

Standards Update

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This issue of the Standards Update focuses primarily on the work of ISO/TC42/WG18 (Photography/Electronic still picture imaging) and several related Joint Working Groups (JWGs). These groups met recently in San Jose CA, and it is therefore an appropriate opportunity to provide an update on their work. This report is based in large part on the draft notes and minutes of these meetings, graciously provided by Jim Peyton of I3A and Ken Parulski of Eastman Kodak Company.

ISO TC42/WG18

The secretariat for WG18, and all of the TC42 activities is the International Imaging Industry Association (I3A) which was created in July 2001, as a result of the merger between the Photographic Imaging Manufacturers Association (the former Secretariat of TC42) and the Digital Imaging Group. Mr. James A. Peyton (isotc42@i3a.org) is staff to ISO TC42 and its associated Working Groups including WG18.

This meeting of WG18 was the occasion of a change in leadership. Mr. Eric Edwards of Sony Corporation, who has been a leader of WG18 for over 5 years, had indicated a desire to step down and the new leaders are Mr. Motokazu Ohkawa (of the Japan Camera Industry Association) as convener and Dr. Scott Foshee (of Adobe Systems Incorporated) as co-convener. In passing over the reins of leadership Mr. Edwards noted that "when he first began participating in WG18, the very first digital cameras were just being introduced. Today, digital cameras are mainstream consumer devices."

The WG18 portfolio includes the standards noted below. Where a year is shown following the number of the standard, it indicates that it is a published standard and the year is the date of ISO publication. Published standards are available from ISO and national standards bodies and, unless noted otherwise, there is minimal current WG18 activity on these published standards.

Standards shown as in ballot at the CD or DIS stage are available for review and comment through the sec-

retariat, or through the appropriate shadow committee in participating National Bodies. Where standards are noted as being in working draft or preliminary work stage, they are the subject of active work within WG18. If these are topics in which you feel you can make a contribution, or are interested, you are urged to contact Jim Peyton and get involved.

ISO 12231, Photography — Electronic still-picture imaging — Terminology This standard is now being balloted as a DIS with a closure date of 2002-03-25. In light of the discussions and comments at the WG18 meeting, when the current DIS closes it will probably be edited to reorganize the terms included and quickly submitted for a second DIS to achieve full consensus.

In the ISO process, after a new work item (NWI) is approved, standards are first developed as working drafts (WD) which are distributed to the technical experts on the committee. When the technical experts are satisfied a Committee Draft (CD) is circulated to all of the National Bodies (NB) that are members of the ISO TC. When approval is reached at the CD stage the document is then prepared as a Draft International Standard (DIS) which is then circulated to all NBs participating in ISO. When a DIS is approved the publication copy is prepared and circulated as a Final Draft International Standard (FDIS) as last verification of the publication text. The final step is publication by ISO.

ISO 12232:1998, Photography — Electronic still picture cameras — Determination of ISO speed As this standard approaches its ISO mandatory 5 year review it has been proposed that the specification of the exposure required to produce a specific digital code value be added. Other proposed changes would make the ISO speed specifications more easily understood by users and better suited to practical usage in consumer camera specifications.

ISO 12233:2000 Photography — Electronic still picture cameras — Resolution measurements This standard includes the design of a resolu-

tion test chart and the development of three measurement methods, including a computerized method of measuring the spatial frequency response using a digital photograph of the resolution test chart. Sources of the test chart are included on the TC42 website (www.pima.net/standards/tc42.htm) along with downloadable software to assist in the evaluation of results.

ISO 12234-1:2001, Electronic still picture imaging — Removable memory — Part 1: Basic removable memory reference model

ISO 12234-2:2001, Electronic still picture imaging — Removable memory — Part 2: TIFF/EP Image data format

ISO 12234-3, Electronic still imaging — Removable memory — Part 3: Design rule for camera file system (DCF) Although this standard has completed DIS ballot it will be circulated for a second DIS with updated Exif references.

ISO 14524:1999, Photography — Electronic Still Picture Cameras — Methods for measuring opto-electronic conversion functions (OECFs)

ISO 15739 Photography — Electronic still picture imaging — Noise measurements This standard has completed a DIS ballot but is being edited to address comments and will shortly be circulated for a second DIS ballot. An image noise plug-in file is available from the TC42 website.

ISO 15740, Photography — Electronic still picture imaging — Picture Transfer Protocol (PTP) for Digital Still Photography Devices Picture Transfer Protocol, or PTP, provides an abstraction layer to help enable any digital camera to work with any host device, such as a computer, appliance printer, another camera, etc. PTP provides eight mandatory commands which all devices must support. A large number of optional commands are also defined. The PTP standard also includes a vendor extension mechanism.

