

# *New Initiatives In Standards Result from Needs & Concerns*

*Increasing interest in, and use of, color management has prompted more cooperative activities within the industry.*

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**T**he increasing interest in, and use of, color management has prompted more cooperative activities within the industry. The recent interest in the GRACoL printing characterization and the Printing Across Borders (PAB) activity are examples of this increased desire to find common solutions to issues that have been around in one form or another for some time.

The recent meeting of ISO/TC 130, Graphic Technology, was the focus for several proposals that tie into these same concerns. These topics were also discussed in the ICC meeting that was held a few weeks later (with some of the same participants). Because these ideas are still in the formulation stage, I am describing them here with an invitation to you to provide comments, or get involved, or both. While these are separate proposals, as you will see, they are synergistic with each other and together point the way to a more organized (one might almost say engineered) workflow in our industry.

The three that are described below: Profile registry, CMYK exchange spaces, and Paper classification are all issues that are being discussed in, and actively pursued by, both TC 130 and the International Color Consortium (ICC).

## **Profile Registry**

Currently, all PDF/X files must point to the characterized printing condition for which the data in the file were prepared. In addition, where color managed files are exchanged, an ICC profile must also be included. Color managed files are defined as any file where the data are not in the same color space as the characterized printing condition. This gener-

ally applies to RGB workflows where the intended output is CMYK printing.

In TC 130 discussions of new versions of the PDF/X specification, it has been proposed that the ability to reference profiles rather than embed them in the PDF/X file would be a useful feature and is being incorporated in PDF/X-5. This led to a larger discussion of the confusion, on the part of many new users of color management, as to what profile to use and where to find the correct (or any) profile for registered characterized printing conditions. It was generally agreed that we need to make it easy for creators and readers of PDF/X to identify profiles and relate these to printing conditions. More generally we need to make it easy for users to find profiles for registered printing conditions.

Out of these discussions three use cases for a profile registry were identified:

- ▶ Users know the reference printing condition and wish to select a suitable ICC profile for that condition. Profile selection in this case is a manual process.
- ▶ Users have received a PDF/X-1a file with a reference printing condition but no embedded profile and wish to have an automated method of selecting a suitable profile for this printing condition in order to make a proof.
- ▶ A version of PDF/X-5 is envisioned that permits users to include links to profiles rather than including the profile itself in order to reduce file size and to avoid having to include the same profile in multiple documents.

While the draft of PDF/X-5 does not require a profile registry, it is generally agreed that a profile registry maintained by the ICC would provide enhanced reliability to a PDF/X-5 file exchange. In addition, a profile registry maintained by the ICC would provide



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both the creditability and stability needed to enable use cases one and two above.

At this point both the ICC and TC 130 seem committed to creating such a registry under the auspices of the ICC. There are four implementation options being considered:

- ① Profiles may be posted directly on the ICC web site.
- ② A link to the profile is presented on the ICC web site.
- ③ A link to a set of click-through pages that provide conditions of use is presented on the ICC web site. In this case, some user intervention is required to access the profile. This would include the case where the user must read and agree to a license agreement before downloading the profile.
- ④ The profile exists but must be licensed and is not available for direct download.

At this point the ICC is studying these implementation options as well as the issues of required metadata (such as a short, easily understood description of the conditions for which the profile is intended, TAC, GCR, and so on), registry location, confirmation of profile identity, IP issues, persistence, naming conventions, etc.

If you have any inputs or ideas, I am sure that both the ICC and TC 130 would be interested.

### CMYK Exchange Color Spaces

There is a growing concern that the industry seems to be generating more characterized printing con-

ditions than are really necessary. This issue has come up within the PAB activity as well as within the ICC, TC 130, and other industry groups. Currently the ICC Registry shows 46 reference printing conditions registered. Of these, 37 are from FOGRA, four from IFRA, four from the TC 130 Japan National Committee, and one from the U.S. CGATS Committee.

