



IS&T

# REPORTER

"THE WINDOW ON IMAGING"

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## SELECTED CONFERENCE ABSTRACTS: Technologies in Digital Photo Fulfillment 2009

### The Exploration of Dry-Micro/Minilabs

Kurt H. Freund, IMAGING POWER Picture + Print  
(Switzerland)

**Abstract:** The most important fact from ANALOG to DIGITAL is not the technical change; It is the change of consumer habits and there new demands!

It is not true that we have today less outputs of pictures, we have today much more possibilities to print out at many new and different locations. While in the past picture outputs where printed most on silver halide, there are today hardly borders on which media we can produce pictures.

This development has lead to a decrease of turnover in wholesale labs and of course has touched also very strong Minilabs!

### The Picture to Print Value Chain

Reiner Fageth, CeWe Color AG, and Philipp Sandhaus,  
OFFIS-Institute for Information Technology (Germany)

**Abstract:** This paper describes the changes in the value chain from taking the picture to displaying it. In the days of analogue imaging, there was only one option for displaying images after they had been taken; developing the film and prints. Nowadays the consumer has various display possibilities that do not necessarily include tangible products. Possible integrations and real data of consumers' behavior while

ordering tangible products are presented and analyzed.

### Increasing Online Photo Gift Sales Through Emotional Interplay

Ulf Unbehaun, DAZZ.com (Germany)

**Abstract:** Understanding the rapid advances in image processing and photo gift creation technology is a challenge for the traditional customer. For them, it is hard to imagine what great products can be made out of their personal photos let alone visualize how they will eventually look. Photo gift producers need a tool to show their clients the possibilities available.

In 2007, Personello, the German photo gift company, interviewed 500 potential photo gift clients and found out that there were two major reasons why potential clients did not buy a photo gift. Reason One: Clients felt they did not have a suitable image. Reason Two: Many clients preferred traditional products like mugs because they did not want to risk buying something they couldn't imagine.

We took our studies one step further and analyzed what made our customer's photos unsuitable, and discovered that a lot of good images were spoiled by bad backgrounds. As a result of this, Personello created the DAZZ.com "Photostyle" creation service which eliminates the original background of the customer's photo, restyles it and sets it into a collection of new backgrounds to suit a variety of products and occasions.

In order to introduce the customer to our complete range of photo gift products, and give them a variety to choose from, their collection of "Photostyles" is presented on all of our photo gifts. To recre-

To view full papers go to [www.imaging.org/pubs/reporter/](http://www.imaging.org/pubs/reporter/)

\* These papers were presented at the IS&T International Symposium on Technologies in Digital Photo Fulfillment, held February 28 - March 1, 2009, in Las Vegas, Nevada.

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ate a store-like shopping experience the customer can take a closer look at the gift by clicking on the picture. A video file opens enabling the customer to visualise the final product from all sides. For example, see jigsaw pieces drop onto a desk and fly together piece by piece until the customer's personal image appears.

The DAZZ.com service increases the customer base by opening up a channel to reach out to new customers who previously considered their photos unworthy. Once the customer sees the 3D video clips of their restyled photo on a range of products an

emotional bond is created to the product which, more often than not, leads to a sale. The innovative video presentation serves to create a buzz amongst users triggering them to share their experience with others.

This paper outlines the problems that hold potential customers back from having a photo gift made, and shows how offering choice and providing entertainment can arouse emotions that stimulate customers to buy. Thus increasing photo gift sales.

## Second Symposium on Digital Photo Fulfillment Provides Much Food for Thought

by Stuart Gordon, TDPF Symposium Chair; Brian Atkins, TDPF Program Chair;  
and Diana Gonzalez, IS&T Conference Program Manager

The Second International Symposium on Technologies for Digital Photo Fulfillment was held in Las Vegas, February 28-March 1, 2009. It featured 25 excellent papers covering a wide range of topics, including papers on CCD sensors, color negative film, image enhancement, metadata, photobooks, and numerous output systems. Several papers focused on business opportunities in the marketplace.

The symposium reflects the explosion of digital imaging as the consumer's choice mode for taking photos in the 21st century. While capture and image processing have directly effected the growth of digital photography, fulfillment of images captured is lagging behind.

Despite a smaller group of attendees than hoped for, conference participants represented the full spectrum of the digi-



Ulf Unbehaun (DAZZ.com) and Bill Orr (Imaging Solutions) network during the conference reception.

tal imaging community—from capture to process to output, with a special emphasis on new ways of growing the fulfillment of images. This area is primed for strong growth, whether through the more traditional 4"x6" and larger individual images or through the new generation of personalized photo gifting including photo books.

