

Update on Standards: What's Happening?

It's time to step back and review the overall standards program.

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Most of the recent standards articles in the *IPA Bulletin* have focused on specific activities or projects. Our last overview was in the July/August 2002 issue, thus it is time to step back and review the overall program again. Unfortunately, space does not permit a complete summary of the standards program, so we will focus on some of the more recent activities and accomplishments.

A Brief Review of Who and What!

Before we dive into details, let's review the major players and some of the acronyms we use.

Two standards committees that directly impact the U.S. printing and publishing market are Committee for Graphic Arts Technologies Standards (CGATS) and ISO/TC 130, Graphic technology. CGATS is an American National Standards Institute (ANSI) accredited national standards committee. TC 130 is the Technical Committee (TC) within the International Organization for Standardization (ISO) responsible for standards in the area of printing and publishing. There is also a Technical Advisory Group (TAG) accredited by ANSI that is responsible for coordinating the U.S. involvement in, and input to, TC 130.

NPES The Association for Suppliers of Printing, Publishing and Converting Technologies is the organization that has been approved by ANSI to be secretariat of CGATS and the USTAG to TC 130. In addition, NPES is the secretariat for the International Color Consortium (ICC) as well as ANSI Committee B65 (Safety standards for printing presses, bindery machines and other printing equipment).

The work of ISO/TC 42 (Photography) is closely allied with the work of TC 130 and there are several Joint Working Groups (JWG) between TC 42 and

TC 130. For those interested in a complete rundown of all of the graphic arts standards activities, a review of *What? by Whom? with Whom?, And How Does It All Fit Together?* in the July/August 2002 issue of the *IPA Bulletin* is recommended. See Sidebars *Stages of Standards Development* and *Key Standards Committees for Graphic Arts* which have been taken from that article and updated.

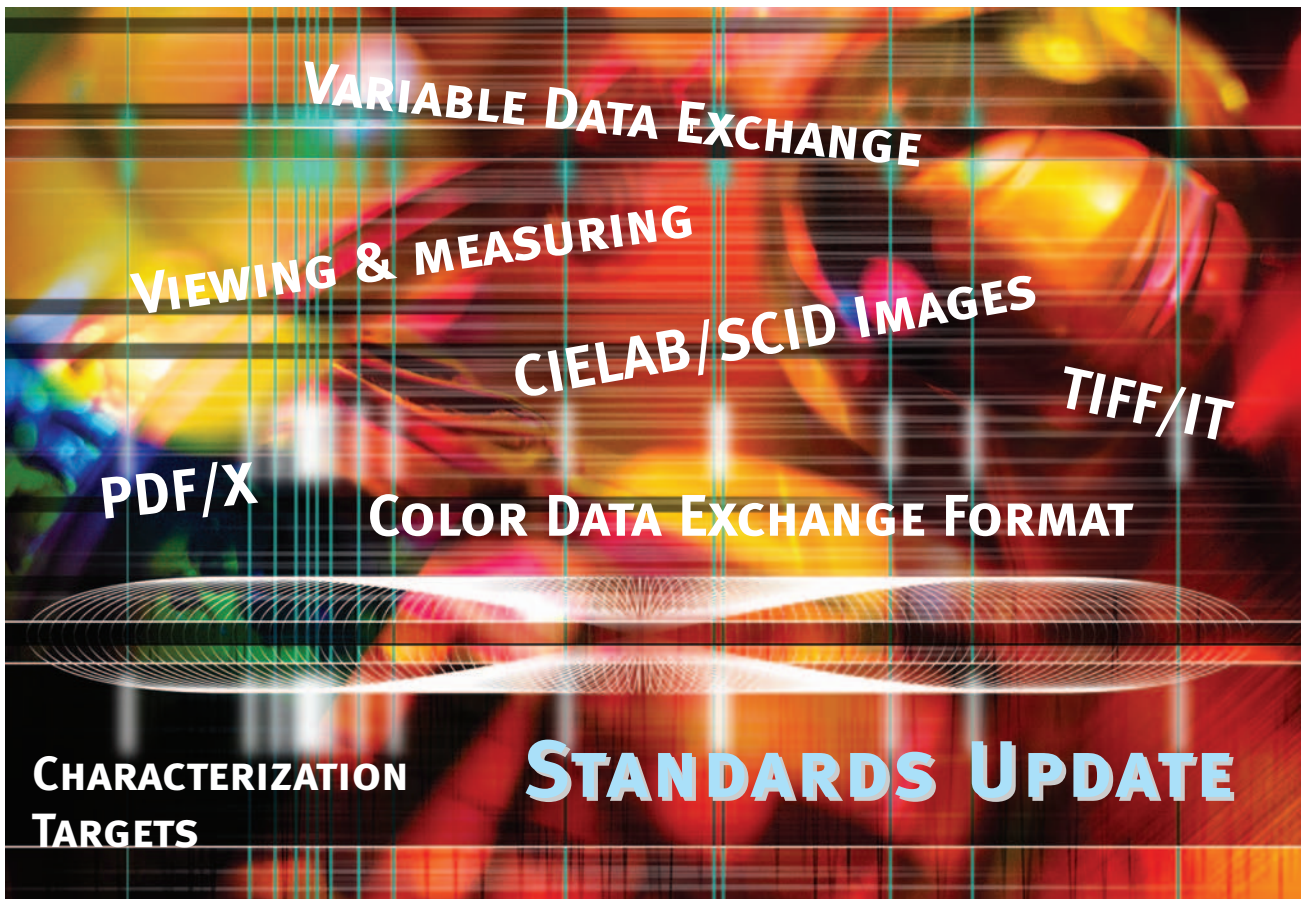
So, What's New and/or Important?

