STANDARDS UPDATE

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This issue of Standards Update focuses on the work of ISO/TC42/WG18 (Photography - Electronic Still Picture Imaging). The assistance of Jack Holm (of Hewlett Packard Corporation and a long time participant in WG 18) in preparing this issue of Standards Update is gratefully acknowledged.

ISO/TC42 (Photography) has addressed the standards issues of the photographic industry from the very beginning of international standards. One of the most widely used TC42 standards, the ISO 5 series on densitometry, is one of the two single digit standards still active. However, as the photographic industry has changed and evolved, so has the work of TC42. Over the years Working Groups (WGs) have been added to address issues of concern to the photographic industry, which has been a strong supporter of TC42.

The current scope of TC42 opens with the statement: "Standardization primarily, but not exclusively in the field of still picture imaging – chemical and electronic – including, but not limited to:". This is followed by a listing of specific issues included and exclusions of certain work being done by other committees.

The secretariat for TC42 has been held for many years by the Photographic Imaging Manufacturers Association (PIMA) on behalf of the ANSI, the organization that represents the United States in matters of international standardization.

Formation of WG18

As part of the ongoing support of the photographic industry, TC42 formed WG18 (Electronic Still Picture Imaging) in 1991 to proactively develop standards for digital photography and provide stability in this newly emerging market. To date, WG18 has published two standards (ISO 12231 and ISO 12232), four standards have been completed and are awaiting final approval and publication (ISO 12233, ISO 12234-1, ISO 12234-2, and ISO 14524), and five are at various stages of development (ISO 15739, ISO 15740, ISO 17321, ISO 1606, and a proposed new standard).

WG18 Program

A brief look at each of these standards will provide an overview of the activities of WG18.

ISO 12231:1997 Photography - Electronic Still Picture Imaging - Terminology

Terminology is a key issue in areas of emerging technology, where old terms take on new meaning and new terms are imported from other disciplines. Although a published standard, updates and revisions to ISO 12231 are ongoing. Some of the more unexpected terms defined include: "effectively spectrally neutral", "image storage application profile (ISAP)", "ISO speed of an electronic still picture camera", and "photosite integration time"

ISO 12232:1998 Photography - Electronic still-picture cameras - Determination of ISO Speed

The ISO speed rating is an important attribute of photographic systems. The electronic camera ISO speed ratings described in this standard are intended to harmonize with film ISO speed ratings. However, there are differences between electronic and film imaging systems that preclude exact equivalency in use. Cameras with variable gain, and digital processing after the data has been captured, allow desired tone reproduction to be achieved over a range of camera exposures. It is therefore possible for electronic cameras to have a range of speed ratings. This range is defined as the ISO speed latitude. To prevent confusion, a single value is designated as the ISO speed, with the upper and lower limits of the ISO speed latitude indicating the speed range.

ISO/FDIS 12233 Photography - Electronic still picture cameras - Resolution measurements

ISO 12233 describes a resolution test chart and three resolution metrics: visual resolution, limiting resolution, and spatial frequency response.

Visual resolution is twice the maximum number of equal-width black/white line pairs across the short dimension of the image that are visible and not aliased when the image data is rendered at high magnification.

Limiting resolution is the value where the imaged response (average depth of modulation value) equals 5% of the reference response, or the value of the Nyquist limit in LW/PH, whichever is lower.

Spatial frequency response (SFR) is the linearized response of the camera as a function of spatial frequency. The algorithm specified calculates the SFR from slanted edge image data. The results obtained indicate the approximate SFR of the camera in a specific, but reasonably representative situation.

ISO/FDIS 14524 Photography - Electronic still picture cameras- Methods for measuring opto-electronic conversion functions (OECFs)

This standard describes test methods for measuring both camera OECF's and focal plane OECF's. Camera OECF's include the effects of the camera lens and associated flare, while focal plane OECF's do not. These image formation effects vary with the overall scene luminance ratio, the amounts of each of the different luminances present in the scene, and the spatial arrangement of these luminances. This variability can be quite large, and consequently it is possible to determine a repeatable camera OECF only for a specific scene, such as a test chart.

ISO/DIS 12234-1 Photography - Electronic still picture cameras - Removable memory - Part 1: Basic removable memory reference model

This standard addresses removable memory applications for electronic still

cameras. Unlike a traditional photographic system, where most of the entire imaging chain is embodied in the film, an electronic imaging system divides the imaging chain into discrete components separately devoted to image acquisition, storage, transmission, processing and display. Since the components may be made by different manufacturers, there is a need to specify a standard format for data interchange among the various components of an electronic imaging system.

