# Relating Security Printing to Emerging Digital Printing Solutions

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## Abstract

Today all documents that carry intrinsic value contain one or more security design features. Applications of security printing range from banknotes, passports and ID documents, to checks, lottery tickets and gift vouchers. Dramatic growth in product counterfeiting has also lead to more attention to the packaging of fraud-sensitive goods. It is clear that these markets have different demands, yet they share a common goal: to make life difficult for the counterfeiter through design complexity and authenticity verification features.

Today, we also notice an ever-increasing interest from the security printing industry in the developing technologies for digital printing. This interest includes both opportunity as well as risk-assessment. An overview of existing and emerging technologies will be placed in comparison with the current practices for the production of security documents and brand protection. The various parameters (ink, substrate, and design) of digital printing and their relationship to the specific needs and concerns of the security printing industry will be discussed.

## The Security Printing Industry

Most people relate "Security Printing" immediately to the printing of banknotes. Indeed, this is probably the most eye-catching security application. Many other applications exist however where printed matter either needs to be protected against counterfeiting, or where the printed matter serves as anti-counterfeiting protection itself. Or of course a combination of both.

### Security Printing – Protecting Printed Matter

Obvious applications: banknotes, checks, lottery tickets. All such documents represent a money value. They can be exchanged against goods (although in the case of lottery tickets not that often…). The 'product' is thus printed matter only. This category is often referred to as 'security documents'. By tradition, the producers as well as the public are quite aware that counterfeiting is a possible threat.

### Security Printing to Protect Against Counterfeiting

This is typically the category also referred to as 'brand protection'. The reasoning here is to complicate counterfeiting the package of goods. This ensures the consumer of the authenticity of the product she/he will be buying. More down-to-earth: a well-designed and thus secure package design should defer the counterfeiter to other, less well protected, products.

The public awareness that there is a threat of counterfeiting is steadily growing, still many more products are subject to counterfeiting than is realized by the general audience.

## Characteristics of the Security Printing Industry

It is of course difficult to make general statements about an industry. However, a few things certainly stand out here:

- **Closed:** this is not an industry that is willing (or able, for that matter) to talk openly about issues and challenges. As a supplier to this industry, it is extremely important to be introduced in the networks to even be able to propose solutions.
  And, quite contrary to what one might believe at first sight, the brand protection industry is no less closed than the security document industry.
- **Slow-moving:** this especially is true for security documents. The public visibility of the products (again, think of banknotes) is high. Introducing unstable features could cause serious – even political – issues. Therefore, this industry rightfully tend to wait until a feature proves to be 100% stable; on the other hand though, there is a constant search for exclusive features not spread to the 'normal' printing world. The practical consequence of this dilemma is that quite a lot of research programs are launched, but few will really make it to live production.
- **Traditionalist:** especially when introducing new print features in the security document world, their press people frown. As long as external features such as e.g. holograms, stripes…implement a protection; the actual printing methods are left unchanged. But introducing e.g. inkjet printing as part of a security document process will cause no less than commotion. In an industry that uses deliberately obsolete printing

techniques (Intaglio) to warrant and protect the exclusive document character, the use of a common printing technology such as inkjet is at first sight out of the question. The challenge for the industry is to poke through this perception and convince the market that security printing *can* benefit from new printing techniques, as these open up paths for more of those much-desired exclusive developments.

- **Supply chain fit:** this is more a characteristic of the brand industry. Major brand owners, especially in the fast moving consumer goods sector are very keen on the optimisation of their supply chain. Issues such as counterfeiting are considered in respect to the global supply chain story. This means that the introduction of any new feature or printing technique should match seamlessly (or improve upon!) the supply chain. Exotic features that require one to step out of the normal production flow are excluded.

## Characteristics of the Digital Printing Industry

Again here it is difficult of course to generalize on characteristics of an industry, especially in a young and fast developing one as the digital printing industry. Nonetheless:

- **Innovation-oriented:** in comparison to the age-old printing industry, digital printing is still largely in its infancy. New developments, new technologies, new ideas are launched frequently. This is of course essential to make the whole digital printing idea mature, but it also frequently leads to a position of 'let's wait a while before investing in this, since we can expect price drops / quality improvements within a year' … and a year later, the same position causes the possible client to wait a little longer still…

- **Technology driven:** generally, all of us spend a lot of time to convince people of the technology, but we tend to forget to explain the how-to-do-business with that same technology. It is clear that we need to focus on the business cases of digital printing, i.e. how a user can earn money with our technology.

