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Conference on Optical Security and Counterfeit Deterrence 2010

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Editors:

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Proceedings of the Conference on Optical Document Security II

Palace Hotel, San Francisco, 20-22 January 2010

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Conference Website: <http://www.opticaldocumentsecurity.com>

TIP: for ease of navigation, open bookmarks with author names

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|---|----------------------|
| 21 JANUARY 2010 – SESSION I: CURRENCY I | |
| SESSION CHAIR: Sara Church – Federal Reserve Board (USA) | |
| Innovative Approaches to the Selection of Banknote Security Features | (pp. 6-89) |
| <i>Hans de Heij, De Nederlandsche Bank (DNB) – The Netherlands</i> | |
| Shortly after the introduction of the euro, DNB developed the so called simple model to keep track of the quality of the incoming counterfeits. One of the findings is that - on a scale of 0 to 12 - the average quality of counterfeits is 7 points. How may this be explained? And what does this mean for future feature selection? | |
| From Feature to Sensor - A Flexible Measurement Platform for Statistical Process Control | (pp. 90-99) |
| <i>Thomas Türke, KBA-Giori S.A – Switzerland</i> | |
| Providing adequate measuring devices is today an integral part of the development for new machine readable security features. Preferably these sensors are well integrated into the existing measurement concept, with defined data interfaces for reporting instead of using stand-alone devices with proprietary interfaces. | |
| Document Production and Verification by Optimization of Feature Platform Exploitation | (pp. 100-114) |
| <i>Volker Lohweg, Ostwestfalen-Lippe University of Applied Sciences – Germany</i> | |
| The intaglio process is important for the security of banknotes, but direct measurement of its 3D structures under the rough and challenging conditions of circulation have proved to be difficult. In terms of signal processing, the fine structures of intaglio technique can be considered as areas of interest with certain ranges of spatial frequencies. Therefore, a new algorithmic approach, which is especially able to detect the intaglio structures and their intrinsic characteristics, has been explored and developed. | |
| New Level of Optical Measurement and Inspection in Intaglio Plate Making and Printing | (pp. 115-124) |
| <i>Thomas Kern, Austrian Banknote Printing Works (OeBS) – Austria</i> | |
| Intaglio printing is a real 3D printing process that needs high resolution 3D measurement equipment for further developing the printing process and proper quality analysis. A new measurement device with a unique combination of 3D data and true color information as well as sample measurements will be presented. | |
| 21 JANUARY 2010 – SESSION II: CURRENCY II | |
| SESSION CHAIR: Malcolm Knight – De La Rue (UK) | |
| A Method for Quantitatively Determining the Security Effectiveness of Bank Note Security Features and Whole Notes | (pp. 125-136) |
| <i>Erik Balodis, Bank of Canada – Canada</i> | |
| Many security features are available from suppliers today, and central banks have the difficult task of selecting one or several of these features for integration into their banknotes, taking into account security, usability and durability. The Bank of Canada has developed a methodology for estimating the usability of security features in circulation through a series of laboratory tests which indirectly measure their effectiveness. | |
| Fitness Check of Soiling for Circulating Banknotes | (pp. 137-155) |
| <i>Armin L. Stöckli, BEB Industrie-Elektronik AG – Switzerland</i> | |
| Soiling levels of banknotes are a key factor in automatic fitness checking. Therefore, circulating euro banknotes of different soiling degrees were measured densitometrically and compared with framework and test decks. This presentation shows how significant deviations were observed. | |
| A Photopolymer-based OVD for Banknote Applications | (pp. 156-169) |
| <i>Wayne R. Tompkin, OVD Kinegram Corp. – Switzerland</i> | |
| Volume holograms display attractive and secure visual effects. Many barriers precluded their implementation on banknotes, including durability in circulation, integration into the banknote production chain, cost of integration, and compatibility with cash handling. We have now developed, manufactured and tested a photopolymer-based OVD, specifically for banknote applications. | |

| 21 JANUARY 2010 – SESSION III: SUBSTRATE & PRINTING I | |
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| SESSION CHAIR: Volker Lohweg – Ostwestfalen-Lippe Univ. Of App. Sciences (Germany) | |
| Identifying Unique Polymer Films Using High Speed Analytical Techniques <i>Robert Stewart, Innovia Films – UK</i> | (pp. 170-183) |
| The core of every polymer banknote - a 75µm thick biaxially oriented polypropylene film, which is manufactured using a double bubble process - is demonstrably unique. A technique consisting of a combination of white light interferometry and analysis of the films' birefringent properties has been developed to prove this, with Verus detectors that allow this identification to be performed online and using other banknote processes. | |
| Revenge of the Physical - Mobile Color Barcode Solutions to Security Challenges <i>Steven J Simske, Hewlett-Packard Labs – USA</i> | (pp. 184-197) |
| Ubiquitous access to digital cameras and phone cameras has changed the way in which consumers and retailers may interact with their environment and products. In this paper, we describe how color barcodes, captured with mobile cameras, can best be deployed for product security — from track and trace to product provenance, authentication and forensics. | |
| Inspection and Authentication of Color Security Deterrents with Multiple Imaging <i>Jason S. Aronoff, Hewlett-Packard Labs – USA</i> | (pp. 198-209) |
| Reading and authentication of security deterrents can be performed in multiple ways with different reading devices. In this paper we examine a method for allowing multiple types of authentication through the design of a printed security deterrent which can be authenticated both in color and grayscale. | |
| Non-diffractive Non-printed Optically Variable Security Devices <i>Luke P. Maguire, Reserve Bank of Australia – Australia</i> | (pp. 210-218) |
| A complex and optically variable design, visible in transmission and reflection, is created on transparent substrates, such as polymer banknotes, through the embossing of microprisms. The microprisms are high quality optical elements that create a highly visible variable image through non-diffractive manipulation of light propagating through, and reflecting off, the transparent substrate. | |

