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Protection

# The evolution of the photocopier and the threat to secure print

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## The evolution of the photocopier and the threat to secure print

Chester Carlson, an American physicist and patent attorney, spent many years conducting experiments in his kitchen in his spare time. Despite a few explosive and smoky mishaps, he persevered and successfully produced his first copy in 1938 using sulphur powder, a zinc plate and a handkerchief. He patented his invention and several years later the first electrographic photocopier was developed by Xerox with the first commercially available push-button device launching in 1958, the popularity of this new technology by Xerox gained the technique the alternative name of xerography.

Today, this technology is still used in LED and laser toner printers, but this is typically combined with a digital scanner in a multi-function printer (MFP). Some lower-end devices, often called all-in-one (AOI) devices, use digital image capture systems combined with inkjet printing technology instead.

Early digital copy devices were no match for the high resolution of secure conventional print, but with significant advances in image capture and digital printing technology over the last three decades, reasonable reproductions are now possible, at least to the untrained eye. Not only have image capture devices become significantly better in terms of image quality and speed, the image sensor technology has moved on from CCD to CMOS.

Although both technologies are still used today, CMOS sensors have gained market share as the image quality can now be considered similar to that of a CCD image sensor, moreover, CMOS sensors enable the manufacture of smaller and cheaper devices.

The emergence of inkjet technology in the consumer market in the 1980s has also had an impact with AOI inkjet devices readily available for less than £40 from high street and online vendors.

This digital revolution poses a significant threat to some types of security print, with many people having counterfeit production devices at their fingertips, both at work and at home. It is no surprise that with the advancements observed in digital technology and the increase in accessibility to copiers, scanners and printers, there has been a notable increase in the proportion of counterfeit documents produced using these digital MFP and AIO devices.

Most concerning for De La Rue and the security printing industry is the increasing difficulty to observe discernible differences between the secure, conventionally printed, genuine documents and the digitally printed counterfeits, without the use of magnifying equipment.



Today De La Rue continues to encourage the layering of security throughout all its documents with the incorporation of specific security features and high security print.

It is not only MFP and AOI print and copy devices that pose a threat to secure print. Since the launch of the first camera phone in 1999, which had a 0.11MP camera, the technology has evolved rapidly with smartphones now having multiple cameras in a single device.

Smartphones today typically contain 12MP cameras, but February 2020 saw the launch of a smartphone boasting a 108MP camera! Smartphones have become so popular that 3.5 billion of the global population now use one, in the UK it is estimated that 79% of the adult population own a device. These sophisticated image capture devices should also be considered a threat.

De La Rue was quick to act in the early 90s developing anti-scan and anti-copy print features Pyramid® and Tartan®, and later incorporating SC marks and DR marks, which are still in use. Many customers are still interested in anti-scan/copy features today, particularly given the increase in the number of counterfeit documents produced using digital technology. The De La Rue Authentication team have been thoroughly investigating the efficacy of current anti-scan/copy features and exploring whether modern copying and scanning devices can be fooled through print alone.

The team initially sought to engage with third party image capture experts and exploit their knowledge for ideas, however, most of the progress made has been through iterative, empirical experiments. The project has revealed the complexity of today's digital copying devices with many having multiple settings to choose from, depending on the type of document being copied, all producing subtly different reproductions.

Through these empirical investigations, significant progress has been made in developing a printed feature that when copied on an MFP using all modes shows a discernible effect to the trained, unaided eye.

In the coming months the team will be developing and validating a more extensive anti-scan/copy test protocol utilising a variety of market-leading home and office devices from the cheaper all-in-one home printers to the more advanced, and expensive, photo scanners and toner printers, as well as incorporating the use of smartphones for image capture. The new testing protocol will enable further development and optimisation of anti-scan/copy features ensuring efficacy across a range of typical home and office equipment.



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