Level 1 Security – Long Live the King!

An ITW Security Division White Paper – July 2016

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Overview

This ITW Security Division paper focuses specifically on the use of Level 1 features in holograms - and why Level 1 is still King.

The background to this paper was a series of voice of the customer interviews carried out by ITW with leading companies in the security market. These companies spanned 3 continents and included OEM's (Original Equipment Manufacturers), Integrators and Security Printers.

Of those interviewed, 100% reported back that Level 1 features are in higher demand compared with Level 2 or 3. Indeed it can very much be put succinctly into one comment from the UK National Document Fraud Unit:

"The importance of Level 1 security features cannot be understated … they are the front door locks in any design…"

The primary reason for this, is the need for quick verification of documents particularly when combined with the reduction in budgets for security programs.

The majority of those responding also confirmed that holograms were still the preferred leading overt technology recognised by the public; but at the same time they were also increasingly concerned about the counterfeiting of holography, particularly those with just Level 1 features.

Identity documents need to confirm the identity and the nationality of the holder and in the case of travel documents enable the crossing international borders. They need to be secure ensure that the document cannot be counterfeited or unofficially altered. An Immigration official will use the document to confirm a person's nationality, identity and entitlement to leave or to enter the country.

This paper aims to define the security level features available and the recent developments in Level 1 holographic and security features, in particular bringing something new that is difficult to copy or simulate by the counterfeiters.

Interview – Key Results

- *100% reported that Level 1 (overt) features are in high demand vs. Level 2 (covert) or 3 (forensic).*
- *Level 2 features are on the decline due to State budgets (require a tool/reader to detect)*
- *Holograms are still the leading technology and most recognized by end-customers*
- *Great deal of concern about counterfeiting Level 1 features*

(Source: ITW Security Division Voice of Customer Survey, 2016)

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Different Security Levels – Definitions

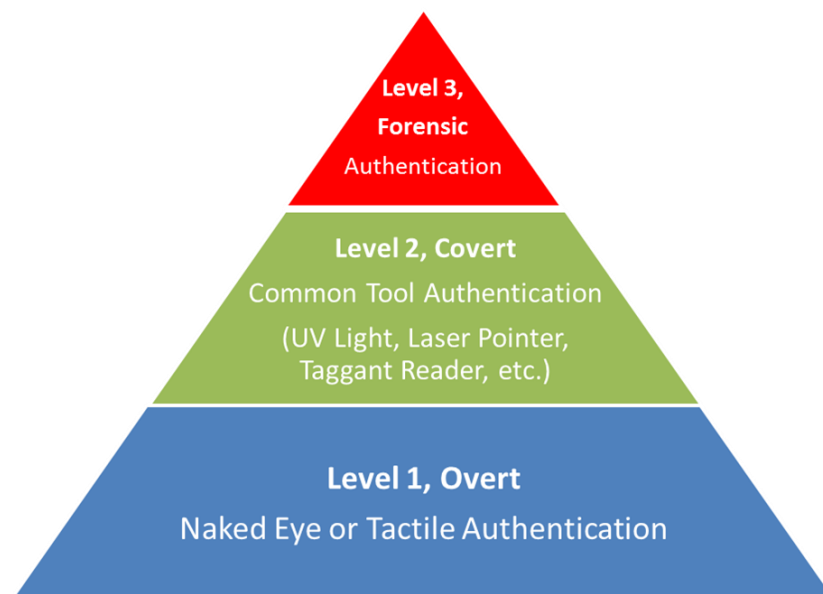A security feature is a feature that:

"helps insure the document's integrity and/or authenticity as a properly issued document that has not been tampered with"
(ISO/IEC 18013 Part 1)

"protects against unauthorised reproduction, alteration, and other forms of tampering"
(ICAO)

Detection of security features can be at any or all of the following 3 levels of inspection:

Level 3,
Forensic
Authentication

Level 2, Covert
Common Tool Authentication
(UV Light, Laser Pointer, Taggant Reader, etc.)

