THE CHALLENGE OF OBTAINING GOOD QUALITY AND COLOUR

In an industry where specialist expertise is declining, Tom Mooney introduces Global Graphics Solutions' SmartMedia – a suite of components that maximises quality and output from a digital press

Tom Mooney is Product Manager at Global Graphics Software

The rise of Industry 4.0 and the smart factory, has allowed the production process to be as efficient as possible. The use of technology, such as artificial intelligence, has helped to predict order requirements or produce on demand. We have seen a shift from mass production to mass customisation. The benefits mean that the user gets what they want when they want it and the producer benefits from savings due to reduced stock, transportation costs and storage. However, this has also resulted in a decline in specialist print knowledge, especially where print is part of a wider production process. For example, where the press is driven by general production operators, not print specialists.

DIGITAL INKJET

Colour management has been around for a long time and its challenges are well known in the industry. We know that obtaining good quality and colour often requires specialist print knowledge. Unfortunately, it is a declining skillset coming at a time when there is an increase in digital presses and colour demands.

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With a digital press there may be only one operator whose job it is to load the substrate, offload the finished print and sort out any paper jams and errors. They may know little about colour management and simply want to load the substrate, load the job and print. As printers, we have been mainly concerned with putting ink on paper, but with digital inkjet, the substrates we print on vary widely. From specialist printing directly to aircraft, walls, textiles or tiles, to the more common papers, plastic film and boards.

COLOUR CONSIDERATION

Concerning ink and substrates, colour reproduction is a major consideration in all of the above applications. The aim is usually to achieve accurate colour. However, different ink and substrate combinations not only have different colorimetric and physical properties, but also come at different price points. So, printers have to support a range of quality/cost trade-offs, while still maximising print output. Add into the mix environmental conditions, such as temperature and humidity, and it becomes a real challenge to produce consistent colour across a fleet of digital presses from different manufacturers.

The key to achieving consistent colour is to have a reproducible workflow that can be repeated time after time by both skilled and unskilled operators. Global Graphics Software has introduced SmartMedia – a suite of components that simplifies the process of obtaining optimum quality and output from a digital press. Press manufacturers (OEMs) often have print specialists and a reference press that is set up to print excellent quality and colour for each media. SmartMedia packages all the OEM's reference press settings for each media and ink set to create a library of media definitions. It then builds a simple process to match the customer's production press to the OEM's reference press. This allows the same settings to obtain equally good quality for the customer.

With SmartMedia, the OEM creates a package of parameters that controls the colour on a digital press including:

DROP LEVEL MIXING

A typical piezo inkjet printhead may have three drop sizes – small, medium and large. The small drop is used for lighter shades of the print and, as it gets darker and more ink is put down, the larger drops are required. These transitions or mixes are controlled by the OEM.

DOT GAIN CORRECTION

As more ink is added the result is a non-linear tone reproduction curve and, if not corrected, could give a darker image than intended. It is dependent on ink, media and the halftone or screen patterns being used. This is measured and a correction curve applied (**Figure 1**).

INK LIMITING

This is important not only to get the optimum colour gamut, but also to prevent over-inking

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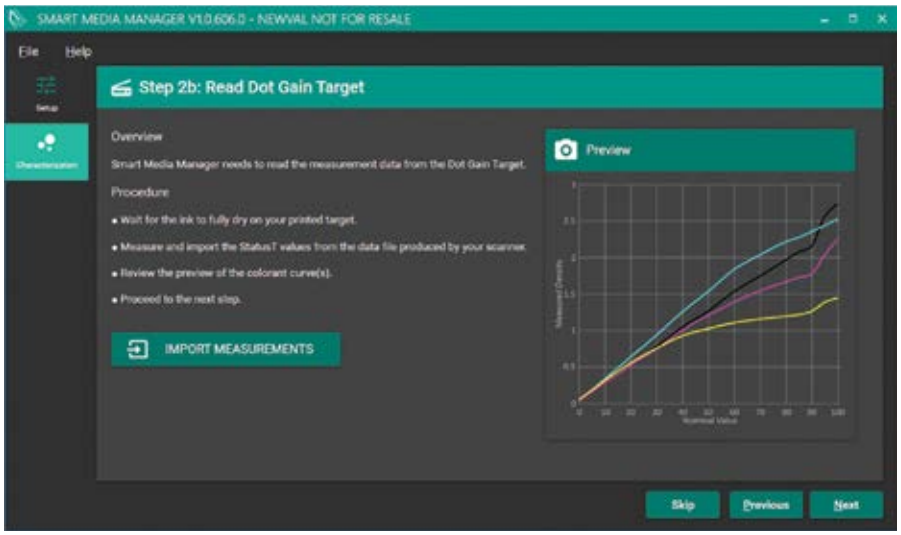

