Standards Update *by David Q. McDowell, Editor*

Because this issue of *Standards Update* will be my last, I am indulging personal privilege and using it to reminisce about the history of graphic arts standards development.

I have decided that 2014 is the year for me to bow out of the standards activities. This decision is based on personal and family issues. I have been involved in the graphic arts standards activities since 1982 (as a volunteer since I retired from Kodak in 1999) and it has been a very enjoyable and challenging experience. However, in recent years my wife can no longer travel with me and I realize that I am not as quick as used to be, so my goal is to be fully withdrawn from standards activities by my 80th birthday, October 2014.

Now to some reminiscences about my standards journey.

The Beginning

In the late 1970s the printing and publishing industry in the United States had no formal (ANSI) standards activities and although there had been some earlier activities to start an ISO committee it had become dormant and essentially ceased to exist. The industry did use some of the standards developed by the Photographic industry—specifically densitometry, sensitometry, and viewing conditions. But these were not optimized for graphic arts use. The prevailing attitude in the industry was standards were the "lowest common denominator" and no one printed that way.

The Wakeup Call

In late 1979, Scitex introduced the first graphic arts image manipulation system. Such systems were called CEPS or Color Electronic Prepress Systems. The Scitex announcement was quickly followed by systems from Hell, Eikonix, Crossfield, and Dainippon Screen. Such systems were "practical" because the available computer processors and memory had finally become powerful enough to support the image manipulation required by the graphic arts industry. Then, and now, a typical graphic arts 8.5 x 11 inch image is about 30 MB. These early systems all cost about $1.5 million, had 2-4 MHz processors, and less than 100 MB of online storage. Although such systems took about 20 minutes to rotate an image, they worked.

The user community was immediately faced with two issues. First, each of these systems stored data in a different format and orientation. Second, the only media available to move data between systems was 8-track magnetic tape. Those tapes carried no standard header or other information about the format of the data encoded on the tape. Therefore, these systems could not easily exchange data and the industry remained isolated islands of electronic data manipulation that continued to use film as its exchange media.

The industry desperately wanted to be able to exchange digital data between systems, and more importantly between organizations. Because this involved multiple companies in both the vendor and user communities, standards seemed to be the logical direction to take. An ad hoc industry group was formed called DDES (Digital Data Exchange Standards) in an effort to start the dialogue between vendors, and between users and vendors. This was the nucleus around which ANSI Image Technology Committee 8 (IT8) was created and chartered with NPES as the sponsoring organization.

The first approach was to simply rationalize and document the various formats being used and to develop standardized file headers to identify the contents of an individual tape. (ANSI IT8.1 to IT8.5, which became ISO 10755 through 10759). This was followed by the development of media independent file formats based on TIFF called TIFF/IT (ANSI IT8.8, ISO 12639) TIFF/IT was subsequently replaced by the PDF/X data exchange file formats (ISO 15930).

What Does the Data Mean?

As long as halftone film was the principle exchange vehicle for printing "data" there was usually a close coupling between the organization preparing the film and the printing organization. The only major exception was the magazine publication industry, which had very tight specifications on the preparation of hardcopy proofs that were the formal agreement between the advertiser, publisher, and printer. The proof was the reference for printing.

Exchanging data seemed to be the key to taking advantage of the computer revolution and the step that would allow the graphic arts industry to move into the world of electronics. However, we quickly realized that there was no point in moving data between systems if you did not know what the data meant and how to consistently reproduce the images that they represented.

This led to a whole host of additional standards to define the meaning of the data and its reproduction, and the creation of the ANSI Committee for Graphic Arts Technologies Standards (CGATS) for those standards that were not file format related.

The Move to ISO

This early standards work started in the ANSI IT8 and CGATS committees. However, by the late 1980s we realized that there was as much international involvement as US involvement and that US standards were not easily referenced nor used by participants from other countries. A small group was formed to investigate the reactivation of the dormant ISO TC 130 committee. The secretariat for TC 130 (Graphic technology) had been given up by France and accepted by Germany on a caretaker basis. However, they were reluctant to reactivate the committee. In addition ISO/IEC JTC1 (Information technology) had been recently formed (1987) to consolidate the work in information technology. JTC1 took the position that anything involving computer data was within their area of responsibility and TC 130 was not needed for data exchange issues. The US ad-hoc group prevailed in discussions with the ISO Technical Management

Board and Germany was requested to call a reactivation meeting of TC 130. That meeting was convened by Germany on July 4, 1989 and was attended by representatives from ten countries. Much of the work that was started in ANSI IT8 and CGATS was immediately moved into the new TC 130 committee.

Data to Color Relationship

Early in the process it was realized that a key to defining and understanding the meaning of the data was the relationship between data and the color it represented. We naively thought that CIE (the International Colour Commission) had defined color and all we had to do was use the CIE definitions as a reference. We quickly discovered that CIE offered too many options (observer, illuminant, measurement geometry, etc.). An early task was to define a unique selection out of the many options and we settled on many parameters that were already defined for viewing and or density measurements: D50, 2° observer, 0/45 geometry, black backing. These parameters were defined first in CGATS.5 and later ISO 13655.

The other half of the relationship between data and color was the definition of targets (the data). First was a scanner characterization target (based on the Kodak Q-60 target) where the layout of a target was defined along with the methodology for determining the colorimetric values for each patch. The development of this target was a joint activity in which all of the film manufacturers (Kodak, Agfa, Konica, Fuji, Polaroid), along with scanner manufacturers and users, participated.