Level 1, Overt
Naked Eye or Tactile Authentication

Level 1, or overt, features are those that are instantly verified by the naked eye or have some kind of tactile structure. They are visible and discernible to the average person who has no training or instruction. The very fact that a hologram is present on a document is such an example as would be the presence of intaglio ink with its raised structure.

Level 2, or covert, features would be those that are not immediately discernible to the average person and would only be seen when a trained examiner uses a simple verification tool. Here examples would be a Covert Laser Retrievable element, the use of Invisible UV Ink or Taggants and of course the inclusion of some Hidden Text. In such situations a laser pointer, UV lamp, taggant reader or magnifying loop would be required for authentication.

Level 3 features are those that we refer to as forensic features. Features that are only discernible by people with extensive training in a complex laboratory environment. Examples here would be the analysis of optical structures that have deliberately been manipulated to create a unique fingerprint or very fine Nanotext.

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What do Immigration Officers look for in a travel document?

The purpose of a travel document is to confirm the identity and the nationality of the holder for the purpose of crossing international borders. It therefore needs to be secure in order to ensure that the document cannot be counterfeited or unofficially altered. An Immigration official will use the document to confirm a person's nationality, identity and entitlement to leave or to enter the country.

More than 200 countries issue passports and each country issues many different documents. The ICAO promotes a standard layout and recommended safeguard standards such as digital images which are more secure. The MRZ offers global machine-readability and the standards for biometrics are vital.

How are documents checked?

Because of the numbers of different travel documents that are in circulation, it is usual for Immigration officials to be trained to identify generic rather than specific security features. It would be impossible to remember the specifics of every travel document.

That is why adherence to ICAO specifications is so vital

Verification of a travel document therefore takes place on four levels and relates to the security levels previously defined.

- *Level 1 – on entry*
- *Level 2 – back office*
- *Level 3 – forensic lab*
- *Level 4 – manufacturer*

The importance of Level 1

This is the start of the process. *If suspicions are not raised here, level 2 – 4 checks cannot be conducted.* Whilst security features are checked it must be borne in mind that an Immigration official only has a very short time and little in the way of equipment to conduct all of these checks.

According to a recent presentation made at Security Document World 2016 by the Canadian Border Service Agency (CBSA)

"a border control guard has 7 seconds to verify Level 1 features, if (a counterfeit) fools the officer then this document is down the road and the second and third level features will never be inspected" (Source: http://securitydocumentworld.com/article-details/i/12749)

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"The importance of Level 1 security features cannot be understated since the majority of end users do not have access to specialist equipment. They are the front door locks in any design and, as such, are usually the first point of interest for not only for the examiner but also for the criminal.

The way this type of safeguard is used is just as important, if not more so, than simply what the safeguard is. Consideration as to position, integration with other features and how the end result will be verified all contribute to how successful the safeguard will be in everyday use.

If used intelligently, they can work in concert with other features drawing the viewer in and encouraging further examination."
(Source: UK National Document Fraud Unit, 2016)

The importance of secure Level 1 features cannot be understated.

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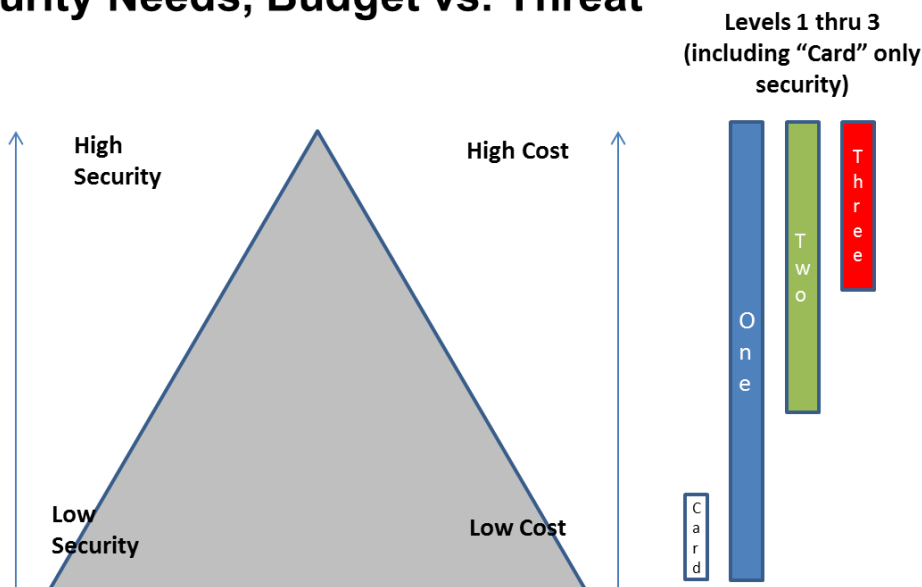
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Levels of Security & Budgets

