seeds as well as the green leaves surrounding the red flower printed in intaglio going from brown to green. The poppy itself has a depth-modulated red background and the defining lines printed in brown, all printed in intaglio. A brown leaf at the bottom of the plant shows the "denomination" number 13 as a latent image also in intaglio. The 13 is repeated in screen printed optically variable ink. Just above this is a multi tone watermark of the head of Demeter with an electro type 13, repeating the denomination. A see-through register security feature and very fine microtexts in offset complete the picture.

The most prominent image on the reverse side is the three-colour depth-modulated iris flower accompanied by scientific drawings of the stamen. A Spark image of an iris and a Motion stripe, as well as the other half of the see-through feature and the denomination number in positive and negative microtext, printed in offset, complete the line-up of security features.



None of the techniques and features used in this sample note is new but they are presented in a very beautiful and pleasing way. They serve as a reminder that banknotes can give aesthetic pleasure, an advantage our products have over electronic cash transfer or payments by mobile phone. And in the fight for the preference of users, banknotes need to exploit any advantage they can find.

A sparkling Oasis

At the Security Printers Conference in Copenhagen, Sicpa presented an optical security feature that adds visual brilliance and deep levels of security to passports, ID cards and even product security in a new application of a trusted technology.

Swiss security ink company Sicpa in Lausanne has an enviable track record in developing security features for banknotes and passports that are eye catching and easily verifiable. One of the most successful and easily recognizable features the company developed is Spark, that can be found on banknotes from the new Euro Europa series to banknotes from Ghana to Brazil or Peru and many other countries. Now Sicpa has come up with another feature that employs its optical colour shifting inks, which the company presented at Intergraf's Security Printers Conference in Copenhagen in April. This one is designed to be used in ID and other security documents.

Sicpa felt that in different ID security documents there was a need for a sophisticated authentication device that would work on the three security levels, the overt, the semi-covert and the covert. Moreover it needed to be a device that was not stand-alone but one that could be totally integrated into the design of the banknote or document but still remain striking enough to be immediately noticed among the other design elements. This was the start of the design process that led to a new application of OASIS.

Typically for Sicpa, the company chose very sophisticated science for OASIS, in this case liquid crystal technology. Liquid crystal is a state of matter that has properties between a conventional liquid and those of solid crystal. It is most commonly used in electronic displays and some forms of liquid crystals have very remarkable optical properties

Sicpa's Oasis is designed for passports but also for ID cards and even for securing product packaging

and these Sicpa has exploited for this security ink system. OASIS is a translucent ink system, but although translucent, the ink comes in four different shades, blue to colourless, gold to green, green to blue and red to green. By printing the inks on a background of different colours, an endless variety of design solutions can be reached.

The real magic of OASIS, however, are its light-polarisation properties. What looks like a single colour to the naked eye, morphs into another under the polarisation validator. With only two inks, four colours are visible when the image is tilted. When looked at under the polarisation validator, a further four colours appear. The result is a total of eight colours with only two inks.

For a designer who has only very limited "real estate" on a security document at his disposal, this is a really liberating development. The design possibilities, when combined with background colours and additional security elements that can be integrated into the design, are virtually limitless. Sicpa's OASIS can be printed in screen printing, flexography or gravure and it is suitable for printing on a variety of substrates, including plastics.

THREE LEVELS OF VERIFICATION

A successful security element needs to be verifiable on several levels, and OASIS satisfies this need on all three levels. On the overt level for the general public, OASIS offers an obvious colour shift when the document is tilted. The semi-covert level functions through a light-polarizing validator, either a credit card sized device or a handheld polarizing flashlight. The third, covert, level is addressed by two handheld devices, the HD10 and the HD 20 that validate respectively the ink's polarisation properties or the presence of SICPAGUARD, if it has been added and a high-speed the OD10 for online or offline validation. To increase the level of security even further, fluorescence and infrared features as well as magnetism can be added. While Sicpa maintains that the ink system cannot be reverse engineered, an even greater security factor is the super secure supply chain.

Sicpa's OASIS is designed for a variety of products, from passports to product authentication.