It was the responsibility of the various film vendors to actually construct the targets on their photographic film or paper products and provide (sell) these with accompanying measurement data. These were the IT8.7/1 and IT8.7/2 targets (ISO 12641). The current best estimate is that more than 700,000 of these targets have been sold for scanner calibration/characterization since implemented.

For calibration of printed output a CMYK target was defined to encompass the printing gamut with reasonable data spacing to allow interpolation and calibration. The initial target had 928 patches and was called the IT8.7/3. A later target, with 1617 patches, was designated the IT8.7/4 target. These became ISO 12642-1 and ISO 12642-2.

To Control the Process

In the 1980s the only printing specification was for publication work. This was defined by SWOP (specification for web offset publications) which defined the process control aims (paper, reference ink samples, solid ink densities, dot gain) for press proofing for publications. The printed work was controlled by visual reference to the standard proof.

Although initial off-press proofing systems used colorants similar to the reference inks, the use of colorants and processes that did not match the offset proofing aims led to the development and use of characterization data to define the aims. ANSI CGATS TR001, developed in 1992, was the first standardized set of graphic arts characterization data published. This quickly became the definition of SWOP for publication printing that could be used for the evaluation and control of both proofing and printing.

The availability of both scanner and printing characterization data and the associated targets was clearly part of the technology that enabled the creation of the International Color Consortium (ICC) in 1993.

ISO TC 130, led by Germany, expanded the development of printing specifications for both variations in substrate and process (offset, gravure, flexo, screen printing; ISO 12647) along with specifications for ink color and transparency (ISO 2846 series). The ISO 12647 series departed from earlier work by replacing density aims with colorimetric aims for the solids of the inks used.

Today, there is active discussion concerning the preferred way to define printing: process control (ISO 12647) vs. characterization data (ISO 15339). Both approaches have their proponents and the current struggle is to find a way that they can co-exist until user preferences determine the preferred approach for the future.

THANK YOU

IS&T sincerely thanks

DAVID Q. MCDOWELL

for 23 years of reporting on standards activities for the Society. His insight, historic knowledge, wit, and wisdom will be missed in these pages.

Joint Activities

There have been a number of joint activities with other standards committees that have played a major role in the support of the graphic arts standards. Most notable with ISO TC 42 (Photography) to revise the densitometry (ISO 5 series), viewing (ISO 3664), and color measurement (ISO 13655) standards. This work has resulted in consistency between these standards, as well as insured that the needs of both photography and graphic arts were met in a single set of standards.

There has been excellent cooperation between TC 130, TC 42, and TC 171 (Document management applications) in the movement of the PDF reference specification from an Adobe document to an international standard (ISO 32000). This cooperation also produced the PDF archiving standards known as PDF/A (ISO 19005 series).

Other Tools

As printing has moved from a craft to a manufacturing process many other standards have been developed to support various aspects of the process, such as preparation of test prints (ISO 2834), register systems (ISO 11084), continued on page 13

understood in the Graphic Arts industry sector. In general, the applicability of current ISO/TC 42 image permanence test methods for analogue printing warrants investigation.

American National Standards News

Nearly 70 legal experts and other members of the standards and conformity assessment community came together on October 1, 2013, for the American National Standards Institute (ANSI) Legal Issues Forum. Focused on arbitration of RAND disputes, this year's event examined significant issues connected to the licensing of patents essential to the implementation of a given standard on reasonable and non-discriminatory (RAND) terms. The forum was held by ANSI as part of the 2013 World Standards Week (WSW) series of events.

In recent years, an increase in the number of high profile patent disputes has focused increased attention on what RAND commitments really mean and how they can be resolved without resort to litigation. Support was voiced for arbitration as a method for resolving such disputes, with the noted advantages that arbitration proceedings are private and can be conducted by an individual with demonstrated technical expertise. The corresponding caveat is that there can be significant variation in outcome depending upon the arbitrator. ▲

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ink testing (ISO 2836, 12634, 12644), printing plate sizes (ISO 12635), and printing blanket requirements (ISO 12636). Other tools that both support printing and have broader application include:

- ISO 12640 series of SCID (Standard Colour Image Data) image sets that provide standard images encoded in various image states from plain CMYK images (Part 1) through scene reference image data (Part 5);
- Variable printing data exchange (ISO 16612 series);
- ICC color management profile specification (ISO 15076);
- Black point compensation (ISO 18619);
- Colour data exchange using CxF (ISO 17972 series);
- Extensible metadata platform (XMP) specification (ISO 16684 series).

The Future

The standards work that started in the US in 1982 to solve the problem of file identification to allow electronic data exchange has grown into an activity that has revolutionized the printing and publishing industry from a craft-based, largely localized business into an internationally based manufacturing operation. Standards have played a major role, but the key enabling driver has been the change in computing and data storage capabilities over this same time period. Our role has been to help the industry develop the common framework to take advantage of these capabilities.

It has been an exciting ride and I will be sorry to become an observer rather than an active participant.

My sincere thanks to IS&T for allowing me a forum to report on standards activities in almost every issue of the Reporter since 1990. Also my appreciation to NPES for providing the support for travel and expenses to actively participate in these activities since my retirement.

Thank you.

For suggestions for (or input to) future updates, or standards questions in general, please contact Ann McCarthy at standards@imaging.org.