OEMs, integrators, security printers and Immigration officers have provided our brief. The next stage is to ensure that the features need to be both practical and affordable. There is no point having one without the other.

For example, if a client wishes to control access to their building where not many employees work and generally faces are well known, then a simple printed access card without any kind of hologram may be the solution.

The threat of an unknown individual gaining entry is low. Very low security and reasonably low cost.

Security Needs, Budget vs. Threat

Levels 1 thru 3
(including "Card" only security)

High Security

High Cost

One

Two

Three

Low Security

Low Cost

Card

The Challenge

The other interest groups who have to be considered are Governments or National Bodies who specify the documents and therefore need to understand what they need to include, but more importantly the criminals that attempt to counterfeit and forge such documents.

We refer to this last group as the Organised Threat. There are a number of organised threats out there that we need to be aware of and ensure that our features cannot be copied or simulated.

Online it is possible to purchase counterfeit ID Cards and Driving Licenses where the hologram has been simulated to such an extent that the average person would not know the difference.

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There is every chance they are using low priced dot matrix origination machines to produce these copy holograms. The internet then offers a very easy distribution channel.

Organised threats

- *Low-priced dot matrix origination machines are available on the market.*
- *Traditional decorative hologram film producers are suffering in the recession and looking for greater margin in the security market.*
- *Internet offers an easy distribution channel.*
- *International laws are limited in their ability to crack down on such businesses.*

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Level 1 Security Features

All these drivers have been brought together and ITW Security Division set about creating and acquiring technologies that were all concerned with Level 1 features, making sure all these features could be combined with conventional Level 1 features for easy public recognition and importantly made sure these features could not be created on generally available dot matrix equipment that is accessible by counterfeiters.

The NEW Level 1

We have already established that holograms are widely accepted security features. Level 1 features should be authenticated in seconds without tools, and whilst existing as part of a layered security approach, they are growing in demand versus their more expensive level 2 and 3 counterparts.

There are however concerns about the ability of potential counterfeiters to copy such features.
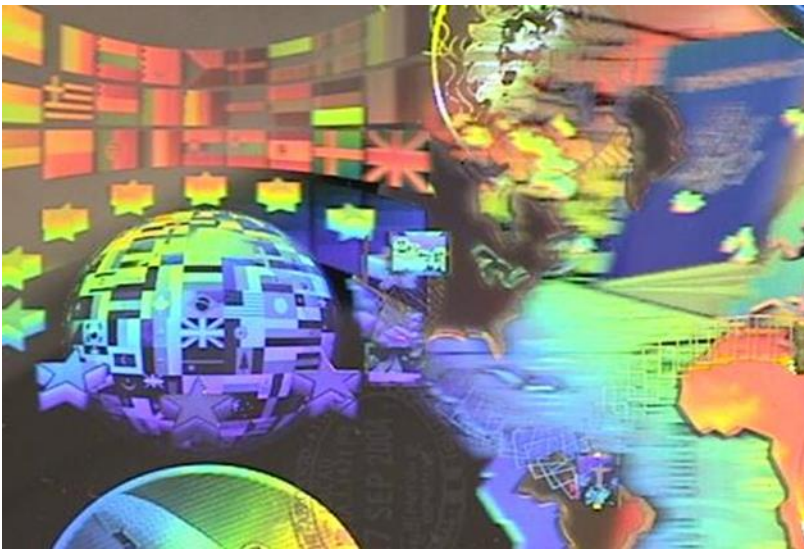
Level 1

