Kodak Colorflow Technology

Colour is getting harder, not easier. This is because, apart from colour's inherent complexity, which involves physics, chemistry and biology, we have an industry stampeding towards distribute and print production. The range and colour capability of the devices in colour workflows is increasingly harder to predict, making it even more difficult to achieve the goal of open colour management.

Colour management technology should provide the equivalent, if not better, levels of colour processing control to those of traditional, proprietary, high end colour systems. These systems are now mostly extinct, but they were designed and built exclusively for colour production. The engineers creating these extremely expensive systems (think €250,000 and up) had absolute control over every aspect of the technology, from the data formats to the operating system. In an age where computers and electronics are used to direct processes in everything from digital cameras to washing machines, the implications of this are hard to comprehend.

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The Problem

It's all about control, or rather the lack of it, because no longer is absolute control possible for colour capable systems. The variables influencing colour production for a specific job, today are totally unpredictable ranging from the obvious, such as the use of different computers and software, to the less obvious such as the colour perception of individuals and the behaviour of particular output devices. Also, despite the efforts of developers to tame the colour management beast, there are still many parts of colour workflows that function in isolation, with indirect communication of colour data to the workflow.

While in some cases there is no alternative, such as digital image capture with a mobile device or digital camera, it should nonetheless be possible to manage the data processing on any networked digital device, including colour data. This is where manufacturers such as Fujifilm, Heidelberg and Kodak sniff opportunity.

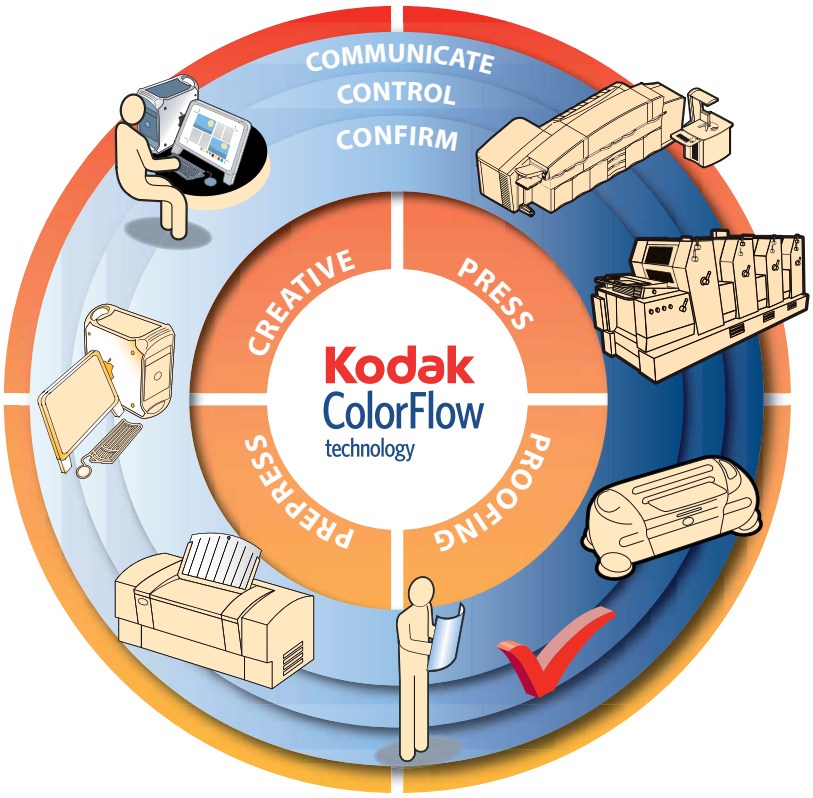
Kodak is the first major manufacturer to declare a formal strategy for colour management. As Kodak et al see it, colour accuracy determines colour worth and value, and a job's fitness for purpose. Even if colour accuracy doesn't matter for images circulated on Myspace or Bebo, it matters a lot if those same images end up in a glossy consumer magazine, for example, as part of an advertisement. Consistency is key, monitor to monitor, proof to proof, inkjet device to digital press, digital press to offset.

Unfortunately from a colour engineer's perspective, we don't necessarily share the same expectations for results nor do we have the means of fully

sharing our expectations, in order to achieve a common result. This was the starting point for the International Color Consortium (ICC) of which Kodak is a founding member. The ICC is doing terrific work in figuring out how to codify subjective values in a digital system, and Kodak is taking the ICC's guiding principals a step further with the Colorflow Technology architecture.

Colorflow Technology

Last August Kodak announced its Colorflow Technology brand, a set of technologies based on open industry standards and Kodak's colour knowledge. With this technology, Kodak brings all aspects of colour management from origination to delivery into a common architecture. Colorflow Technology incorporates tools so that designers will know what colours will look like in print or anywhere else, as soon as the file creation and production processes begin. Colorflow Technology is designed to allow Kodak products to share colour specification for consistent colour reproduction and accuracy throughout the supply chain for all participants. It uses shared terminology and standards throughout the production chain, supporting everyone including creative, prepress, proofing and press people.