## An Important Side Note: The Legal Story

In some cases, especially in the brand protection area, taking legal action against counterfeiters has been extremely difficult. In some circumstances, it has actually been impossible to prove in court that a counterfeit product was indeed fake – simply because the imitation was of such high quality and there were no standards set to distinguish true from fake.

In other trials, even when the bad guys finally did get convicted, punishments for product counterfeiting were by no means as severe as punishments for e.g. banknote counterfeiting. This is / was so in most countries. It causes the brand owners to look at more preventive actions to be taken against producing fakes. Digital printing solutions

come into sight as a means of tracking, tracing and establishing the authenticity of a product.

There are also some law changes needed to cover the legal implications of digital printing. For example, in many countries it would today still be quite difficult to really make a legal proof out of a digitally printed (variable) feature. One would not only need to certify the authenticity of the product, but first of all the solidness and authenticity of the anti-counterfeiting measure itself will have to be established! Of course, this issue has been there for all new technologies in the past too, and therefore it is merely a matter of time before things get regulated. Still, making sure that a digital print feature is legal proof can be a tedious task.

## Upcoming Digital Technologies with Security Potential

This – obviously incomplete – chapter lists in brief a few technologies that may have the right potential to answer to the requirements of the security printing industry.

### Toner Printing
For digital printing, this is already a relatively mature technology. Even some security applications have already been implemented, and productivity demands can in certain cases be met with the latest generation of high speed production stations. Still, the idea of using toner for security applications is not always perceived as being a good idea, the preference being given to the use of real inks. A secondary concern has been the orientation of toner-based machines towards the office document environment, making the technology less interesting for integration in production environments.

### Inkjet Printing
Inkjet printing has of course been around for many years, but until recently, no industrial-scale applications have been emerging. This has recently changed, and the arrival of these true production solutions that use true inks certainly raise the interest of the security printing community. With the production potential now available, there is an active search going on to integrate security features into this technology, e.g. specific ink developments, or image processing technology such as digital watermarking.

### Covert Marking/Digital Watermarking
These are truly digital features that can be added to printed matter without creating a large production overhead. They are digital technologies in essence: digital files are needed to implement the features upon, and the reading and interpretation of the mark is also to be done by digital means. These technologies have been around for quite some years now; they've already seen a growth path with several generations of significant improvements. They provide a great fit with industrial-scale digital printing, and

are a good proposition especially when automated processing is a must.

**Automated Identification Production**

This is an area that has been given significant attention recently. It is all about producing (printing) identification tags digitally, e.g. to use variable (inkjet) printing to print conductive material and thus produce tiny electronic circuits that could serve to uniquely identify documents and/or products. Applications exists, and everybody seems to be expecting a breakthrough in the field of Auto-ID, RFID etc.

It is without doubt possible to find many more applications, but one should always wonder in what stage of development the target technology is. It should really be feasible to implement a technology at industrial scale, to guarantee commercial success.

## Conclusions:

If we apply the characteristics of the digital printing industry onto the security printing industry and vice versa, we can summarize that

**For security documents:** before all, our industry needs to prove to the market that the security isn't compromised by digital printing but that it opens up new protection possibilities; and secondly that production capacity is adequate, that the system is stable and that the costs are favourable.

**For brand protection:** we need to prove to the market that the digital printing technology in case is suited for the product line in question, and to convince the end user that

adding digitally printed security features is a cost-efficient and secure approach to reduce their counterfeiting issues.

The security printing industry is traditionally a market that is resistant to change; but, although paradoxical at first sight, it is also a market that is constantly investigating into new technologies.

The real-life answer to this paradox is that the security market is certainly a good market for research projects and pilot trials… but that it is much harder to move into commercial use of security features.

Nonetheless, and to end with an optimistic note: we are part of an industry that is quickly progressing towards industrial-scale production capacity and mature products; hence the future should be bright for digital security printing solutions!

## Biography

**Jan Van Laethem** is Manager, Security Systems for dotrix nv. Jan holds an engineering degree in electronics/software engineering. He began his career at Barco in 1989, where he started in software application development for CAD systems for the packaging design market. This work included the development of a CAD system specifically for the ceramics design market. Since 1993, he has been with the Security Systems Group, and was responsible for the design and implementation of the Fortuna digital design and assembly system. At the end of 2001, dotrix was created from the Industrial Printing Group of Barco. In his current position at dotrix, Jan is managing the Security Systems group, which develops and markets the Fortuna, SecuSeal, and SecuPass/Insider products. He is also responsible for the development of OEM opportunities within dotrix.