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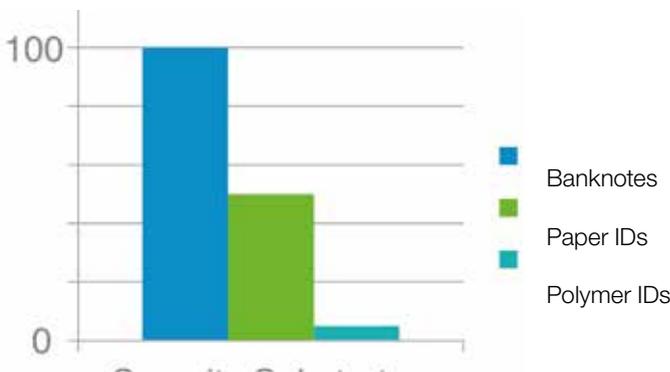
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The security technology focus for polymer ID documents is usually the surface of the card or data page rather than the body of the document substrate. The technology is there to make the substrate itself as secure as the various printing and foil technologies that go on top of it.

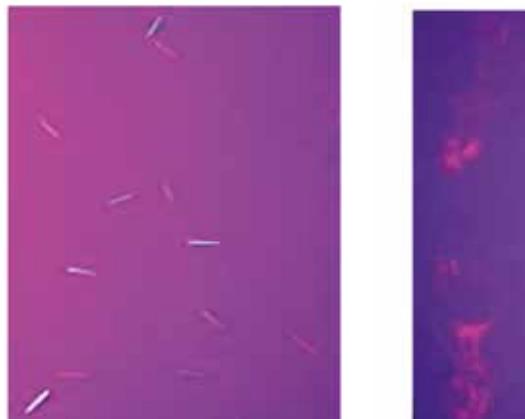


Deep security for polymer



Level of use of security substrates

No one in the banknote or secure document industry could imagine printing a banknote or passport on ordinary paper, however many security elements we pile on top of the substrate. But when it comes to secure documents on polymer, only few have such qualms. Under 10 per cent of plastic ID documents are printed on security polymer. The reason may well be that polymer is a relatively new substrate for security printers and issuers, and consequently there is a lack of



Due to high temperatures and high pressure during polymer manufacture, UV-fluorescent fibres will melt or be cut into small fragments and thus be no longer visible as fibres.

knowledge, making printers believe that the choice of plastic alone, be it PC, PVC, PET, ABS, etc., guarantees sufficient security. Plastic is often seen as the next step in the evolution of security documents and as a 'modern' material it has to be inherently more secure than old-fashioned paper. That is clearly wrong.

Polymer sheets need security elements just as much as paper sheets do in order to be secure, but due to the entirely different manufacturing process, the security elements that work well and are well known in paper do not work in polymer. In the manufacturing process, polymer is exposed to very high pressure of up to 2000 bar and to high temperatures up to 300°C while both pressure and temperatures in paper manufacture are much lower.

A HARSH MANUFACTURING ENVIRONMENT

Were one to imitate watermarks in plastic by embossing the material, the relief would soon disappear through melting in the lamination process. UV-fluorescent fibres will also melt or be cut into small fragments and thus be no longer visible as fibres. There is, however, a whole range of other security devices that work very well in polymer substrates especially in the transparent grades.

Polymer printing substrates are made by mixing and melting polycarbonate granules and forming a continuous web in the extrusion unit, after which the material passes through a calender stack and a cooling unit before being wound into a roll. Both the in-feed silo and the extrusion unit can be the entry points for security elements which may be ceramics, minerals, metals, alloys or dies. The latter are added in pure condition in the extrusion unit.

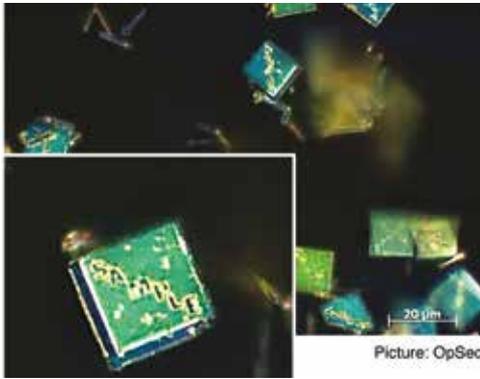
Among the features added at the polymer granule stage are metallic micro holograms that are visible

The only level one feature for security polymer: metallic micro holograms that are visible with the naked eye as glittering particles.

