GROWING USE OF HOLOGRAMS

Dr Paul Dunn *explains how innovation hastens closer digital interaction of security and brand protection holographic devices*

Innovative developments in materials and advanced processes, together with a desire to seek out new applications, ensure commercial holography continues to feature in the frontline fight against counterfeiting, identity theft and brand piracy. Indeed, it's the technology's capacity to secure data and combat the effects of criminal interference, tampering, alteration, forgery or imitation that remains priceless. Moreover, holography is not solely present to prevent counterfeits, but to also act as a physical detection device; making it easier for the trained eye to distinguish the genuine item from the fake.

The growing use of holography is bringing smartphone digital interaction in the brand protection and authentication space ever closer as the technology finds new outlets and applications for its benefits. This will see continued expansion as increasing numbers of organisations around the world adopt the advantages on offer and invest in purchasing digital-based interactive solutions for their products as they look to protect themselves from piracy and counterfeiters.

Today, we can see holography is already finding its way to ever more sophisticated applications in medical and pharmaceutical imaging, data encryption, transmission and storage systems, as well as continuing to drive improvements in the security of everyday consumer products, banknotes and bankcards.

Recent holographic developments are bringing digital smartphone interaction into sharp focus. For instance, De La Rue expanded its brand protection holographic brand protection portfolio with the launch of PURE labels, a range of surface relief holographic labels that compliment IZON – the holographic photopolymer label series that are tamper-proof labels incorporating serialised QR codes. Similarly, SmartPack labels from 3DAG provide digital smartphone holographic tamper-proof labels with serialised QR codes. Krypten, which is based in Russia, has developed a range of brand protection labels that can interact with a smartphone, taking the initiative a step further with the development of holographic effects and Smart-HIT covert features that include augmented reality (AR), using a smartphone. The AR technology reproduces a realistic interactive 3D object on the hologram visualised on the smartphone.

The Indian Ministry of Road Transport and Highways is using holograms to tackle the issue of vehicle fuel pollution

Meanwhile, Indian company Holostik has developed a suite of holographic digitally interactive smart labels for a range of different sectors, while Kurz has recently unveiled its latest smart label solutions to protect automotive parts and other products called *TRUSTCONCEPT*. This is a modular solution for product and brand protection combining optical security features based on the company's visual and digital technology with flexible software solutions that enables product parts to be authenticated in real-time.

Staying in India, the Indian Ministry of Road Transport and Highways has looked to the flexibility of holograms in a new move to tackle the issue of vehicle fuel pollution – in dozens of states across the country, people are being urged to ensure that they comply with a Supreme Court directive to use colour-coded hologram stickers to identify the type of fuel used in their vehicles.

The initiative started in 2018 when the court instructed the Indian Government to start issuing colour-coded holograms/stickers to all vehicles to restrict the movement of vehicles, preventing them from emitting choking fumes in areas that had already been deemed heavily polluted, either on a temporary or a permanent basis. The programme, which started in Delhi-NCR in October 2018, is currently being rolled out across all states.

The directive sees diesel vehicles bearing a hologram sticker with an orange-coloured background, while cars running on petrol and compressed natural gas (CNG) will use another sticker with a light blue background. For all other vehicles, the background will be grey.

The hologram sticker, which includes the registration number, the registering authority, a laser-branded PIN and engine and chassis numbers, essentially acts as a third registration plate attached to the inside of the bottom-left side of the windshield.

The state Government of Kerala, meanwhile, has introduced 300 Holographic Registration Plates (HRPs) in a move to tackle the increasing number of unregistered fishing vessels that infiltrate coastal regions and have been identified as being involved in criminal activities, including human trafficking.

The HRPs, which are designed as a tetrahedron to be visible from all sides, feature embossed security holograms, which are extremely difficult to duplicate. Individual plates are fixed on top of the wheel house with an identification number laser etched to ensure each of the vessels has a unique identifier.

The application of holograms in this way is replacing the traditional registration marks applied to boat hulls or to the beading on top of the wheel house. This is enabling the authorities to better track fake fishing vessels, improve coastal security, boost the recognition of unregistered vessels out at sea and in conducting rescue operations more effectively.