The conference highlight was an extemporaneous keynote given by Ben Nelson, general manager Snapfish (Hewlett-Packard Company) on "Why Trying to Resell Wireless Minutes Leads to Success in Online Imaging." Conference participants found Nelson's talk very appealing and there were so many questions, the session ran over a bit. There was much interest in the birth of Snapfish, which is indicative of the interest and potential opportunities presented by the business of fulfilling digital images.

### TDPF2009 STATISTICS

Attendees:	34
Oral Papers:	25
Dates:	Feb. 28 - March 1, 2009
Location:	Las Vegas, NV

The more intimate nature of the conference allowed old friends and new acquaintances to engage in more lively and informative discussions during the sessions, as well as at the networking events.

Feedback from the symposium survey shows that 69% of those who responded found the conference useful and would attend again. The survey also asked how often the conference should take place and 75% said every other year. These views will be taken into consideration as IS&T makes plans for the next International International Symposium on Technologies for Digital Photo Fulfillment.



Robert Mindler presents a paper on the Kodak Adaptive Picture Exchange (APEX).



Keynote speaker Ben Nelson (right), general manager Snapfish, with Technical Editor Jacques Kauffmann (MOS).

## STANDARDS UPDATE

David Q. McDowell, Editor

ISO TC130 has created a number of image sets that are generally known as the SCID (Standard Colour Image Data) images. Currently three sets have been published as Parts 1 through 3 of ISO 12640; a fourth set is nearing publication and a fifth set is in preparation.

Each of these image sets provides different features that are useful in evaluating the imaging chain. This article describes the relationship between the various image sets and the application area for which each is intended.

### Background

Standard test images provide a set of data that can be used for evaluating:

- the color reproduction of imaging systems;
- color image output devices;
- the effect of image processing algorithms applied to the images; or
- the coding technologies necessary for the storage and transmission of high-definition image data, etc.

These standard, well-defined image data sets are typical of the high-quality image content commonly encountered when capturing and printing images. Users can therefore be confident that the images should produce good quality reproductions if properly rendered, and that they provide a reasonable test of the evaluation task being undertaken. No set of images can fully test any system but the sets provided give as reasonable a test as can be expected from a limited image set. Furthermore, the existence of a standard set enables users in different locations to produce comparisons without the need to exchange images prior to reproduction.

Different applications require that the standard image data be provided in different image states using different image encodings (see ISO 22028-1 *Photographic technology — Extended colour encodings for digital image storage, manipulation and interchange — Part 1: Architec-*

*ture and requirements*) and so the user must select those appropriate to the evaluation task being undertaken. Whilst transformation of the image data to another image state is always possible, there is, in general, no agreement amongst experts as to how this should be done. Thus, it has been considered preferable to provide data in different image states in the various parts of this standard.

### The Published Image Data

**ISO 12640-1**, *Graphic technology — Prepress digital data exchange — Part 1: CMYK standard colour image data (CMYK/SCID)*, provides a set of 8 bits per channel data that is defined in terms of CMYK dot percentages. The colors resulting from reproduction of CMYK data are strictly defined only at the time of printing, and as such the data is only applicable to evaluation of CMYK printing applications.

Transformations to other image states and color encodings may not be well defined. In fact, the data may not even be useful for CMYK printing processes different from those typically found in traditional graphic arts applications, as the image data are defined to produce 'pleasing' images when reproduced on systems using 'typical' inks and producing 'typical' tone value rendering. Printing systems that use inks of a distinctly different color, or produce a very different tone value rendering, will not reproduce them as pleasing images without a well-defined color transformation. Moreover, with a bit depth of only 8 bits per channel any color transformation employed may well introduce artifacts.

**ISO 12640-2**, *Graphic technology — Prepress digital data exchange — Part 2: XYZ/sRGB encoded standard colour image data (XYZ/SCID)*, provides a set of test image data encoded both as XYZ values with each channel scaled to the range 0-65535, and as sRGB (defined in IEC 61966-2-1), with a bit depth of 8 bits per channel. Both sets of data are optimized for viewing on a

reference sRGB CRT display in the reference sRGB viewing environment, and relative to CIE standard illuminant D65 for which the XYZ tristimulus values were computed prior to scaling. The images are mainly designed to be used on systems utilizing sRGB as the reference encoding, and as such are primarily applicable to systems for which a color monitor similar to the sRGB reference display is the 'hub' device.