(below) Micro particles are only 10 µm wide and not visible with the naked eye. They are added at the granule mixing stage.



Picture: Optaglio



Picture: OpSec

with the naked eye as glittering particles, making this the only level one feature for security polymer. Closer examination under 100 x magnification reveals the ca. 90 µm holograms to be engraved. The concentration is about 10 holograms per cm of substrate. Significantly smaller, and not visible with the naked

eye are micro particles, which are only 10 µm wide and which are added at the same stage.

Another security feature that can be added are fluorescent particles in which the fluorescence is activated at 450 to 480 nm, which does not interfere with UV fluorescent features added to the surface of the security document. Three further classes of particles that can be added to the polymer in manufacture are firstly anti stokes crystals, that turn IR (infrared) light into visible light. The additive is activated with an IR laser at 960 to 980 nm. Secondly there are magnetic resonance particles, whereby the low concentration of particles in the polymer substrate interferes with the magnetic field of a dedicated reading device. The authenticity of the document is shown visually, by a green (or red) light and by an acoustic signal. Lastly there are photochromic dyes, which are UV light reactive and can be used for polymer substrates with a melt temperature of 190° C. UV light turns the material blue, colouration that is quickly reversible.

Although about half of all ID documents are printed on polymer substrates, only a small proportion of these are printed on special security polymer. The technology is there to make polymer ID documents even more secure. It should be used.

This article is based on a paper given by Georgios Tziouvas of Bayer MaterialScience AG at the 2015 Intergraf Security Printers Conference and Exhibition in Copenhagen.

COMPARING PORTRAITS

There is no single magic bullet to fight passport fraud. Only the use of a whole array of proven and new personalisation elements will beat the fraudsters. There are some new security features that will be useful in the arsenal of border personnel.

The actual number of passports in the world is probably unknown, but we know that Interpol's SLTD (stolen and lost travel documents) database contains over 45 million entries and was interrogated 800 million times last year. These numbers are very large, but they should be even larger as many countries still do not routinely use the Interpol SLTD database. Stolen passports are not only used to gain entry to a country illegally, they are the starting point and the enabler for a large number of other crimes.

The point where an illegally held passport meets the first line of legal defence is at a border crossing or airport. The inspection should not take more than a few seconds, even if the border post is remote, the conditions are far from ideal and special tools are not available. The inspection should also reveal



the holder's recent travel history and whether entry into the country is permitted or not. Identification implies that the border inspector looks closely at the travel documents, verifies the information and the integrity of the document and compares it with the actual person. The inspector must assume - as he/she cannot check this - that the document was legitimately obtained on the base of relevant breeder documents, such as birth certificates.

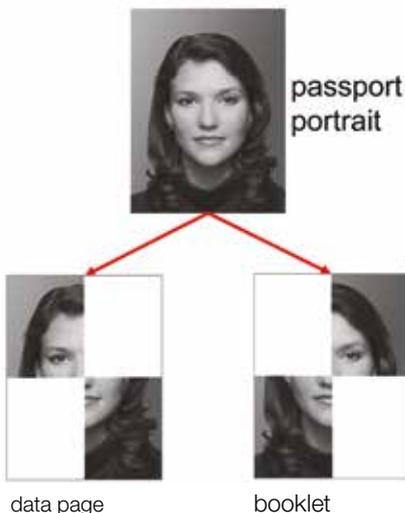
The passport book is thus key to identification and the examiner must verify the integrity of the

whole book. There is an integrity chain with information being repeated on the data page, the MRZ and the chip and any discrepancy within this chain points to an altered or counterfeit document. Even if there is no discrepancy in the information, e.g. in the visible portrait and the one contained in the chip, the comparison of the portrait and the holder will show whether the latter is the rightful holder or not. It is also highly recommended that there should additionally be a link to databases. PKI (Public Key Infrastructure) is used to check the certification chain and revocation list and there is also a link to Interpol's SLTD database. Finally there is the information on the visa pages, which shows the travel history of the holder and whether he has the right to enter the country. ICAO's LDS2 offers the possibility of storing visas in the passport chip, but it may take some time before this is generally applied.