| 21 JANUARY 2010 – SESSION IV: SUBSTRATE & PRINTING II | |
|---|----------------------|
| SESSION CHAIR: Sijbrand Spanenburg – Joh. Enschedé Security Print (The Netherlands) | |
| Combining BitSecure and Encrypted Matrix Codes for Verification of Document Authenticity and Integrity <i>Jan C. Vorbrüggen, Schreiner Prosecure – Germany</i> | (pp. 219-225) |
| The Copy Detection Pattern (CDP) technology, called BitSecure, consists of a small (usually 10 – 20 mm ²) pseudo-random printed pattern. The quality of the print can be quantitatively determined by an optical measurement. This makes it possible to reliably distinguish an original print from a copy, even a professionally-produced one using similar equipment as was used for the originals. A combination of BitSecure and encrypted Data Matrix codes can be used to achieve verification of a document's authenticity and integrity, while remaining resistant to some potential attacks by counterfeiters on document production itself. | |
| Advantages of Magneto-optical and Magnetic Materials in Document Security <i>Ted Rygas, Canadian Banknote Company – Canada</i> | (pp. 226-238) |
| Recent developments in the area of materials with magneto optical and magnetic properties provide new opportunities to produce easily detectable and highly secure marks on documents. An accidental discovery of some new optical properties in a specific application of cholesteric liquid crystals will also be covered. | |
| Proposal for Complex Luminescence – Combining Elasticoluminescence with other Security Features <i>Tsuyoshi Uematsu, National Printing Bureau of Japan – Japan</i> | (pp. 239-244) |
| Luminescent materials are widely used for second level authentication, but such materials are available on the open market. To improve their security, materials with illuminants that excite at various wavelength are being used in combination. This paper examines a two-peak luminescent material with an added luminant excited by mechanical energy such as friction. The result is elasticoluminescence, which enables verification from human perception through to machine detection. | |

| 22 JANUARY 2010 – SESSION V: OPTICALLY VARUABLE SECURITY I | |
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| SESSION CHAIR: Wayne R. Tompkin – OVD Kinegram Corp (Switzerland) | |
| Multi-Color, Three-dimensional Floating Image Overt Security Features <i>Douglas Dunn, 3M Safety, Security, & Protection Services Lab – USA</i> | (pp. 245-257) |
| 3M has developed a process for creating three dimensional images that appear to float above and/or below the surface of a substrate. This technology was originally scaled up to produce black-and-white images in Confirm™ Retroreflective Security Laminate. Recently, a new technology has been developed for producing two color floating images, which include a laser-written kinetic microtext covert feature. | |
| Dynamic 1-D Moiré Features for Banknote and Document Security <i>Andreas Schilling, OVD-Kinegram Corp – Switzerland</i> | (pp. 258-268) |
| Optically variable 1-D moiré features are developed, dedicated to banknote and ID-card applications. Sample banknotes are presented and polycarbonate cards that display novel movement effects when tilted. Several examples are shown, including variants where the animated moiré features are combined with other visual first-line effects. | |
| Analysis and Future of Novel Anti-counterfeiting Micro-optic Security Features <i>Samuel M. Cape, Crane Micro-Optic Solutions – USA</i> | (pp. 269-283) |
| Unison® is a class of micro-optic security films that use micron-scale geometrical optic systems to present striking visual effects. These films are devices which take full advantage of moiré magnification and integral imaging. This paper will qualitatively describe some of the effects that are possible with Unison, compare their potential effectiveness when used in different formats, and give a look into the future of what is possible with this technology. | |
| Novel Method to Arrange Microstructures for Moiré Magnifier Type Security Features <i>Michael Rahm, Papierfabrik Louisenthal GmbH – Germany</i> | (pp. 284-294) |
| Astonishing visual effects can be achieved by placing an array of microstructures in the focal plane of an array of microlenses. We will discuss a new method for arranging the microstructures, which can be described with a simple mathematical formula based on a modulo-algorithm together with linear mapping. | |