Color Management

A contractual agreement has been approved between the ICC and ISO/TC 130 under which the ICC Specification, ICC.1:2004-10 has been prepared as ISO 15076-1:2005, *Image technology colour management—Architecture, profile format and data structure—Part 1: Based on ICC.1:2004-10*. This ISO standard has been approved and is in the final publication stages. Both the ICC and TC 130 are committed to keeping the ICC version and the ISO version of this document synchronized so that both the technical content and text will be identical. Because the ICC can approve incremental changes, such ICC approved proposed changes will be maintained in a separate addendum until there are sufficient changes (or a change of sufficient technical import) to warrant a revision. When a revision is initiated it will be simultaneously processed through both TC 130 and the ICC.

This represents a significant step for both TC 130 and the ICC. The work required to create the parallel versions of the document has resulted in a much clearer and more definitive document that benefits the whole color management community.

The link between the ICC and TC 130 has also been strengthened by the strong tie established between



the PDF/X family of standards and the ICC color characterization data registry (www.color.org/registry2.html). As will be discussed under the PDF/X work, the preferred color data definition for all PDF/X files is the ICC color characterization data registry.

Viewing and Measuring

As was discussed in *Viewing Conditions, Colorimetric Measurements & Profile Making* in the November/December 2004 issue of the *IPA Bulletin*, the requirements of ISO 3664 (*Viewing conditions—Graphic technology and photography*) and ISO 13655 (*Graphic technology—Spectral measurement and colorimetric computation for graphic arts images*), while currently consistent with each other, are not consistent with current industry needs and practices.

It is critical that any revisions to these documents be done in a coordinated manner. This is complicated by the fact that ISO 3664 is the responsibility of TC 42 while ISO 13655 is the responsibility of TC 130. Both TC 42 and TC 130 have formed joint working groups (TC 130 JWG8 and TC 42 JWG24) to work on these documents together. The chairs of both TCs have pledged that the JWG8 will meet together and that the final decisions will be reflected in both documents.

The two key technical issues that must be

addressed are the spectral power distribution of the illuminant used for colorimetric measurements and for viewing, and the sample backing used for colorimetric measurements and for viewing.

The real conundrum is that the proper UV component of D50 (or almost any other illuminant that would be desirable for use) is difficult to achieve in a viewing booth and almost impossible to achieve in a small spectrophotometer used for colorimetric measurements. The simple solution is to use UV blocking filters for both viewing booths and instruments. However, that also kills the effect of optical brighteners used in almost all proofing and printing substrates. Will a proof-to-print match in the absence of the paper reflectance boost produced by the brighteners still produce a printed result that meets customer expectations?

The backing issue goes back to the question of process control. The densitometry standards all call for black backing based on the concern that when a sample with back-side printing is measured over a white backing, the results vary widely depending on what is on the back side. Further, the measurement data obtained is much more sensitive to small variation in the absolute value of a white backing than to similar variations in a black backing. This effect applies to both densitometric measurements and to

colorimetric measurements. Here, the simple solution is to allow white backing for colorimetry and viewing and black backing for densitometry. However, in an increasing number of situations the same spectral instrument is used to collect both types of data. Two different instrument configurations and/or two sets of measurements are not appealing and are prone to increased probability of error.

