Why the Hologram Continues to Dominate the Authentication Space

Since the early 1980's, the hologram has grown in popularity as an authenticating device. Starting with the first images on credit cards, its applications expanded rapidly into document protection, branded goods authentication, fiscal stamps, and currency. In fact, the hologram is now the reference device against which other security devices are compared. Over 50 percent of all document or product protection uses the hologram as the central, publicly recognized feature.

The reasons for this steady rise to dominance are many. No competing technology works at so many levels (overt, covert and forensic) or combines decorative, kinetic, and bright additive color effects in one single space. It can display parallax effects (3D images that change with the viewing angle) and record stereograms of photographic images or computer generated models. The flexibility of forms in which the hologram can be delivered, on many different types of products, is huge.

Hologram usage for authentication is increasing and the technology is not standing still. New developments will provide more exotic and difficult-to-simulate optical effects. Researchers are now working at the sub-micron level to produce novel, overt effects once impossible to achieve.

There is concern today that access to competent simulations and complete re-originations of images is possible, but the hologram still offers a very cost-effective way of defending against even the most professional of attacks. Despite the sophistication of counterfeiting devices involved, the basic raw materials used combined with economy of scale of manufacturing and application result in a very affordable, secure solution. The choice of technology used is critical in such situations, and effective verification may ultimately rely on second level (covert) features identified by educated people in the field.

Benefits of the hologram as a security device

The advantages of holograms include:

- a technology that works at multiple levels all in one space—overt, covert, and forensic
- the combination of security with eye-catching shelf appeal
- colorful kinetic effects that are visually appealing and not achievable with any other print technology
- full 3D and stereographic views of objects, people, landscapes, and computer-generated models.
- applicability with a vast array of product media including hot or cold stamping foil, labels, tamper-evident seals, shrink sleeves, cap seals, tear tapes, blister packs, laminates, threads, and fibers
- a technology that is capable of development and is being constantly improved and upgraded.

Consider the threats

We can further see the effectiveness of holograms by considering various threats posed by likely counterfeiters. The casual or amateur counterfeiter, the largest growth area for document counterfeiting, is almost totally defeated at first-level inspection. The cost barrier to even semi-professional results is prohibitive. The professional or career counterfeiter can be defeated at second-level inspection by the use of more sophisticated origination technologies and proprietary features. An organized-crime counterfeiter has the same problem, but in the area of high-volume product counterfeiting, this criminal must contend with the additional barriers of volume sourcing and application issues.

The hologram remains a highly cost-effective feature as long as it is made using restricted technologies which are difficult to simulate or copy but easy to verify. The use of holographic stickers places an article at much higher risk of counterfeit because of the much wider availability and lower cost of holographic sticker production. Hot and cold stamping foil versions are much less available and present significant technical barriers to entry.

The public has come to accept and expect the hologram as an indication of authenticity. However, as with most other technologies, it is unrealistic to expect the hologram to act as an absolute guarantee of authenticity at the consumer level of inspection, other than in the case of the casual or amateur counterfeiter.

The real key to ensure authenticity is the careful use of covert, second-level features which will be verified by trained agents in the field. These features should be hard to simulate but easy to verify using handheld devices or by eye. It is well documented that all recent attempts at compromising security holograms have failed at this second level[1].

Features and benefits in the war against counterfeiting

- Holograms are 100% effective against casual photocopying or scanning or other digital document reproduction methods.
- By avoiding the use of low-tech, low-resolution dot-matrix holograms, the barrier to entry in origination is high. This is especially true when using proprietary features only available from a single controlled source that is easily verifiable.
- Holograms combine effectively with other security technologies such as optically variable inks and variable data to be part of an overall, layered solution.
- Holograms can contain both covert and forensic security features.
- Images (both overt and covert) are relatively easy to change or update, adding an element of future proofing.
- A hologram image register (HIR) prevents the inadvertent copying of security holograms by bona fide manufacturers.
- Hot-stamp foil forms are highly cost effective, costing fractions of a penny per protected item. They represent a substantial technical barrier to counterfeiting in both manufacture and application (especially in volume applications).
- Holograms very effectively combine decorative and promotional graphic elements with security features—they look good.

Note:

1. "Identifying Fake DOVIDs," Ruud van Renesse, HoloPack, HoloPrint conference proceedings, 2010.

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