Although this standard is at the ISO working draft stage it is based on

PIMA 15740:2000 which uses USB as the transport layer.

To develop additional transports for the ISO version, the plan is to focus on the IEEE 1394 (Firewire) transport via a subgroup organized by I3A/IT10. A proposal to support PTP over IEEE 1394 using the IEEE SBP-2 (Serial Bus Protocol) standard is being prepared.

It was reported at the WG18 meeting that support for PTP is included in the Macintosh OS X operating system using Apple's Image Capture Architecture (ICA), in Windows XP via WIA (Windows Imaging Architecture), and in Linux. More than 15 different camera models supporting PTP are now available from Kodak, HP and Sony. Additional companies are expected to announce cameras that support PTP at the February 2002 PMA conference and show. Currently, six camera vendors, three providers, and two software vendors have registered vendor extensions.

ISO 16067-1, Photography — Electronic scanners for photographic images — Spatial resolution measurements — Part 1: Scanners for reflective media This standard is currently in DIS ballot which closes 2002-06-30. The TC42 website makes available several tools for this standard including a Spatial Frequency Response Plug-In. A specifically formatted target is available from several manufacturers.

ISO 16067-2, Photography — Electronic scanners for photographic images — Spatial resolution measurements — Part 2: Film scanners The film scanner standard is at the WD stage of development. It is expected to be very similar to Part 1, the resolution standard for reflective media.

ISO 20462, Photography — Psychophysical experimental method to estimate image quality This standard is in the preliminary development stage. Its scope is "to provide a guideline for psychophysical experimental methods to estimate image quality."

At present, there are many methods used to judge print quality which results in great confusion when trying to compare results. One of the most accurate methods currently in

use to evaluate small quality differences is paired comparison. One of its advantages is that the results can be converted into "just noticeable differences" or JNDs.

A new triple comparison method has been proposed in the first WD of this standard. It has accuracy similar to the paired comparison method, but takes much less time. Another method, called the quality ruler also been proposed. It enables comparisons over a broader range of quality levels, but requires the preparation and calibration of reference samples for the quality ruler scale. However, these samples can be used as cross-over references in future experiments.

A new WD is being prepared for review that will specify the triple-comparison method and the quality ruler method.

ISO 21550, Photography — Electronic scanners for photographic images — Dynamic range measurements This standard is at a very early stage of development. A key issue will be to insure consistency with ISO 15739, the camera noise measurement standard, which specifies camera dynamic range.

Joint Working Groups (JWGs)

In ISO when more than one Technical Committee indicates an interest in participating in the development of a new standard, the usual practice is to form a Joint Working Group administered by one of the TCs involved in the work - usually the TC that first initiated the new work item.

Three JWGs have been spun out of WG18 to enable active participation and balloting by other Technical Committees or to enable TC42 to participate in standard work initiated by the IEC. These are JWG20, JWG22, and JWG23,

JWG20

JWG20 is a joint working group with ISO TC130 Graphic technology and is responsible for the development of a multi-part standard for color characterization of digital still cameras.

ISO 17321-1 Graphic technology and photography — Colour characterisation of digital still cameras (DSCs) — Part 1: Stimuli, metrology, and test procedures This

part of ISO 17321 is in the WD stage of development with a goal of having a CD by late spring or early summer. It specifies the color stimuli, metrology, and test procedures for the color characterization of a digital still camera to be used for photography and graphic technology applications. Two methods are provided, one using narrow band spectral illumination and the other using a spectrally and colorimetrically calibrated target.

Except for a specific set of permitted image processing operations, the digital still camera data used are raw, sensor-referred data. The permitted image processing operations include color pixel reconstruction (demosaicing), flare removal, and white balancing. However, image processing operations that render the image data so that they become output-referred (ready to display or to print) disqualify the data.

ISO 17321-2 Graphic technology and photography — Colour characterisation of digital still cameras (DSCs) — Part 2: Methods for determining transforms from raw DSC data to scene-related image data by minimizing errors in colour spaces This part of the ISO 17321 family specifies the methods for deriving transformations from raw digital still camera data in order to estimate scene colorimetry, including an error minimization method and a metric for quantifying the errors in scene colorimetry estimation.

JWG22

This Joint Working Group is a somewhat different than the other working groups in that it has been set up to be the ISO coordinating group for joint work between ISO and IEC in the area of color management for multimedia applications. This enables TC42 to participate in the development and balloting of several color standards projects initiated by IEC TC100.