Figure 1. Dot Gain – showing the Tone Reproduction curve of the press in StatusT Density

and damage to the press. Ink limits for the print bar colours are set, as well as a Total Ink Limit (TIL) or Total Area Coverage (TAC).

GREY BALANCING

The human eye is very sensitive to black and white, and it is important that greys do not have a colour caste. This step can be left to the ICC profile, although the ICC characterisation software will struggle if it does not have a good underlying response from the press. Here, the neutrality of the grey can be measured and the ink mixes changed in order to achieve the lowest possible colour values. This process is repeated or iterated and learns from the previous measurements until the preset tolerance is met (**Figure 2**).

CHARACTERISATION OR ICC PROFILING

Characterisation is then done using an ICC profiler to capture the 'fingerprint' of the press. This can be a small test chart with a few hundred patches to ones with thousands of patches. The more patches there are the more points can be measured to make a more accurate colour table.

CONCLUSION

With SmartMedia there is no longer a need for the end-user operator to be a specialist print expert and create ICC profiles, etc. By keeping all this colour-critical information in one package, its integrity is ensured and the operator can use it with a simple, one-step calibration. This effectively puts the OEM colour expertise in a file. And, for those print-service providers or manufacturing plants who do have print experts, colour tweaks can be made to match their own preferences. ■

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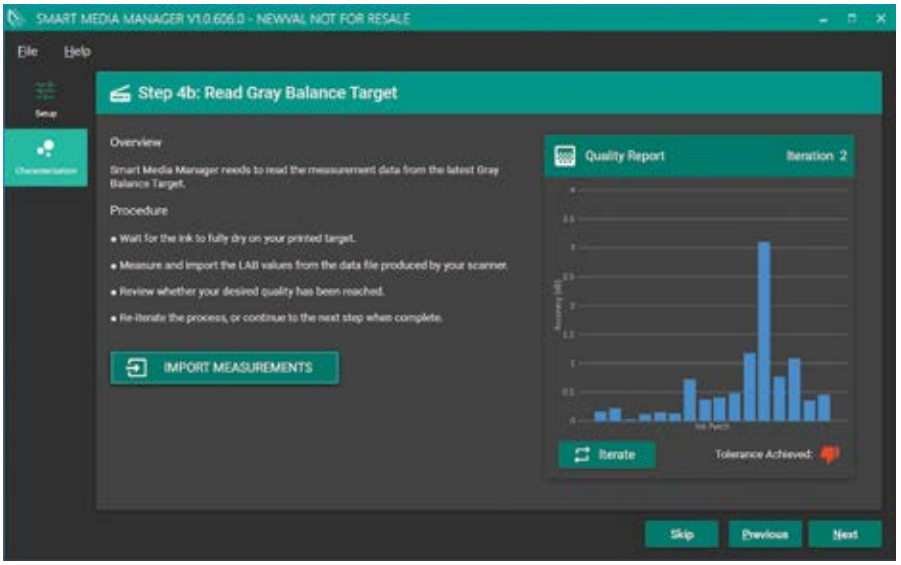

Figure 2. Grey Balancing – an iterative process removing the colour caste from a neutral grey.