DOCUMENT INTEGRITY

Document integrity is key and multiple portraits are standard procedure. There is always a principal portrait on the data page and in an e passport it is also stored on the chip. It is recommended that there should be a secondary portrait on the data page and well known examples of this are MLI or CLI with a flip effect, ImagePerf and SLI (Stereo Laser Image), a stereoscopic portrait by Morpho. Some forms of secondary portraits have a 3D effect or they can even be put in a transparent window as is the case with Trüb's 'tru/window LOCK' element of a negative portrait produced by selective laser ablation. Looking through the positive image enables comparison of the second and the primary portrait. An example of this can be found on the driving licence for Washington DC. To give another example, the Swedish passport has six portraits, providing a very strong barrier against counterfeiting.

The tru/window VERIFY feature, jointly developed by Trüb and Orell Füssli.



Counterfeiting or forging a passport often requires a book to be taken apart and here are some optical features that can assure that any disassembly is easily detected. Under UV light, page numbers, often within a patch, line up to form a «step» feature and the thread used for sewing the book, can have UV features. A printing register is also something that can be applied as well as personalised information such as a printed or perforated serial number, and duplicate information.

In terms of the physical link between the data page and the booklet, there are interesting examples of a data page being extended over two pages. There needs to be a reliable mechanical connection between the pages and they should also be flexible because they

will need to be flipped. Integrating the data page into the book presents a manufacturing challenge, as the paper of the visa pages and the polycarbonate of the data page have very different properties. The company Trüb, now part of Gemalto, offers VisiFab UV technology, in which the fabric of the booklet has interwoven threads that react to UV and any attempt to cut or interfere with the pages can be seen. VisiFab UV also includes printed elements.

A new feature for secondary portraits developed by Trüb and Orell Füssli, called tru/window VERIFY distributes personal information over two pages. One part of the information is personalized within a see-through window on the data page, while the remaining personalized information is placed on the adjacent page. Placing the data page on the adjacent page reveals the complete information. Any tampering with the images becomes visible as replacing the first or the second part of the image would lead to an improbable portrait when both are placed on top of each other.

A number of options are available for implementing this feature. Where there are two sub images with portrait information, the second can be placed on the back of the front cover or on the first visa page. For example, the data page can be composed of two sub images and should the passport have been changed, the portrait would not be recognised as being valid. There is even the possibility of having three sub images to link three pages together, where the second sub image would be on the end paper and the third would be on the first visa page. In the example given, document data and holder data are placed in the window and when you look through the window you see date of birth, document number and the person's name. The images can be presented in different techniques, with laser engraving in the window and inkjet printing on the paper, for example.

The advantage of the feature is that it is self-explanatory. Verification is by human eye without any need for tools. The threat of passport manipulation is unfortunately real and the question is whether the document holder is presenting a legitimate travel document with an unaltered travel history. Checking the linkage of the data page to the booklet is therefore very important and Trüb's and Orell Füssli's new feature, tru/window VERIFY, provides layered personalised information that can be implemented as a means of addressing these challenges. This comes with a very rapid verification process using the human eye as an inspection tool. It also comes with a very high degree of freedom for implementing customers' own designs and security concepts.



Double Window

The time when a transparent or semi-transparent window in a banknote or security document substrate was considered to be a sufficient security feature in its own right is over. There are many highly complex things that now go into windows and Swiss security printer Orell Füssli has just introduced another sophisticated one.

TwinImage is an optical first level feature that is verifiable without additional tools.

When the first Australian dollar note printed on a polymer substrate was issued 25 years ago, the clear window in the note was a sufficient security feature to deter baffled counterfeiters. Meanwhile many have learned to fake not only the polymer substrate but also the clear windows. However, windows became something of a must-have in banknote substrates and even cotton banknote paper soon sported windows, such as Louisenthal's Varifeye and the company's Hybrid paper/polymer/paper substrate and Landquart's Durasafe polymer/paper/polymer

combination. The two latter substrates can have any kind of window or half window anywhere the designer wants or is allowed to have it. And of course, both polymer substrates Guardian by Innovia Security and Safeguard by De La Rue feature windows extensively.

With such a proliferation of windows in banknotes and even ID documents, makers of traditional security elements had to struggle to fill these windows with things that counterfeiters would find hard to copy. One of the very spectacular applications

of existing security features that emerged was the zero-zero image by OVD Kinegram on the last series of Canadian banknotes, a refractive part-demetalized image visible on both sides of the clear window, that visually splits the polymer banknote from top to bottom.

