

SPARK®

Innovative optical technology for document sophistication and identity protection

by Pandelis Papadimitriou

This article focuses on the innovative optical technology SPARK®, designed for front-line authentication required for level one protection. The cutting-edge technology - encompassing patented inventions in multiple domains - has been rapidly validated by central banks and successfully integrated on about 60 banknote denominations in over 40 countries. Since 2012, the technology has been extended to the protection of government-issued banknotes and travel and identity documents.

Identity protection and document integrity play an important role in the international fight against terrorism and counterfeiting. As more than three billion people travel each year, border officials are required to authenticate travel documents efficiently without jeopardising border clearance. To deter identity theft and facilitate the detection of fraudulent documents, innovative security technologies are necessary in travel and identity documents.

Immediate recognition

According to the INTERPOL resolution of May 1992¹, multiple public optical features are recommended to ensure immediate and intuitive recognition. This allows for an unambiguous on-the-spot check by law enforcement officials based on visual, intuitive verification without requiring detection equipment or special training.

On the occasion of the 2nd Counterfeit and Security Documents Working Group/Meeting with Law Enforcement and Private Industry², the Swiss company SICPA presented a portfolio of security ink technologies for the protection of security documents and banknotes: how ink-based security features can be authenticated efficiently by law enforcement officials.

One of these security ink technologies is the SPARK® technology, which brings design flexibility and counterfeit robustness while allowing efficient control for police, customs and border officials without any need for detection equipment. The new INTERPOL passport has adopted the technology and a rising number of countries are expected to join.

Technology

The SPARK® security feature exhibits three visual characteristics: optical brightness, colour-shift and dynamic light effects (see figure 1). Tilting a passport carrying this feature gives a three dimensional impression of volume and movement, allowing efficient and unambiguous authentication during document controls at borders and checkpoints. This overt feature is intuitive to detect but impossible to reproduce without the complex and interdependent dedicated components.

The essential elements required for the creation of SPARK® are the precision pigment OVMP®, the ink OVMI® (see figure 2), and the dedicated printing module with customised magnetic assemblies. All these elements are the fruit of extensive research and development, and the innovations in terms of pigment



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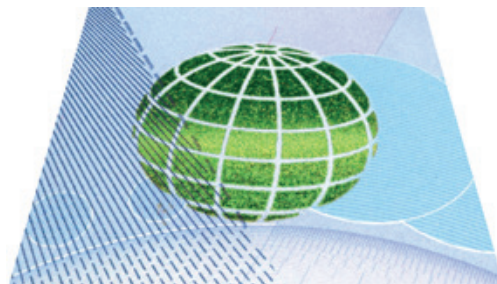


Figure 1
The colour-shifting globe motif changes from gold to green, with a rolling-bar of light moving across the globe.

Figure 2 (left)

OVM[®] for the creation of SPARK[®].

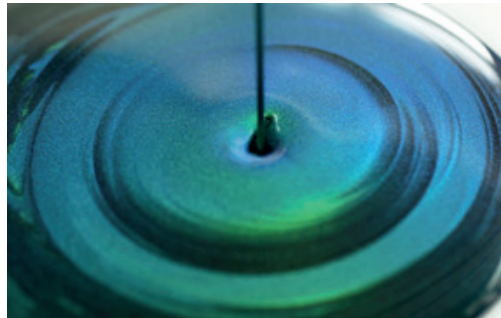


Figure 3 (right)

SPARK[®] can be integrated in the form of the standardised ICAO e-Passport symbol coupled with the ISO code of a designated country.



manufacturing, ink formulation and printing configuration are protected as patented intellectual properties available for governmental security use only.

Design recommendations and customisation

SPARK[®] is a designer-friendly optical security feature giving room to creativity and flexibility. Drawing on designer expertise, the optical feature can be created into different motifs and dynamic effects to achieve thematic coherence and aesthetics. While the design potential of the feature is exciting, a set of design guidelines are recommended for the feature integration in passports in order to facilitate

document, and can be easily understood and carried out by law enforcement agents worldwide. The recommended diagonal rolling-bar dynamic effect aims at harmonising the authentication work across all INTERPOL member states.

