The Latest Developments in Holograms as a Security Feature

How holograms protect people and revenues from criminals

By **Paul Dunn** - 19/05/2022

Security documents and ID documents are at risk from counterfeiting, but holograms play a central role in the battle to protect people and revenues from criminals, says Dr Paul Dunn, chair of the International Hologram Manufacturers Association (IHMA), who considers the latest developments.

Governments and issuing agencies around the world, as well as other global entities, continue to be impacted to the tune of billions of dollars each year in lost revenue by the growing and important problem of counterfeit documents and ID fraud. Meanwhile, while the cost of paying for anti-counterfeiting measures to bring criminals to justice can run into hundreds of millions of dollars. The problem has also been exacerbated in recent times by the impact of Covid, which has accelerated digital transformation in every industry, accompanied by a drastic increase in fraud.

Counterfeiting of security documents presents challenges for the use of holograms, but the technology's capacity to evolve ensures it remains a potent anti-counterfeiting measure. Providing innovative and sophisticated solutions for security documents requires not only a design that will make a document attractive; it also means enhancing the intrinsic security of that document. Secure document conception can be achieved for ID cards and passports by integrating security features with exclusive designs that highlight attack attempts and facilitate controls, for example, checking that an ID document matches the bearer.

Today, propelled by advances in materials and applications, holography remains valued and potent, especially in securing data and preventing interference, tampering, alteration, forgery, or imitation by criminals. Certainly, developments in new technology, innovation and advanced processes ensure protection against the forgery of variable information, most notably photographs and personal data. Holography also provides innovative and sophisticated design solutions for often non-descript security documents (which lack distinctive or interesting features or characteristics), simultaneously enhancing the security of an identity document.

Holograms protect and authenticate, alerting issuers and those checking the documents to counterfeiting attempts. Indeed, in the wake of the Covid pandemic, countries around

the world continue to examine ways to make their document(s) more secure. In places such as South Africa, we are seeing authorities inexorably moving towards the inclusion of biometric technology in their anti-counterfeiting plans, in an effort to stem the rising tide of identity fraud.

A new generation of high security, award-winning holograms

A new generation of high security, award-winning holograms for ID documents, such as Surys' Spectreod, are pushing the envelope when it comes to ID document security and protection. The new holography provides highly effective tools to help law enforcement to better fight the criminals.

These technologies utilise phase shifting micro-optic authentication elements, which enable the viewer to pick out and identify information using a smartphone light source. When observed at a direct angle, the Spectreod is recognisable to the naked eye, but when it comes under a light source, pre-selected floating coloured information appears, following the movement of the light. This can help to authenticate a document at a glance.

Trained document examiners at the borders generally have little time to inspect travel documents but nevertheless need to detect manipulated or forged documents. At the same time, machines and mobile devices equipped with software algorithms should be able to capture images and perform template matching to confirm authenticity.

With this in mind, OVD Kinegram's KINEGRAM® "Bee Design" offers next generation protection for data pages in polycarbonate documents. The ability to integrate the embedded Kinegram elements over a larger area in perfect optical harmony with other features (such as the security print) leads to a document design which is intuitive and self-explanatory and hence suitable for quick and reliable human inspection.

KINEGRAM® "Bee Design"

The document design tells a story that even the untrained eye can immediately understand, while the solution protects the personalized data and the photograph of the

passport's data page for ID3 format passport data pages and ID1 format identity cards or driver's licenses. It's also compatible with most contemporary manufacturing processes to produce ICAO compliant documents, while the individual security features of the Kinegram are amenable to computer vision and optical machine authentication using desk-top document readers and mobile phones.

Applications of the latest hologram technologies

For example, in the UK, a new hologram has been recently added to both provisional and full GB driving licence cards* in the shape of a circle and a changed design, which is proving beneficial in allowing motor car dealerships to check proof of ID for test-drives or finance products.

Manufacturers are working with state and commercial security printers and providers to protect documents using secure ID components. These include the addition of holographic laminates to help to protect the risk of alterations to the genuine holder's details. The top target for counterfeiters is the bio data information held on passports, so with ICAO 9303 specifications recommending a holographic element to protect the bio-data page of all passports, the use of holographic laminates uses a broad range of optical feature effects combined across HRI and metalised areas. This ensures that the data behind the hologram remains protected but can still be easily viewed and authenticated.