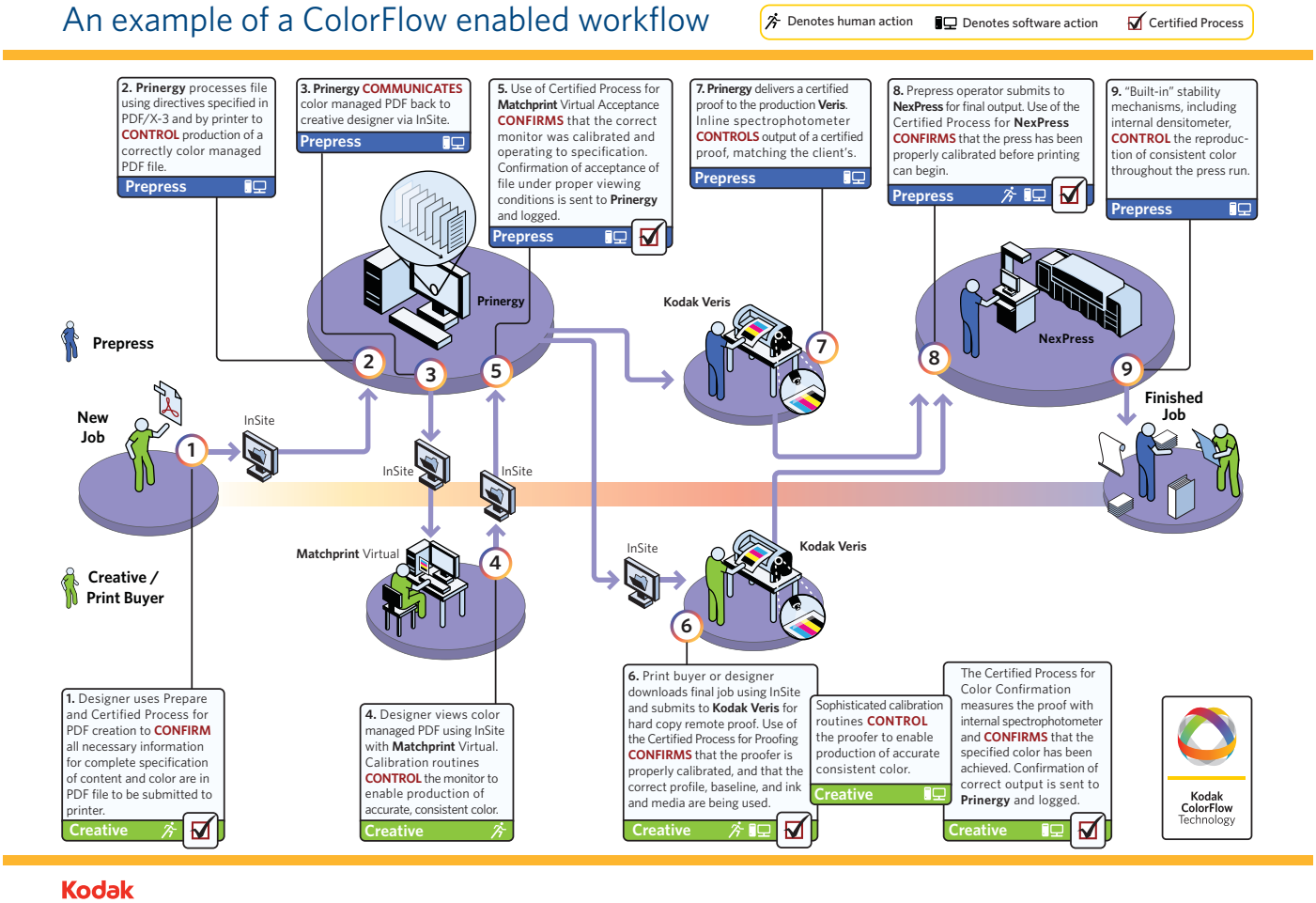
Kodak believes, rightly, that the solution to the colour management problem lies with integrated systems and data processing. This is not dissimilar to the views of Heidelberg or Fujifilm, both of whom have stated their commitments to a systematic colour management approach. The difficulty they all face is that today it's impossible to predict or control everything that will influence colour in a workflow. This is why data processing standards, such as the ICC specification and device profiling, and PDF-X/3 are so important. PDF-X/3 is an important part of Colorflow because it supports data in colour managed colour spaces such as CMYK or CIELab.

