

The Future of Overt Optical Security Features for ID Card Protection

By Scott Magnacca, Director of Global Sales and Customer Service of Authentication Solutions for the Advanced Optical Technologies segment, JDSU

Increasing the security of ID cards is an ongoing concern for consumers and governments everywhere. Although a single multifunction card is more practical than several single-function cards, putting so much information on one card creates an even greater need for security. Multitechnology cards that offer machine-readable elements—with contact and contactless chips and overt optical security features—are the trend. Because consumers will want direct visual interaction with their cards, overt optical security features will remain standard. Innovation will involve new ways to combine unique color and holographic effects to create more highly integrated, harder-to-reproduce images and surfaces.

The demand for tamper-apparent, counterfeit-resistant card-based ID solutions continues to drive innovation. These solutions enable personal authentication, facility access, border crossing, registration, voting privileges, and even payment of certain types of fees. In addition, multifunction cards demand ever more complex and integrated layers of visual, physical and digital security to ensure individual identification and correct functionality in card-based ecosystems.

Historically, card security has relied on the overt optical security feature of the hologram to give consumers confidence about authenticity. However, as electronic identification re-shapes the discussion about card security, there is an emerging focus on what is “inside,” and not just what is on the “outside.” Significant technical and manufacturing expertise is needed to ensure that multilayer and multitechnology card solutions meet format, functionality and durability standards, all while providing consumers with the visual assurance of authenticity.

Today’s solution providers must rise to the challenge to deliver greater innovation in advanced optical technologies. Innovation in optical technologies will result in

enhanced designs that integrate more optical technology and sophisticated imagery. The improvements will continue to support user confidence and help manufacturers continue to raise the bar against mimicry.

While it may seem paradoxical, existing printing technologies will carry most of the weight as cards evolve given their relatively low cost for high-volume applications, ease of implementation with existing production infrastructures, the possibilities for sourcing with local vendors, and fast overall time-to-market. High-speed printing can cost-effectively produce optically variable security devices that are simple, affordable, eye-catching, easy to explain, unique and secure.

Recombinant printing: optically variable pigments plus holograms

Using specialized printing techniques with high-security inks can make overt features particularly difficult to replicate. Hard-to-reproduce color effects in ink are achieved with specialized optically variable pigments (OVP). These pigments include flakes with multiple layers of chemical coatings applied to thin film. The composition of these coatings can be highly customized, creating unique colors, reflectivity, and refractivity, for a range of options. OVPs that use light-interference technology are comprised of microscopic flake structures that enable the reflection of different wavelengths of light. Each flake exhibits a unique color shift as the angle at which it is viewed changes. OVPs that use light-diffraction technology are comprised of microlayered flake structures manufactured to very precise thicknesses and surface finishes, which cause light to be slightly bent. This creates a rolling rainbow effect in a silver field. Optically variable magnetic inks provide additional features such as flip-flop, rolling bar and hide and reveal. The dynamic color-shift effects can be seen in a wide range of viewing conditions, making the technology highly adaptable for commercial use.

The use of microstructured taggants, which are also flakes, is another important, semi-overt security technique. Taggants are not visible to the naked eye but are easily read in the field by retailers or investigators using a commercially available microscope. Taggants can be made from various substances to be uniquely distinguishable based on structure, size, shape, color, surface

inscription or material composition. Thanks to their microscopic size, they can be added to a variety of inks or applied as a clear varnish. An attractive feature of taggants is that they can be manufactured with customized logos or text unique to the brand of a specific customer. Taggants can be manufactured using very sophisticated multilayer customization methods, making them virtually impossible to copy.

Holograms are eye-catching optical devices that allow objects to appear as 3D images with motion and other kinetic effects. They have been in use for many years, making some types of designs vulnerable to counterfeiting if used alone, and certain lighting conditions may be required to see a complete holographic effect. In addition, the consumer or retailer needs to know what to look for in a hologram. These problems can be overcome when holograms are combined with sophisticated demetalization processes and color-shift ink solutions.

When high-security colored inks and taggants are combined with holographic technologies (classical, digital and E-Beam) to create uniquely integrated solutions, the bar can be set even higher in terms of producing unique overt devices for authentication that ensure against fraud.

When these high-security printed solutions are married with other techniques such as high-resolution imaging, fine-resolution demetalization, security-image replication via hard embossing, compliant embossing (UV casting), hot-stamp foils and transparent laminates, the number

of possible solution combinations increases dramatically and gives card manufacturers a considerable array of cost-effective options.

Layering Printed Effects

Holography has traditionally been the layered approach in overt security, but new solutions enable printing of hard-to-reproduce layered security elements that combine optically variable pigments and holograms. A flexible and low-cost solution starts with a base element, integrates a messaging layer, and then adds multiple effect layers, one or more of which can be transparent. The result is a complex, branded, yet cost-effective solution which can be produced quickly using common printing techniques. This approach also provides the flexibility to incorporate additional covert security technologies such as taggants, as well as hidden imagery and micro and nano text. These printed features work with polycarbonate and Teslin® and also with hot-stamping applications that can be applied directly to a substrate.

In summary, using proven technologies in new and different ways is a smart and fast way to keep up with the growing need for card protection. Recombinant technologies are already having a significant impact on increasing security for ID cards, and innovation in this area will continue to support market requirements.

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