During the TC 130 meeting it was noted that, because the colorants used in ink are relatively similar regardless of the printing process, the color gamuts of CMYK printing are generally shared across printing processes. The paper used for a particular class of printing seems to have a better correlation with achievable color gamut than does the printing process. Thus, the question arises whether print process independent CMYK exchange color spaces could be identified as one step in minimizing the need for process-specific characterized printing conditions.

Clearly, even when different printing processes have the same color gamut, they often exhibit significantly different within-gamut characterization conditions. Within-gamut characterization is affected by tone value increase, trapping, hard dot vs. soft dot printing (or no dot printing such as gravure), etc.

However, there is increasing confidence that color management can successfully adjust within gamut data between processes while preserving

such things as the black to color relationship, etc. In addition, the approach being pursued by GRACoL, which involves a digital calibration process as a precursor or complement to color management, also offers promise as a way to bring together disparate processes that have the same basic outer color gamut.

Given these capabilities, it appears to make sense to see if there is a family of color gamuts that span the printing range from newsprint to high end “annual report” printing. At present the number of gamuts that would be required, and their spacing in chroma, is unknown. It is clear that as the quality of the printing stock increases it is able to support a greater ink load and generally has a bluer (whiter) color. This suggests that any family of color gamuts should not be completely symmetrical but have a white (or center) point that moves from yellow towards blue.

An additional consideration that was identified in these discussions was, that because these are exchange spaces, they do not necessarily need to be tied to any specific printing condition. That is, one of the set would be close enough to any particular printing condition to allow it to be used as the reference for CMYK data exchange. Color management or other calibration processes would be used to accomplish the final matching to real printing data requirements. These exchange spaces could also become the reference for a family of proofing conditions that would allow greater flexibility for design and prepress to prepare material prior to final commitment of a printing process.

If this concept were to prove feasible, these exchange spaces could become the default reference printing conditions. This would greatly simplify the issue of a profile registry, etc., and would allow preparation and printing to be more effectively decoupled.

An intriguing idea that needs additional study, but which may offer some real simplification to the interface between preparation and printing. Again, any inputs and thoughts would be welcomed by the groups involved.

### Paper Classification


Paper is a critical component in all process color printing. It is not only the fifth color but its characteristics also determine both the appearance of and the amount of ink that can be printed. This in turn defines the achievable color printing gamut. It is true that volumetric processes like gravure can, in gen-

eral, print slightly more ink on a particular paper than can be achieved by planographic process like offset, and thus achieve a somewhat larger gamut. However, this gamut increase would be at most one step in any CMYK exchange space gamut family.

The sheer number of individual printing papers available from all suppliers is so vast that characterization data can never be provided for even a small number of them. Ideally, the color management community would like to be able to add metadata to printing characterization data, or CMYK color exchange space data, indicating the types of papers and printing processes for which that data are appropriate.

Unfortunately, the way papers are categorized gives little direct indication of the printing characteristics. In addition, paper categories and the measurements used to determine them are different in different parts of the world—North America, Europe, and Asia. Further, there are some fundamental differences in the way the papers typically used in the United States, Asia, and Europe are made which also affect printability.

From a color management perspective, what we care about are the factors that affect reflectance, ink carrying ability, and tone value increase. Reflectance issues include brightness, whiteness, spectral reflectance, opacity, and shade. Ink carrying ability and tone value increase is dependent on physical characteristics such as ink absorptivity, smoothness, gloss, and surface topography. Tone value increase also has an optical component of diffusivity or scattering. An added factor that impacts the measurement of both paper and printing characteristics is the use of brightening agents.

As one step in starting a dialogue about these issues, TC 130 and the ICC are arranging an open meeting to be held as part of the ICC meeting and CGIV Conference (IS&T European Conference on Colour in Graphics, Imaging, and Vision) to be held in Leeds, United Kingdom, in June of 2006. The intent is to invite representatives of the world-wide paper industry, color management experts, and printers to an open discussion of the issues. The goal would be to identify a way forward that could point to paper characterization parameters that would correlate with printing (and measurement) characteristics that might allow better predictability of the applicability of color characterization data. Yes, a mouthful, but that is really the goal. 