There are three documents that currently fall within the work of JWG22. They are:

IEC 61966-2-0, Multimedia systems and equipment — Colour measurement and management — Part 2-0 Colour management — General This is intended to be a general introduction to the issues of color spaces

for color management.

IEC 61966-2-1, Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space — sRGB, Amendment 1

IEC 61966-2-2, Multimedia systems and equipment — Colour measurement and management — Part 2-2: Colour management — Extended RGB colour space — scRGB,

These three standards are all under development by IEC/TC100, Audio, Video and Multimedia Systems and Equipment. ISO and IEC management have recently decided that work that is of common interest to committees in ISO and IEC should be conducted through joint activities and balloted within both IEC and ISO. When these standards are jointly approved in both IEC and ISO they will become dual logo standards.

Current activity in JWG22 is to coordinate ISO comments on these standards and to work with TC100 and ISO/IEC management to develop the necessary procedures to resolve comments among the interested parties in both standards organizations.

JWG23

JWG23 is a joint working group with ISO/TC130. It has as its charter the development of an image state architecture, the specification of the requirements to be met by any color encoding that is to be used for digital photography and/or graphic technology applications involving image storage, manipulation and/or interchange, and the definition of at least two extended gamut color encodings.

ISO 22028-1 Photography and graphic technology — Extended colour encodings for digital image storage, manipulation and interchange — Part 1: Architecture and requirements This standard has been the subject of considerable active discussion and it is anticipated that a CD will be available by the April

2002 time frame. A key point of discussion has been the introduction of a concept called “image state”. The current draft of the standard defines image state as “Attribute of a colour image encoding indicating the type of image data to which the encoded image colorimetry is referred. The image states defined in this standard are scene-referred, original referred and output-referred.”

Subsequent parts of ISO 22028 will define extended gamut encodings for different image states and application needs.

JPEG 2000 and Digital Still Cameras

A JPEG2000 technical expert (from ISO/IEC/JTC1/SC29/WG1) provided a report to WG18 on the status of JPEG 2000 (ISO 15444-1:2000). He noted that software toolkits and hardware chipsets that support JPEG 2000 are now available.

There are two versions of the reference software: A Java version, JJ2000, created by partnership of Ericson, EPFL, others, available at: <http://jj2000.epfl.ch>. A C version, Jasper, created by partnership of University of British Columbia and Image Power available at: <http://www.ece.ubc.ca/~mdadams/jasper>

Both versions are free to use in both commercial and non-commercial work. They provide codestream decoders and encoders, which means that they can take a buffer of image data and compress it or decompress a codestream to a raw buffer, but they cannot yet provide any information about the meaning of the image data (metadata, colorspace, etc.), which is provided by the file format.

Part 1 of the standard has been recently amended. Part 2 (JPX) and Part 3 (motion JPEG) became international standards in Nov. 2001.

Part 4 (conformance requirements) and Part 5 are in the FDIS stage. Part 5 Amendment 1 will add a conforming file format decoder for the JP2 file format, as defined in Part 1.

Work continues on Part 6 (mixed raster file format), and an FDIS is ex-

pected in March 2002. Work on Part 8 (security) and Part 10 (volumetric imaging) has just begun. Work on Part 9 (Internet protocol) has started on a very accelerated schedule. Technology is to be selected in March 2002, with a commercially implementable working draft by July 2002. The FDIS is expected in mid-2003.

TC42 was urged to take the initiative and create a JPEG profile for use in digital cameras before individual camera manufacturers developed their own profiles. Although TC42/WG18 was not ready to create a new work item proposal around this topic, an Ad Hoc group to investigate a possible JPEG profile for digital cameras was started. Those interested in joining this activity are asked to contact Mr. Peyton.

Other Standards Items

The current issue of the ISO Bulletin contains an article about PDF/X titled “From PDF to PDF/X - Finding the right balance”. It is available at www.iso.org/iso/en/commcentre/isobulletin/articles/2002/pdf/pdftopdfx02-01.pdf

Newly available specifications and standards include:

ICC-1:2001.12, File Format for Color Profiles, is available for free download from the ICC website (www.color.org).

ISO 15929, Graphic technology — Prepress digital data exchange — Guidelines and principles for development of PDF/X standards is available from ISO or authorized resellers of ISO standards (for graphic arts standards in the United States - www.npes.org/standards/workroom.html)

For suggestions for future updates, if you have a standards topic that should be reported, or standards questions in general, please contact the author at mcdowell@npes.org or mcdowell@kodak.com