- *Holograms are accepted commonly so people know to look for them*
- *Can be authenticated in seconds without the use of tools*
- *Gaining in demand over more expensive Level 2 or Level 3*
- *Can be mass produced for cost effective and enhanced security*
- *But, there are concerns with more capable counterfeiters*

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Achrogram™

The first new feature that ITW has launched is the Achrogram™. The Achrogram™ is essentially a hologram with a colour flip feature. Part of the image is shot as a rainbow structure and the other as matt white.

As the viewing angle changes the rainbow and matt white areas flip; rainbow becomes matt white and matt white rainbow. This is a feature that is very easy to verify but not easily to simulate or replicate with printing techniques.

It is not produced on standard laser origination equipment rather a hybrid system that essentially builds structures without colour. The ITW Achrogram™ is not unique but its availability worldwide is limited so not something a would-be counterfeiter could try to get hold of either.

- *Excellent rainbow/matt white flip effect*
- *Not produced using standard laser origination techniques*
- *Extremely difficult to counterfeit or replicate with printing techniques.*

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Deep Channel Structure

Our Deep Channel Structure is a feature with great movement and depth. Again like the Achrogram is it produced on a hybrid origination system that builds structures without colour.
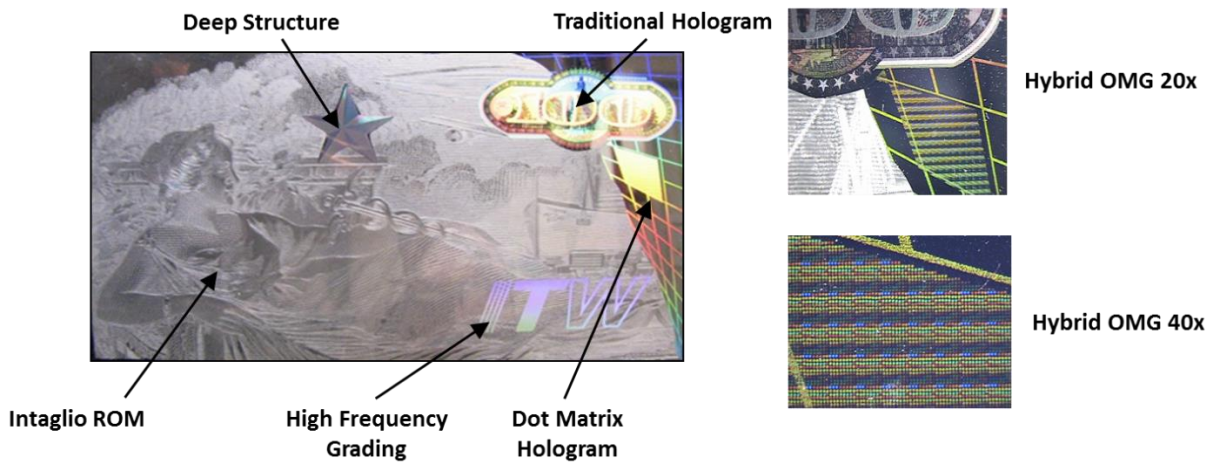
The clever part is then deeply embosses the image into a thin film for mass production. The feature can be included in almost the full range of products used in the security print arena today and is again something that would be hard to simulate with printing techniques and very difficult to source.

- *Structures originated on hybrid system*
- *No colour*
- *Structure then deeply embossed into film*
- *Film used in a variety of different products*
- *The overall effect is that of great depth*
- *Cannot be simulated with print techniques*

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Optical Micro Grafting (Hybrid Hologram)

A proprietary process in which design elements from different origination methods, holographic and non-holographic are seamlessly combined.