Paradoxically, the SPARK[®] feature can fulfil both the specific national needs for customisation and the global needs of harmonisation. One example of effective integration is having the feature created in the form of the standardised e-Passport symbol coupled with the specific ISO code of a designated country (see figure 3).

Printability, production performance and feature visibility can be fully optimised with the integration of the SPARK[®] feature on the page facing the personal data page, or on the first inside cover page. The integration of the SPARK[®] motif can be integrated on visa pages as well where ever the issuing authority sees the necessity. The feature can be selected to exhibit the same colour-shifting properties of OVI[®], which is currently in use for the protection of personal data pages in a large number of passports.

Until now, SPARK[®] has been incorporated in the passport of the People's Republic of China (see figure 4), the INTERPOL passport, as well as the passport specimen jointly developed by Polish Security Printing Works and SICPA (see figures 5 and 6). Furthermore, the feature is integrated on the newly issued EUR 5 note (see figure 7). Thus, the technology has been validated and proven for applications on official travel documents and banknotes, and an increasing number of security printers are gaining experience in the in line creation of this innovative optical feature.

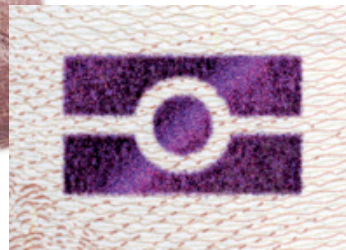
Control supply chain and feature resistance

The optical magnetic SPARK[®] is a SICPA technology in partnerships with exclusive security providers. The joint partnership is fully committed to the continuous development of this technology, taking into



Figure 4

Magenta-to-green SPARK[®] motif in the passport of the People's Republic of China.



feature recognition and detection efficiency during security checks in different countries. This is an important practical concern as border guards need to authenticate security features on passports of a large number of countries within the shortest lapse of time. The SPARK[®] feature with a dynamic and easily recognisable rolling-bar effect is designed to achieve high detection efficiency.

The recommended rolling-bar effect can be integrated in the form of a beam of light moving diagonally across the e-Passport symbol, as this would facilitate visual detection with the minimum tilting of the passport



Figure 5 (left)
Marie Curie passport specimen jointly by the Polish Security Printing Works and SICPA. The optical feature is integrated on the visa page in the form of the standardised e-Passport symbol plus the Radium symbol.



Figure 6 (right)
Rolling-bar dynamic effect when the passport is tilted, while the colour shifts from gold to green.



Figure 7 (below)
SPARK® feature on the newly issued EUR 5 (2013).

consideration international regulations and changing Environment, Health and Safety requirements in the decades to come. The technology is strictly reserved for banknotes and official identity and travel documents, controlled by a secured supply chain which is exclusive to accredited high security printers.

Conclusion

Official identity and travel documents protect against identity theft and contribute to public safety. Each day, law enforcement officials carry out systematic checks of these documents, particularly at border crossings and travel hubs.

The security ink technology SPARK®, with effective design integration in passports, allows for the creation of a security feature which is functional, secure and aesthetic at the same time, guaranteeing an efficient visual detection of genuine documents against alterations and illicit reproductions. Observing the security standards set by INTERPOL, a rising number of countries are expected to adopt this feature in the issuing of a new generation of passports.

References

- 1 Resolution 8/FOMON/RES/5, made during the 8th International Conference on Currency Counterfeiting by International Criminal Police Organization INTERPOL, in Ottawa, Canada, April-May 1992.
- 2 The 2nd Counterfeit and Security Documents Working Group/ Meeting with Law Enforcement and Private Industry was organised by INTERPOL in Lyon, France on 30 and 31 May 2012.