Color Data Exchange Format

With the increasing amount of color measurement data being exchanged, it is important to provide data formats beyond the ASCII key-word value pairs that are defined in the current family of standards. The obvious choice seems to be some form of XML data structure. TC 130 has a new work item to create an XML data format for such data exchanges. Its current title is ISO 17972 *Graphic technology—Prepress data exchange—Colour data exchange format (cxdx)*.

The recently completed CGATS.17, *Graphic technology—Exchange format for color and process control data using XML or ASCII text*, represents the U.S. input to this work and the other input is the GretagMacbeth CxF-Color Exchange Format. Unfortunately there are significant architectural differences in the XML design of these two formats. One is largely a flat structure and the other is a highly hierarchical structure. It is not clear at this point that there is a way to reconcile these differences so both can be easily compatible with any ISO standard created.

TIFF/IT Alive and Well

A revised version of TIFF/IT (ISO 12639) was published in 2004. It added a P2 conformance definition which includes an expanded LW palette to support up to 65,535 colors; support for up to 32 separations; a new file format “SD” for copy-dot data with CCITT G4 compression; two new compression schemes: Flate and JPEG; and the “FP” file format is now defined as normative. In addition, an amendment is in final approval which will add JBIG2-Amd2 compression which will be particularly useful for copy-dot files. While the use of copy-dot files is dwindling in the U.S. and parts of Europe, they are still considered very important in many of the Asian countries.

PDF/X Getting Increased Capability

The PDF/X family of standards has been very successful and has seen wide implementation. The most

current versions are documented in ISO 15930 Parts 4, 5 and 6. However, they are better known as PDF/X-1a:2003, PDF/X-2:2003 and PDF/X-3:2003. All are based on Adobe PDF Version 1.4. It is important to note the PDF/X standards are the first graphic arts data exchange formats that fully define the content and are capable of blind exchange. One of the keys is the fact that all necessary fonts must be embedded and used by the recipient, and inclusion of, or pointers to, color characterization data is mandatory. The key site for color characterization data is the ICC registry at www.color.org/registry2.html.

Since the 2003 PDF/X standards were published, there have been two revisions to the PDF specification—Versions 1.5 and 1.6. While most printing and publishing needs are well served by the existing standards, there are some new features that warrant inclusion in the PDF/X standards to ensure future compatibility of systems. In addition, some of the features introduced in PDF Version 1.4 are now stable enough to be standardized.

At its recent meeting in London, TC 130/WG2/TF2 agreed to move forward on a new set of PDF/X standards based on the following rationale:

- ▶ The additional value to enabling use of new features such as optional content (layers) and transparency in a CMYK-only workflow was rather small. PDF/X-1a:2003 (and even PDF/X-1a:2001) address the requirements of that workflow very well.

- ▶ Addition of support for optional content and transparency is a large step; greater than would be appropriate to treat as an update to PDF/X-3.

- ▶ While there have not yet been any implementations of PDF/X-2, there is continuing interest in some quarters, so the idea should not yet be dropped.

During these discussions, other areas were identified where there would be value in omission of resources required for rendering from the exchanged file: fonts (especially CJK) and ICC profiles in the output intent.

The committee, therefore, agreed to work on the following:

- ▶ A new conformance level, to be known as PDF/X-4, which will allow for color managed workflows with optional content and transparency. This will be defined in ISO 15930-7.

- ▶ A second new conformance level, to be known as PDF/X-5. A PDF/X-5 reader must read all files that a PDF/X-4 reader must read, and must be able to accept files where one or more of the three categories of fonts, ICC profiles, and XObjects are supplied

externally to the main exchanged file. This will be defined in ISO 15930-8.

The two standards will be developed as far as possible in parallel, with the aim of balloting and publication together. Both will, as recommended by CGATS, be based on PDF 1.6. Because of the size of the changes required, the task force meeting in London did not manage to reach a stage where it was reasonable to appoint an editing committee to finish off a draft suitable for CD ballot. Work will, therefore, continue outside of meetings, with the goal of reaching that point at the meeting in São Paulo, Brazil, in September. Much of the discussion outside meetings will occur on the email list at http://groups.yahoo.com/group/pdfx_revision. All interested parties are welcome to participate.

Variable Data Exchange

ANSI CGATS.20-2003, *Graphic technology—Variable printing data exchange using PPML and PDF (PPML/VDX)*, has been successfully moved into ISO and was recently approved as ISO 16612-1 *Graphic technology—Variable printing data exchange—Part 1: Using PPML 2.1 and PDF 1.4 (PPML/VDX-2005)*. This standard builds on the PDF/X standards as well as the industry PPML and JDF specifications.