Deep Structure · Traditional Hologram · Intaglio ROM · High Frequency Grading · Dot Matrix Hologram · Hybrid OMG 20x · Hybrid OMG 40x
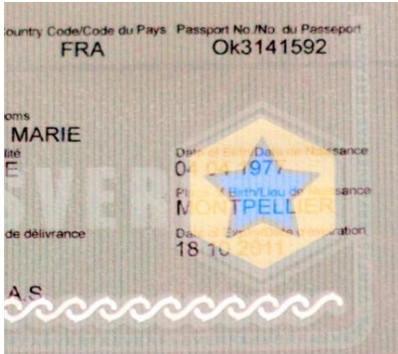
All of the aforementioned features are, however, very different in appearance to what people in general have come to refer to as a hologram so for now it is better that we use these new level 1 features in combination with the more standard holographic structures.

Through our in house Optical Micro Grafting process we can easily bring together different origination elements from multiple media sources seamlessly into one uniform design. This process can offer massive benefits to the client. They don't have to choose between a holographic feature that people will recognise and the new features that make potential counterfeiting extremely difficult. Ultimately they can have both.

Also the greater the number of origination techniques used to produce a hologram, the more difficult the image becomes to potentially simulate and the more likely that would be counterfeiters will look elsewhere.

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Ovtek™

Aside from just holographic level 1 features, ITW are also promoting a number of printed features. Ovtek™ is one such example.

The feature is essentially a transparent colour shifting ink. The technique involves the printing of patterns composed of two separate graphics with colours that swap instantly based on the viewing angle.

The colours are bright and clear and yet biographical data can still be read through them. There are 6 different colour combinations available giving clients design choices and the inks are reactive to chemical, thermal and mechanical attacks.

- *Transparent color shifting ink feature – Great colour & transparency*
- *Colours swap instantly based on viewing angle – 6 available combinations*
- *Inks reactive to chemical, thermal & mechanical attacks*

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Imagram™

Imagram™ is another example of a fantastic level 1 printed feature. Here a diffractive variable photographic image is printed with excellent colour rendering and yet like Ovtek the finished effect is transparent ensuring that the variable biographical data underneath can still be clearly read.

Again the feature is printed in such a way that any attempt to tamper with the inks will be exposed.

- *Printing of diffractive variable photographic image*
- *Excellent colour rendering & transparency for bio data*
- *Inks reactive to chemical, thermal & mechanical attack*

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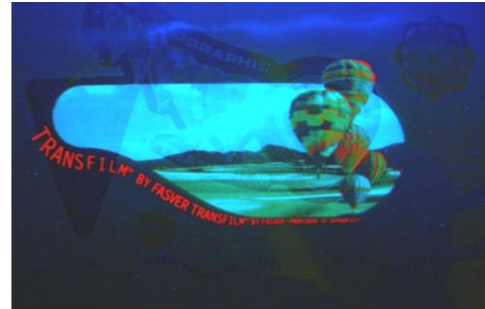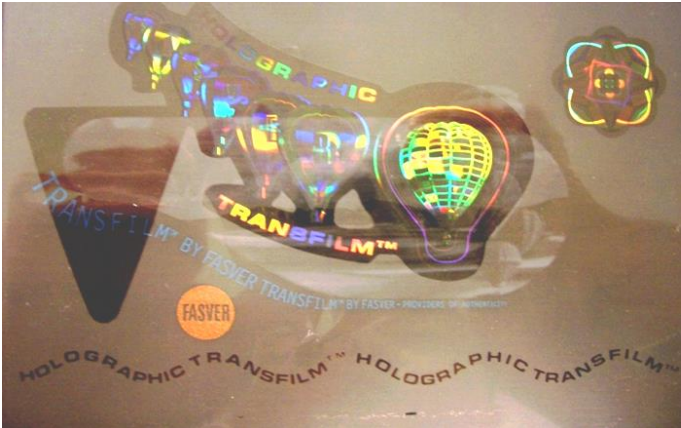COUNTRY OF

Thermochromic Printing

Thermochromic inks are not new to the market but ITW are now offering thermochromic inks in a wide range of colours, even specific colours when needed, for use on a wide range of substrates with up to a 10-year life.