The project is already reaping benefits, according to S Venkatesapathy, director, Fisheries Department, who is quoted as saying HRP will prove extremely helpful in ensuring coastal security and vessel identification. Looking to the future, the department is considering the practicality of creating an HRP networking system for real-time monitoring of sea-going vessels through incorporating the HRP with GPS functionality. A microchip containing the details of the vessel and the crew could also be fitted with it.

HOLOGRAPHY CONTINUES TO FEATURE IN THE FIGHT AGAINST COUNTERFEITING AND IDENTITY THEFT

The capacity for holography to incorporate other data forms and recognition information continues to grow in importance, but for now it is clear the technology demonstrates an ability to thwart criminal activity in challenging and difficult-to-monitor industries. With advancements in technology and widening applications, there's no reason why the technology should not continue to play a critical part in the on-going battle to remain one step of ahead of the counterfeiters

Reflecting a similar trend, French company SURYS has created an integrated system called Optokey. This combines technologies to prevent product tampering, facilitate track and trace while incorporating overt, covert and digital security features, which connect products securely to the digital world. The system provides immediate brand appeal and visual recognition, offline automated authentication, and consumer engagement opportunities.

They provide all the advantages of physical and product protection qualities brands require with tamper-proof evidence in a single, easy-to-apply digital package for authentication, supply chain track and trace, grey market monitoring. They can also be used

as an integral part of an enhanced, upgraded warranty management scheme and product return programmes to instil greater consumer confidence.

Offering a high level of counterfeit resistance, the new generation of digital enhanced optical features, which incorporate holographic effects and offer overt, covert and forensic features, herald a step change in areas in the secure document industry and other areas in the coming few years. For instance, OpSec Security's Lustre – a new proprietary technology – can be changed by wavelengths/intensities of light, altering the liquid crystal molecules and the colour they reflect.

HOLOGRAPHY'S ABILITY TO INCORPORATE DATA AND INFORMATION CONTINUES TO GROW

Holographic applications that bring digital interaction a step closer are also set to play a critical role in tackling the current COVID-19 pandemic and other global threats. For instance, De La Rue is looking at authentication technology to support a way of certifying people that have immunity against the virus. In an interesting development the company is considering its track and trace products 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 a person's passport or other identity document and then be verified by, for example, passport control officials using a simple smartphone app.

Other products include OpSec Security's, Opsec CATS (COVID Authentication and Traceability Solution) that incorporates holographic and other anti-counterfeiting technologies such as OpSec SecureITT authentication labels, OpSec InSight supply chain management software and OpSec Online e-commerce protection.

Austrian-based Authentic Vision's also launched a GDPR (General Data Protection Regulation)-compliant holographic fingerprint health tamper-proof tag that provides secure authentication of the health status of individuals in exceptional epidemiological situations such as the current Coronavirus pandemic.

The great advantage of this type of holographic application is that it can be deployed quickly depending on the government and healthcare systems in place, while also helping to protect supply chains that have been under threat or exposed as Coronavirus has swept the globe.

There's no doubt that the use of well-designed and properly deployed digitalised holographic solutions, as advocated by the ISO12931 standard, enables those with responsibility for law enforcement and security across borders to verify the authenticity of a legitimate product, differentiating it from fake products coming from counterfeiting hot spots around the world. Even those that carry a 'fake' authentication feature can be distinguished from the genuine item if that item carries a carefully thought-out authentication solution.

It remains appropriate that as holography looks likely to find new ways to embrace digital interaction going forward, the technology remains undimmed, evidently going from strength to strength as an innovative, ground-breaking and highly effective authentication device. And, as it gazes at a vista of new digital opportunity, there's no reason why it will not continue to enjoy a bright future ●

Dr Paul Dunn is chairman of the International Hologram Manufacturers Association. He has been involved in the optical security industry for more than 30 years with an array of experience in teaching and technology development, and is currently Director of Technology Innovation at OpSec Security Ltd.

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