Although such systems are used for consumer photography, they are less popular in the graphic arts industry because the sRGB color gamut is quite different in shape than the color gamut of typical offset printing. This difference can necessitate fairly aggressive color re-rendering to produce optimal prints from sRGB image data.

**ISO 12640-3**, *Graphic technology — Prepress digital data exchange — Part 3: CIELAB standard colour image data (CIELAB/SCID)*, provides a set of test image data with a large reflection medium color gamut, illuminated using illuminant D50. The bit depth of the natural images is 16-bits per channel, while the color charts and vignettes are 8-bits per channel.

In order to be useful for applications where large, print-referred output gamuts are encountered, common in graphic technology and photography, it was felt that it would be desirable to produce an image set in which some colors are permitted to be encoded close to the boundary of the full color gamut attained with surface colors.

Furthermore, from the perspective of color management it is advantageous if the images are referenced to illuminant D50, which is the predominant reference illuminant used in graphic arts and photography, both for viewing and measurement. For this reason, it has also become the predominant reference illuminant for most color management applications.

### Still in Development

**ISO 12640-4**, *Graphic technology — Prepress*

*digital data exchange — Part 4: Wide gamut display-referred standard colour image data [Adobe RGB (1998)/SCID]*, is in the final stage of approval and publication. It will provide a set of wide-gamut test image data encoded as Adobe RGB with a bit depth of 16 bits per channel. These data are optimized for viewing on a reference Adobe RGB display in the reference Adobe RGB viewing environment (defined in the Adobe RGB (1998) Colour Image Encoding specification).

The images are designed to be used mainly on systems utilizing Adobe RGB as the reference encoding, and as such are mainly applicable to the professional market and those systems for which the wide gamut color monitor is the 'hub' device. Such workflows are popular among professional photographers, and are increasingly used in the graphic arts.

The Adobe RGB reference display color gamut is closer to typical offset printing gamuts than the sRGB reference display color gamut. Adobe RGB encoded images generally require much less aggressive color re-rendering going to print than sRGB encoded images, although this difference can necessitate color re-rendering between Adobe RGB images and sRGB images. The purpose of Part 4 is to provide a test image data set with a larger color gamut than sRGB, related to the Adobe RGB wide-gamut display-referred color space.

It is anticipated that Part 4 will be available by mid to late 2009.

**ISO 12640-5**, *Graphic technology — Prepress digital data exchange — Part 5: Scene-referred standard colour image data (RIMM/SCID)*, is still in preparation. When completed, it will provide a set of scene-referred test image data encoded as RIMM-RGB with a bit depth of 16 bits per channel.

These data are estimates of scene colorimetry obtained by capturing natural scenes using a variety of digital cameras and transforming the captured raw camera RGB signals to scene colorimetry estimates. The accuracy of these estimates is influenced by a number of factors including the degree to which the camera spectral sensitivities approximate human visual system color matching functions, the appropriateness of the transformation from raw camera RGB signals to colorimetry estimates, optical effects such as lens falloff, aberrations and flare, and the noise present in the camera signals. The transformations applied to obtain the colorimetry estimates were general transformations, *i.e.* they were not optimized for the spectral characteristics of each scene. Consequently, there may in some cases be significant errors in the estimates.

The image state of these data is scene-referred because no attempt has been made to color render the data to produce a pleasing reproduction on some output medium. The only processing applied to these data based on visual evaluation was to select the scene adopted white. This was accomplished by applying gains individually to the camera channels to achieve the desired white balance, converting to scene-referred, and then adjusting the overall gain in a linear, scene-referred working space while viewing the image with the example color rendering transform specified in Annex A of ISO 22028-3 applied.

Different white balances may be desired in some cases for aesthetic reasons, and different overall gains may be needed if different color rendering transforms are used. The images provided in this part of ISO 12640 are mainly applicable for evaluating color rendering to different output media.

## Image Availability

As these image sets are all ISO standards, they may be obtained from ISO or the various national body organizations that sell ISO standards. In the United States a convenient source is [www.npes.org/standards/workroom.html](http://www.npes.org/standards/workroom.html).

The text of the standard and the image data are provided on CD-ROM.

Permissions for use are included in the documentation and have kept very liberal to facilitate the use of these images for research, testing, and comparison purposes.

*For suggestions for (or input to) future updates, or standards questions in general, please contact the author at [mcdowell@npes.org](mailto:mcdowell@npes.org) or [mcdowell@kodak.com](mailto:mcdowell@kodak.com)*

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