There are also no restrictions on temperature ranges for any chosen colour. In addition, we are able to produce full polychromatic images as shown above in small or large areas.

- *Temperature range from minimum -20°C/-4°F to maximum +80°C/176°F*
- *Vivid, opaque and semi-transparent colours available*
- *Full polychromatic images*
- *Maximum point size 130 dpi*
- *Minimum line definition 150µm*
- *Inks reactive to chemical, thermal & mechanical attack*

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Alexagram®

Whilst these printed features are secure, relatively unique and work very effectively by themselves, we do also encourage clients to think about going that step further and combining level 1 printed features with level 1 holographic features.

Patented in house techniques allow us to print images in perfect registration to holographic features. Yet another barrier to the would-be counterfeiter wishing to simulate a secure document.

- *Printing of ink features in almost perfect registration to hologram*
- *Selected areas of the hologram outlined with ink*
- *Inks reactive to chemical, thermal & mechanical attack*

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Summary

So to summarise, Level 1 features do seem to be the preferred choice of companies today.

Whether it is first line inspectors looking for the quick less than 10 second verification or the purchasing departments holding the purse strings.

Some of the more common features that we are used to today are being simulated more and more as would be counterfeiters also get used to these features and develop their techniques.

There is therefore a need for new features that provide quick verification, don't cost the earth and are difficult to copy or simulate. With such features now available level 1 will remain king in a safe and secure environment.

- *Requirements are there for Level 1 features*
- *Higher demand for Level 1 versus 2 or 3*
- *Important to understand the document verifier*
    - *What's needed?*
    - *What's practical?*
- *Combine holographic features – Complexity*
- *Combine different technologies – Further Complexity*
- *Constantly assess the situation & review market reaction*

Level One Is Still King. With New Techniques It Will Remain Safe & Secure.

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About Us – ITW Security Division

The ITW Security Division was formed in 2012 through the coming together of the management teams, technologies and resources of Covid®, Fasver® and Imagedata™. Leveraging the strengths of these brands, the ITW Security Division today offers the secure document market a single source supply for high security laminate documents and dye diffusion (D2T2) ribbons.

As an independently operated division of Illinois Tool Works Inc. (ITW), a Fortune 200 company, we have the financial resources necessary to continually invest in new technology, research and development. This global footprint and view has enabled us to supply products to more than half the world's countries from our secure facilities in the UK, France and USA.

At ITW Security Division we understand that the foundation for secure materials begins with highly secure manufacturing facilities. We manufacture products from start to finish in one of our secure facilities enabling us to meet the 'under-one-roof' production requirements demanded by many governments. Our products and technologies driven by our Covid® and Fasver® brands have developed a global reputation for highly advanced security solutions. Overt, covert and forensic security technologies are customised to the specific requirements of each document program to enable the widest combination of personalisation methods and substrates for passport and ID card issuance worldwide. The companies within the security division include:

ITW Covid Security Group Inc was one of the world's first holographic and OVD manufacturers and now has over 25 years' experience. Located in New Jersey USA, the company is ISO14298 & NASPO (North American Security Products Organisation) accredited and manufactures all of its products under one roof, from holographic design and origination through to shim production, embossing, metallising, laminating, die cutting, converting and packing.

ITW Imagedata is a global manufacturer of consumables for the card industry located in the UK, specialising in the design and manufacture of D2T2 (dye sublimation) ribbons that we supply exclusively to OEM card printers.

Fasver® S.A.S.U. is a global leader in the design and production of security products for the protection of personal data on identity documents including Passports & ID Cards. Located in Montpellier, France, the company is ISO & Intergraf accredited and their unique authentication solutions have been protecting documents for over 25 years.

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