According to Kodak, Colorflow combines standards and Kodak colour expertise to provide stable, accurate colour processing throughout the workflow. There are three tenets to its proposition: communicate, control and confirm. Correctly implemented at every stage of colour data processing throughout the workflow, this will ensure a certifiable end result. As Jeff Hayzlett, Chief Marketing Officer, Kodak's Graphic Communications Group puts it "The Kodak Colorflow Technology brand rep-

resents a set of technology solutions, colour expertise, and operational guidelines to help streamline and simplify the process of specifying and reproducing colour."

Communicate

Colorflow is about connecting devices using open industry standards and common user interface attributes, in order to make life easier for operators. Colour management systems are notoriously complicated to use, because they have to take into account so many possible applications and



production environments, which can make for extremely complex user interfaces. Kodak claim that making things simpler makes device set-up and user interaction with colour technologies faster and easier, even in mixed environments. Colorflow exchanges colour parameters using an automated data handshake, to make sure that processes fall within tolerance. The purpose of the automated process is to reduce errors and time spent communicating colour.

Control

Improved control saves time, improves reliability and ensures consistent colour across devices over time. This has considerable value for printers,

print buyers and their customers. Many digital devices can be calibrated, but colour accuracy demands tight tolerances on all components, which the Colorflow architecture provides.

Confirm

Kodak confirms Colorflow file accuracy via a certification process. A certified file is one where at least one of the processes involved in producing it have been performed according to specification, so it's not necessarily a guarantee of quality. It's a sort of inversion of the preflight idea, so that file and device set-up and processing parameters are established at the point of file creation. Certified processes are those wherein the processing has been fixed to provide customers with processes they can trust, working in a sort of expert management mode. The Colorflow Certified mark shows a customer that the printer has processes under control.

Much of what Kodak is describing could be achieved with good working methods, combining device calibration and characterisation, and tight preflight management, particularly for mixed technology environments. Print-to-print variability won't go away, however, investing some sort of lowest common denominator colour management will allow for consistency in basic processing, and give printers an excellent foundation for future developments. This alone is a good enough reason for companies to consider Colorflow, or at least to take a more proactive stance with their existing colour management technologies and practices.

How Far Has Kodak Come?

Kodak announced Colorflow more as a statement of intent than as a completed system. Nonetheless substantial progress has been made, with a number of products already enabled with Colorflow technology. For example, the Veris digital proofer includes a probe that calculates the ink placement details such as droplet size and velocity, and has an inbuilt spectrophotometer. These technologies now operate within the Colorflow architecture so that each proofing engine is constantly monitored to ensure that it is within a specified tolerance.

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The same applies for the Insite Matchprint Virtual soft proofing technology, which includes calibration tools, and for the Nexpress engines in the future. These technologies make it possible for Colorflow to confirm and certify processes within the workflow. Other Colorflow compatible products include Kodak Prepare software, the Prinergy workflow system and Matchprint inkjet proofers.

Colorflow will gradually be integrated into Kodak's existing products and other new products are under development. It will take several years before every Kodak product includes Colorflow intelligence, however the Kodak Approval digital imaging system and Kodak Pressproof software are among the products planned for the Colorflow portfolio in 2007.

It Might Just Work

A colour management system must be able to guarantee consistent results and depends utterly on stable devices functioning within a uniform, standards-driven environment. Colorflow works within such a framework to ensure that the various components within it produce deliverables within tolerance and correctly manufactured. It's an ambitious vision, but Kodak has considerable credentials to do what it says it wants to do.

The company's Graphic Communications Group is based on five established industry names: Creo, Nexpress, KPG, Encad and Versamark, which together give it unmatched market breadth, colour experience and knowledge. As Kodak sees it, Kodak "is the only company with focus, resources, and expertise to deliver" such a system.

However the problem is that to be part of a Colorflow workflow products have to meet certain criteria, and if they don't the whole thing is at risk of becoming a nonsense. The success of this vision depends on the support for Colorflow from other companies, so it's a little reminiscent of the Networked Graphic Production concept set up by Creo before it became part of Kodak. Among other things, NGP sought to encourage other companies to interface with Creo technologies, using Creo specified JDF interfaces. No statement has been made thus far to define Colorflow enabled JDF interfaces.

Kodak recognises that it needs to support hybrid workflows, along with the fact that companies rarely want to be tied into a single technology provider. Non-Kodak technologies are therefore supported within the Colorflow architecture as long as they fulfil Kodak's criteria. These are largely ICC-based so this part shouldn't pose too much of a problem, but the difficulty comes with terminology and user interfaces. There are different vocabulary preferences even within a common language such as English, which will need to be accommodated. Nor will it be easy for Kodak to convince competitors to follow Colorflow's lead for user interface design and behaviour, since user interfaces are key technology differentiators. Nonetheless, Colorflow is a highly laudable intent, one for which Kodak has demonstrated serious commitment. We look forward to monitoring its progress in the run up to drupa.

– Laurel Brunner