| 22 JANUARY 2010 – SESSION VI: OPTICALLY VARUABLE SECURITY II | |
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| SESSION CHAIR: Douglas S. Dunn, 3M Safety, Security, & Protection Services Lab (USA) | |
| Interactive Photonic Crystal Security Devices <i>Andre C. Arsenault, Opalux Inc. – Canada</i> | (pp. 295-301) |
| Photonic crystals (PCs) incorporating active materials display bright color reflections tunable through the visible spectrum. The color platform includes materials with thermally and mechanically tuned colors, and the process also allows color changes through the peeling off of a transparent top-sheet, and the display of the temperature history of an article through permanent color changes. | |
| Color Shifting Multilayer Polymer Fibers and Security Articles Containing Color Shifting Multilayer Polymer Fibers <i>Bruce Wilson, 3M Security Systems Division Laboratory – USA</i> | (pp. 302-313) |
| 3M has developed proprietary multilayer optical fibers. The technology enables an easily observed color response shift when viewed in reflection versus transmission, with the color response based on constructive interference of a multitude of layer pairs. The combination of different polymer pairs, with different refractive indexes, number of layers and optical layer thickness impart different color responses to the fiber. Polarizing effects may also be achieved. If the selection includes a semi-crystalline polymer such as PET, the resultant fiber can be robust enough to be woven into an article, and possesses forensic features as well. | |
| New Materials for Use in Liquid Crystal Security Products <i>Robert Hammond-Smith, Merck Chemicals Ltd. – UK</i> | (pp. 314-326) |
| This paper will describe the chemical, physical and optical properties of liquid crystal materials in general and then introduce new materials developed by Merck. Examples of how these materials allow better control of printing behavior and optical properties will be given. | |

| 22 JANUARY 2010 – SESSION VII: DIGITAL RECORDING AND MACHINE READING | |
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| SESSION CHAIR: Ian M. Lancaster – Reconnaissance International (UK) | |
| Coherent Diffractive Imaging (<i>cdi</i>) – A Novel Diffractive Imaging Technology <i>Nigel Abraham, 3dcd LLC. – USA</i> | (pp. 327-336) |
| A new fringe writing system to produce diffractive imagery, based upon using a laser beam recorder ordinarily used for recording high density data, is discussed. Digital data is input to produce diffractive images in a rotational fashion, as overlapping spirals, allowing the exposure of complex diffractive structures. | |
| Security Solutions with Complementary Optical and Machine-readable Characteristics <i>Mathieu Schmid, SICPA SA – Switzerland</i> | (pp. 337-346) |
| This paper presents novel approaches for implementing security solutions which inseparably combine level one (overt) and level two (semi-covert) functionalities in order to address the potential risk posed by the introduction into circulation of partial reproductions through banknote accepting machines. | |
| Forensic DOVID Reader, bridging 1st, 2nd and 3rd Line Inspection <i>Mikael Lindstrand, gonioLabs AB – Sweden</i> | (pp. 347-356) |
| GonioLabs' DOVID Reader (GDR) provides a spatially resolved trichromatic goniophotometric characterization. The present work discusses how the GDR quantifies optical features and differences between them (defects), as appreciated by perceptual evaluation. GDR Advantages are a) evaluating different DOVID suppliers, b) gaining more detailed understanding of deterioration due to circulation, c) forensic evaluation of different groups of counterfeits potentially originating from the same production equipment. | |
| 22 JANUARY 2010 – SESSION VIII: IDENTIFICATION AND AUTHENTICATION | |
| SESSION CHAIR: Paul G. Coombs – JDSU Flex Products Group (USA) | |
| Digital printing of multilevel optical variable devices for document security & brand protection <i>Robert J. Vrancken, Validus Technologies – The Netherlands</i> | (pp. 357-367) |
| Validus Technologies has created OVDs from liquid crystals applied using ink jet technology, which provide overt, covert and forensic security within one device, but also contain variable or personalized data (mass serialization). This conference is the worldwide launch of our multicolour OVD with variable data. | |
| The Advantage of Being out of Focus <i>Jan van den Berg, Sagem Identification – The Netherlands</i> | (pp. 368-373) |
| 3D Photo ID is a three-dimensional portrait of the holder in an ID-document, realized by a lenticular lens array. During the development of this first line security feature, it was obvious that being out of focus with the lenses presented a significant advantage. | |
| Advances in Holographic Security for Polycarbonate Identity Documents <i>Garth Zambory, JDSU - Authentications Solutions Group – USA</i> | (pp. 374-383) |
| The presentation is focused on a method to enhance the security of polycarbonate documents inclusive of holographic elements together with the elimination of all adhesive layers to bond the holographic element. This has been achieved through an innovative technique for forming the holographic structure onto clear polycarbonate in a single procedure. | |
| Novel Infra-red Absorbing Pigments for Security Printing Inks <i>Jörg Micheel, Gleitsmann Security Inks GmbH – Germany</i> | (pp. 384-390) |
| Infrared absorbing pigments and high security inks for various printing processes are presented which are either completely colorless or only lightly colored to the human eye. They are misleading to potential counterfeiters and provide new opportunities to designers. The infrared absorption can be combined with other security features. This paper was not orally presented but is included in the Conference Proceedings. | |