ONE WINDOW - TWO IMAGES

Swiss security printer Orell Füssli is developing another optical feature for windows in banknotes and ID documents that shows one image when the window is held against a light source and another when the background against which it is viewed is dark. The feature is called TwinImage and it was presented at Intergraf's Security Printers Conference in Copenhagen in April. It is based on colour models that predict the colour resulting from printing images on both sides of a transparent or semi-transparent substrate. TwinImage shows different visible images depending on the illumination as illustrated by the series of images at the top. A first image is seen in transmitted light with a light source illuminating the back of the feature showing William Tell. When progressively changing the light source position to see the sample in reflection mode, the first image disappears as illustrated in. When seen on a dark background or seen in reflection, a second image is visible as shown.

As only very simple changes in lighting are required, the device is a typical level one feature, enabling the public to easily verify the authenticity of a document. Simple visual inspection is sufficient. The two images are visible to the naked eye, no special tool is required to quickly and clearly check the feature under standard illumination. The feature cannot be copied by standard reproduction techniques: it consists of two structures printed on the front and reverse sides of a transparent or semi-transparent substrate. Both sides are inextricably linked and the individual images cannot be digitized by means of a scanner.

SIMPLE, INEXPENSIVE APPLICATION

Orell Füssli claims that TwinImage combines a high level of forgery protection with a simple and cost-effective implementation. The security element can be printed in a single pass with a standard printing process, using standard security ink and halftoning method, through common security printing presses, such as the KBA NotaSys Super-Simultan

offsetpress. The high-precision register of such a machine is required to print the images on both sides of the substrate, as a small register deviation between both sides leads to visible disturbances in the transmittance image.

TwinImage offers a large spectrum of creativity. The security element can be easily integrated into banknote and ID document design concepts. The choice of subject ranges from photographs, images, illustrations, logos to texts that can be combined into a single feature. A special further extension consists of using invisible UV inks printed on the opposite side of the substrate.



A further interesting variation the feature offers is to print an image on one side with standard inks, such as Marilyn Monroe here, and another image on the other side using ultra violet inks. Under daylight the image

printed with standard inks is visible and under UV light, the second image, in this case, Michelangelo's David, appears.



It is also possible to print any other message, such as numbers on one side of the window and letters or logos on the other, using either standard inks or UV inks. One set of images will be seen in transmitted light and another in reflected light.

TwinImage seen in transmitted light (left) and seen against a dark background (right)



Art in small spaces



Hans Erni's reserve series of the Swiss Franc of 1945 and 1950 and his later series of stamps for the Swiss Post Office.

On March 21st, the Swiss painter, sculptor and graphic artist Hans Erni died, aged 106. In over 80 highly productive years he created an oeuvre that made him one of the most popular artist of his country, although he was never considered by the art world as one of the "great" artists of his time, for that he was too easy to understand by the "common man". But his work embodied a certain idea of Switzerland and many of his works can be found on public buildings, schools etc.

What makes the work of Hans Erni relevant for the security printing world is the fact that he was a prolific designer of postage stamps and that he also designed a reserve series of the Swiss Franc in the time between 1945 and 1950. Comparing the banknotes of the 40s with those of the current series of Swiss Franc shows how far banknote design has travelled in about 45 years. The current 8th series was introduced in 1995 and is expected to be replaced next year.

The main difference between then and now is probably the visual simplicity of the Erni note - one image; a farmer and his bull, a chemist and a

turbine - with clear allegorical connotations. The images are very well drawn and engraved and they have the single message to show the importance of their subject within the Swiss economy.

Contrast this with the present Swiss Franc series. Instead of one farmer to represent all of Swiss agriculture, there are images of known personalities, representing art, architecture, etc., shown as a portrait and in their work environment. On the reverse side there are almost abstract, multi-layered images again referring to their work. All is presented in many different hues of the main colour of the note, tracing the move from visual simplicity to complexity of the Swiss currency.

The postage stamps Hans Erni designed are of a different kind. They were done much later in his career and they clearly show the painterly style of his maturity. There are often white lines describing and intersecting figures he paints and the image they convey is often that of "élan" and "joie de vivre". He once wrote: "I am convinced that it is possible to express something even on the smallest space—supposing that you have something to say."



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