Demax, a leading player in the government documents and the high security printing sector, is another company whose products protect the data and photo on the passport's data page against counterfeiting. Its FreeEdge™ Holographic Overlay ensures the information is kept legible and that authenticity can be controlled in a simple and effective way. The overlay is transparent and does not interfere with reading personal data and machine-readable code.

FreeEdge™ Holographic Overlay

Equally, financial and secure documents can be protected against counterfeiting with holograms incorporating complex origination and production processes unavailable to criminals. De La Rue's holograms feature hot stamping holographic foil technology that can be applied to a multitude of substrates and make it impossible to remove the device without damaging the foil and the substrate beneath.

Effective protection of identity and security documents is also a key application for the new OpSec® Cameo product. This technology creates the visual illusion of a three-dimensional bas relief sculpture that appears raised and sculpted or moulded on the surface with a depth of several millimetres. The imagery can be integrated with multiple holographic techniques to produce designs with varying levels of security for easier overt public, covert inspector, and forensic investigator level verification of security and ID documents.

OpSec® Cameo

Smartphone technology is increasingly being used in combination with hologram programmes for authentication purposes, and we continue to see new developments such as Koenig & Bauer Banknote Solutions' ValiCash™ making inroads. This is an app that not only identifies high security documents but also authenticates them, flagging either a "pass" or "fail" response almost instantaneously. Since the system is based on the intrinsic intaglio print properties of the document, it does not rely on specific inks or hidden features. It can also be adopted and used for other applications including birth certificates and other high security printed documents, so long as they contain intaglio print.

New encoding technology

Offering a high level of counterfeit deterrence, a new generation of digital enhanced optical features, which incorporate holographic effects, herald a step-change in areas in the secure document industry in the coming few years. For instance, in the Portuguese mint and official printing office, INCMLAB's UNIQODE project has led to a new encoding technology generated by, and embedded into, holograms that can be verified by online and offline mobile devices, preventing product tampering and facilitating traceability. This is an effective, flexible machine-readable information system used to quickly check and validate security documents, which also has wider protection applications in the consumer marketplace. UNIQODE incorporates a security hologram that encodes unique and irreproducible layers of optical features. By being accessible to its users, it also allows the consumer to help brands and authorities in the fight against counterfeiting, further promoting confidence in the market.

It's also possible to use authentication technology to certify people who have immunity against the Covid-19 virus. In an interesting development, OpSec has a track and trace product to link a Covid-19 test result or vaccination, which carries a unique identifier, with a code on a government grade holographic smart label. This can be attached to an

individual's passport or other identity document and then verified by, for example, passport control officials using a simple smartphone app.

Hologram pioneers IQ Structures' IQ proID protects passports against forgery through the application of precise fabrication and unique application technology. This is a series of holographic laminates that are placed over the datapage of a passport. Anti-fraud is offered through the etching or ablating of personalised information (code, name, or number) into a metallic hologram which is difficult to counterfeit while providing a highly reliable authentication device that can be seen by the naked eye. Transparent windows can be easily combined with other personalised transparent and metallic holograms as well as tactile elements to create unique designs that underpin a document's safety and security.

Moreover, the use of well-designed and properly deployed authentication solutions, as advocated by the ISO 12931 standard, enables those with ID protection responsibilities to verify the authenticity of a legitimate product, differentiating it from counterfeits. Even those that carry a fake authentication feature can be distinguished from the genuine item if the latter carries a carefully thought-out authentication solution. The advantages holography offers will continue even as digital and mobile ID technologies gain increasing levels of traction.

The continued growth in the use of holography as a security device points to the technology's deep underlying versatility, cost-effectiveness, and graphical flexibility. Indeed, it will continue to flourish in those markets where a premium overt security feature is required as governments and other issuers of ID cards, passports and driving licences must implement more security technologies to protect an increasing array of documents from attacks.

Note: The IHMA is made up of more than 80 of the world's leading hologram companies. Members include the leading producers and converters of holograms for banknote security, ID cards and passports, other secure documents, brand protection, packaging, graphics, and other commercial applications around the world, and actively cooperate to maintain the highest professional, security and quality standards.

Sources/References:

https://www.nfda-uk.co.uk/press-room/newsletter/2021/49/new-driving-license-styles-go-live-this-week

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