This community, working through CGATS SC6 TF2, had determined that color characterization data specific to the needs of digital printing is required to support this work and the color characterization requirements of PDF/X used in PPML/VDX. Three color characterization data sets have been proposed and are being developed. The first two are based on the use of a paper having a white point equivalent to a Grade 1 printing paper. The first characterization data set, which is being developed as CGATS TR 007, is based on digital printing with high gloss image characteristics. The second, CGATS TR 008, is based on digital printing with typically low gloss (satin) image characteristics. The third is a smaller gamut that is based on low gloss printing on a substrate having a Grade 5 white point and will use the CGATS TR 001 data set.

Characterization Targets

Although the venerable IT8.7/3 CMYK characterization target (and its equivalent ISO 12642) has provided yeoman service—as we have learned to develop color characterization data and apply color management to the CMYK world—enhancements

Stages of Standards Development

Following are the stages an international standard goes through on its way from an initial idea to a published standard. While these stages are defined for standards developed in the International Standards Organization, there are equivalents in virtually every other standards and specification development process or organization.

NWI - New Work Item Proposal: A proposal to a standards committee that a new standard(s) be developed.

WD - Working Draft: The early draft(s) of a standard, developed by and for the group of people directly involved in the creation process. Comments and suggestions on the WD insure that everyone's inputs are heard.

CD - Committee Draft: The first draft of a standard the developing group feels is ready for review and balloting by a larger group that was not actively involved in the creation process. In ISO the balloting of a CD is by all of the National Bodies included in the parent Technical Committee of the sub group developing the standard. This is the stage that the proposed standard gets circulated to industry trade groups, other standards committees, company experts, etc. Wide visibility at this stage usually ensures that if there are problems they will be identified.

DIS - Draft International Standard: This is the point at which the technical people involved in the development and writing of the standard essentially say, "We think we are done. Have we got it right?" In ISO the DIS is distributed to all 140 nations that are involved in ISO.

FDIS - Final Draft International Standard: This is a "proof copy" to be sure that the things that were fixed in response to the DIS ballot were done correctly.

Review cycle: Once a standard is published it must be reviewed on a periodic basis (every 5 years in ISO) to be sure that it is still applicable. However, the committee responsible may initiate a revision at any time.

The process for Technical Reports (TR) and Technical Specifications (TS) is similar.

are overdue. The biggest issue is that, since the target was defined in 1991, color management systems have become more sophisticated and need data at finer increments, specifically in the highlight and shadow areas. Measurement equipment has also become more automated and target size is less of an issue.

There have been several larger targets proposed and used to some extent by various groups. The most popular of these is the ECI 2002 target. Last year both CGATS and TC 130 made a decision to not change the IT8.7/3 or ISO 12642 target but to create new standards that could be used as a supplement to, or a replacement for, the older target.

The CGATS version is known as the IT8.7/4 target and the ISO target is ISO 12642-2 (the older target will be renamed as ISO 12642-1). Both targets have

KEY STANDARDS COMMITTEES FOR GRAPHIC ARTS**ISO/TC 130: GRAPHIC TECHNOLOGY**

- WG 1: Terminology
- WG 1/ TF1: Correction marks
- WG 2: Prepress data exchange
- WG 2/TF1: TIFF/IT
- WG 2/TF2: PDF/X
- WG 2/TF3: PPML/VDX
- WG 3: Process control and related metrology
- WG 4: Media and materials
- WG 5: Ergonomics: Safety
- WG 5/TF1: Symbology
- JWG 6: Joint TC 130-TC 42 WG: Certified reference materials
- JWG 7: Joint TC 130-ICC-TC 42 WG: Color management
- JWG 8: Joint TC 130-TC 42 WG: Revision of ISO 13655, Colorimetry for graphic technology and photography

CGATS: COMMITTEE FOR GRAPHIC ARTS TECHNOLOGIES STANDARDS

- EXCOM: Executive Committee
- SC 3: Metrology
- SC 3/TF1: Objective Match Evaluation
- SC 4: Process Control
- SC 5: Materials Handling
- SC 6: Digital Content Exchange
- SC 6/TF1: PDF/X
- SC 6/TF2: Variable Data Exchange
- SC 7: Data Exchange
- SC 7/TF1: Revision of IT8.6, Diecutting data