Data interchange, by means of a removable storage media is defined along with the information content required for a removable memory data format. The information content is defined to include both the image data and data items describing the image (image metadata).

ISO/DIS 12234-2 Photography - Electronic still picture cameras - Removable memory - Part 2: Image data format - TIFF/EP

ISO 12234-2 defines a file format for images obtained using electronic still picture cameras. This file format is noteworthy in its extreme flexibility, and in the large amount of standard data items describing the image data (associated data). This format is intended primarily for storing raw digital camera sensor data. The associated data can then be used to process the raw data for rendering. The intent is to provide sufficient associated data to allow any degree of sophistication in the processing. The listing of associated data types can also be used as a basis for selecting subsets to be included in other file formats, as is the case with FlashPix.

ISO/CD 15739 Photography - Electronic still picture cameras - Noise measurements

The signal to noise ratio in uniform areas in electronic still picture cameras is a function of exposure. The signal to noise (S/N) definition used, and measurement methodologies, are defined in ISO 14524 and ISO 12232 (above). This standard describes the reporting form, and also the following metrics: S/N at edges as a function of edge contrast and exposure, and S/N as a function of both spatial frequency and exposure. Although the methodology for the determination of the minimum and maximum exposure limits is defined in ISO 14524, the reporting of the dynamic range is defined in this standard.

ISO/WD 16067 Photography - Electronic scanners for photographic images - Spatial resolution measurements - Part 1: Scanners for reflective media

This standard applies a resolution measurement philosophy, similar to the one in ISO 12233 (see above), to photographic print scanners.

ISO/WD 17321 Graphic Technology and Photography -Colour characterization of digital still cameras (DSCs) using colour targets and spectral illumination (Joint activity with ISO/TC130 Graphic technology).

The spectral responses of the colour analysis channels of digital still cameras do not, in general, match those of the typical human observer. Neither do the responses of different digital still cameras necessarily match each other. It is therefore necessary to take account of the spectral sensitivities, illumination, and reference colour space for the particular application situation. This standard addresses these considerations by defining a scene analysis colour space, a colour target, metrology, and procedures for various situations.

ISO 15740 Photography - Electronic still picture imaging -Picture Transfer Protocol (PTP) for Digital Still Photography Devices

This standard defines a common communication mechanism for exchanging images between digital cameras, PCs and imaging appliances. It provides an extensible high-level protocol that can be implemented using a variety of transports, including USB, IrDA, and ISO 1394.

New Proposal: Photography - Electronic still picture imaging - Design rules for camera file system (DCF)

As digital still cameras have come to enjoy wide popularity, there is a growing need for direct exchange of images between cameras and other equipment, allowing pictures taken by one camera to be viewed on another, or output to a printer. This standard is aimed at the creation of a user environment in which consumers can combine products more freely and exchange media readily. It specifies rules for recording, reading, and handling image files and other related files used on digital still cameras or other equipment.

More Information

More information about these activities is available at the following web sites: www.pima.net/it10a.htm and www.pima.net/standards/TC42.htm

As with all standards activities, participation is open to all interested parties. Your involvement and interest is welcomed. Should you wish to become involved please contact the secretariat, Jim Peyton at: jimpeyton@earthlink.net

Upcoming Meetings

ISO/TC130, Graphic technology, will hold a plenary and working group meetings Sept. 27 to Oct. 2, 1999 in Tokyo, Japan.

The next physical meeting of IEC/TC100/PT 61966 will be held in Beijing, China, Nov. 10 - 16, 1999. The general information, registration and accommodation forms are available at the "Beijing meeting corner" on w3.hike.te.chiba-u.ac.jp/IEC/100/PT61966

The next meeting of ISO TC42 / WG18 will be held in Scottsdale, November 14-16, 1999 just prior to the IS&T/SID Color Imaging Conference.

The 18th Plenary of TC42 will be held October 2-7, 2000 in Tokyo, Japan. The TC42 Plenary 2000 web site (www.pima.net/standards/iso/tc42/plenary_2000) will be the primary source of information for this meeting.

A brief personal note. I have (sort of) retired after 42 years with Eastman Kodak Company. However, I will be supported by Eastman Kodak Company to continue standards work in the area of color and by NPES The Association for Suppliers of Printing, Publishing and Converting Technologies to continue standards work related to graphic arts. Please do not hesitate to contact me with questions, comments or suggestions at either mcdowell@kodak.com or mcdowell@npes.org.