## OTHER STANDARDS NOTEWORTHY ITEMS

**TC 130:** The next meeting of TC 130 will be held in San Diego, California, April 21 - April 28, 2006.

**PDF/X-4 and PDF/X-5:** PDF/X-4 and PDF/X-5 are starting a three-month CD ballot. PDF/X-4 and PDF/X-5 will be based on PDF 1.6 and the following new functionality in PDF has been permitted without comment:

- ▶ From PDF 1.5: 16-bit images, text streams, cross-reference streams, ICC v4 profiles, compressed objects, extensions to many annotations.

- ▶ From PDF 1.6: user space, the NChannel variant of DeviceN colour spaces (with some minor restrictions), embedding of OpenType fonts.

In addition:

- ▶ Use of PDF transparency, as defined in PDF 1.4 and later, has been allowed. (An Adobe TechNote will be published, in support of the PDF/X standards, documenting the various transparency blending modes.)

- ▶ Use of optional content (often known as layers) has been allowed, principally to enable regional versioning. PDF/X-5 requirements will match those of PDF/X-4 in all features. In addition, PDF/X-5 will be required to allow external references for:

- ▶ External profiles,      ▶ Both external profiles and external objects, and
- ▶ External objects,      ▶ External output intent ICC color profiles for n-colorant print characterizations.

**ISO Version of ICC Spec Published:** ISO 15076-1:2005, *Image technology colour management—Architecture, profile format and data structure—Part 1: Based on ICC.1:2004-10, was published on December 1, 2005.* This standard is technically identical to ICC.1:2004-10, *Image technology colour management—Architecture, profile format, and data structure (Profile version 4.2.0.0).* This represents a major step forward for both the ICC and ISO/TC 130.

**ISO 12642-2:** *Graphic technology—Input data for characterization of 4-colour printing—Part 2: Expanded data set*, was approved, comments were resolved, and is in preparation for publication. It is technically identical to ANSI/IT8.7/4:2005 which has the same title. The only differences between the two documents is that the default layout image files in the ANSI version have “tracks” along each of the long dimensions of both the visual and random layout to facilitate use of strip type reading equipment. Both the IT8.7/4 and ISO 12642-2 have 1617 patches. The first 1485 of these match the ECI 2002 target exactly. In addition all of the ink value combinations of the IT8.7/3 target (and therefore the original ISO 12642 target) are included within the new target and a conversion sheet is provided to map these values for applications that require the IT8.7/3 values as input data.

It is anticipated the ISO version will be published early in 2006. In conjunction with the preparation of this standard the standard initially identified as ISO 12642:1996, *Graphic technology—Prepress digital data exchange—Input data for characterization of 4-colour process printing*, has been redesignated as ISO 12642-1, *Graphic technology—Input data for characterization of 4-colour process printing—Part 1: Initial data set.*

**CIELAB/SCID Images:** ISO 12640-3, *Graphic technology—Prepress digital data exchange—Part 3: CIELAB standard colour image data (CIELAB/SCID)*, is in DIS ballot. The default color gamut used for these large gamut color test images, and defined in the standard, has also been adopted by the ICC as the gamut of the perceptual rendering intent reference medium.

**ISO 16612:2005:** *Graphic technology—Variable printing data exchange using PPML and PDF (PPML/VDX)*, has been published. PPML/VDX contains both the graphical page content and the product intent in a format that is independent of the print production workflow and the target output device. By separating the design and authoring steps from production, designers will not have to determine both the print service provider AND the target production equipment before creation. Removing the requirement that all workflow and equipment specifications be known in advance will allow document creators the freedom and flexibility they need to implement variable data printing projects of all sizes and complexity. With PPML/VDX all the information needed to produce the document is contained in a single file, which also ensures the accuracy of production and streamlines the entire process.