TC 42: PHOTOGRAPHY

- WG 3: Sensitometry, image measurement and viewing
- WG 18: Electronic still picture imaging
- JWG 20: Joint ISO/TC 42-TC 130-IEC/TC 100 WG: Digital still cameras
- JWG 21: Joint TC 42-TC 130 WG: Density measurements (Revision of ISO 5 series)
- JWG 22: Joint IEC/TC 100-ISO/TC 42-TC 130 PT : Colour management
- JWG 23: Joint TC 42-TC 130 WG: Extended colour encodings for digital image storage, manipulation and interchange
- JWG 24: Joint TC 42-TC 130 WG to revise ISO 3664 Viewing conditions for graphic technology and photography

CIE: INTERNATIONAL COMMISSION ON ILLUMINATION

- Division 1-Vision and Colour
- Division 2-Measurement of Light and Radiation
- Division 8-Image Technology
 - TC8-01: Colour Appearance Modeling for Colour Management Applications
 - TC8-02: Colour Difference Evaluation In Images
 - TC8-03: Gamut Mapping
 - TC8-04: Adaptation Under Mixed Illumination Conditions
 - TC8-05: Communication of Colour Information
 - TC8-06: Image Technology Vocabulary
 - TC8-07: Multispectral Imaging
 - TC8-08: Spatial Appearance Models

1617 patches. During final balloting of the CGATS IT8.7/4 draft, changes were introduced that modified 6 patches. These changes have been introduced in the U.S. ballot on the ISO target and it is hoped that they will be accepted. When this occurs the two targets will be identical in content and patch IDs.

The new target incorporates all of the CMYK combinations that are in the IT8.7/3 target (but not the redundancies) and in addition the first 1485 patches exactly match the values of the ECI 2002 target. The additional patches enhance the critical area of three-color overprints with low levels of black. These are critical for some flexo and gravure processes as well as package and product printing applications. The new target is felt to be capable of supporting a wider range of printing processes and applications than any of its predecessors.

Both standards will include two default layouts—one optimized for visual evaluation of the patches and the other randomized to minimize interaction between patches. Imageable versions of these default layouts will be freely available. The image portion of the CGATS and ISO default layouts are identical. However, the CGATS versions have an additional set of register “rails” on either side of the long dimension to facilitate use in automated strip readers.

Both standards are expected to be available within a couple of months.

CIELAB/SCID Images

The CIELAB SCID images (ISO 12640-3) have been approved at the CD ballot level and will shortly be in DIS ballot. One exciting aspect of the most recent series of discussions of this standard is that the Reference Color Gamut, defined in Annex B, has also been adopted by the ICC as the gamut of the perceptual rendering intent reference medium. Thus, the images contained within this standard are based on the same color gamut as the ICC perceptual profile connection space. This will enhance the value of these images and test targets in evaluating image compression and manipulation in color management applications.

It is expected that the 5-month DIS ballot will go smoothly and that this standard will be available shortly after the new year.

Proofing Standard

Work has started on ISO 12647-7, which is titled *Graphic technology—Process control—Part 7: Off-*

press proofing processes working directly from digital data. The preliminary scope is:

This International Standard specifies a number of process parameters and their values to be applied when producing digital proof prints that simulate a chosen printing condition. This International Standard is directly applicable to halftone, simulated halftone and continuous-tone proof printing processes that use digital data as the input.


While it has a long way to go, the goal is that this standard can replace a large portion of the many trade association proofing certification requirements (e.g., SWOP, GRACoL, etc.) and at the same time bring consistency to that process. Issues like within sheet and between sheet variability, temperature and humidity tolerances, measurement and evaluation procedures, short and long term image stability, etc., are not unique to a particular trade specification. Consistency in specification through use of an ISO reference would make life easier for the manufacturers of proofing systems as well as for the trade associations trying to certify these proofing systems.

Certainly, each trade association is still going to need to establish characterization aims and complete the evaluation process. However, if many of the basics can be verified through proven conformance to a basic performance requirement, the individual trade association would only need to focus on their specific appearance requirements.

When this document gets farther along copies will be circulated for input and comment. Two of the key U.S. people involved in TC 130 WG3, which is responsible for this document, are Steve Smiley and Larry Warter. Contact them with questions and ideas.

Summary

This has been a quick update about some of the key activities that have occurred since our 2002 overview article. If you are interested in these activities, please consider becoming involved either as an active participant or as an observer. However, be warned that even observers are expected to review documents and provide input and comments.

If you want to sign up in either category, please send an email to Mary Abbott (the NPES staff person who holds all the standards activities together) at mabbott@npes.org. She can send you more specific information and an application form. Mention that you are responding to this *IPA Bulletin* article. 

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