

# Wrappers and Metadata Technology (W25)

*Chaired by Mike Cox*

The work of W25 during the last year or so has been mainly that of consolidation and follows three to five years of rapid development and roll-out of new Standards and Recommended Practices. Work has focused in particular on Metadata Registries, the Material eXchange Format, XML and KLV encoding, and Object and Meta modeling.

Recent meeting agendas have six main headings, which illustrate the proceedings of the committee and working group meetings, as well the issues involved.

**Metadata Registries**—the Metadata Dictionary, the Groups, Types, and other Registries

**Semantic and Naming Conventions** in Metadata Registries and Schemes

**Exchange of Program Material as Bit Streams**—Material Exchange Format

**Object/meta Models**—the Advanced Authoring Format model

**Metadata Encoding**—KLV (Key-Length-Value), XML Schemas

**Legacy Issues**—Digital Picture Exchange Format

## Metadata Registries

Throughout the program supply chain, applications will be totally reliant on unambiguous metadata if the concept of an end-to-end data chain is to be realized. If information is fed into one end of a system, it must pass through all the system interfaces and arrive at the other end intact and with its meaning unchanged if it is to be of any use.

The committee is currently updating the original standards (which are now some seven years old) to address the needs of developments such as the widespread introduction of XML and the increasing need for system interoperability as hitherto digital islands in an analog ocean are directly connected together—not least between broadcaster and end user, where descriptive metadata is increasingly important in competing for audience share, or between libraries and archives in their drive in sharing content to drive down costs or derive an income stream.

Updates to produce version 10 of RP 210 (Elements) have recently been completed, as well as version 9 updates to RP 224 (Labels). Work is in progress on Groups and Types and is about to re-start on Controlled Vocabularies.

## Semantic and Naming Conventions

The exchange of descriptive, as opposed to strictly technical, metadata has brought forth a number of issues that are possibly new to the engineering community, but have been well known for many years to the library and archive community—particularly issues concerning the exchange of metadata between different semantic domains and the necessity for rigorous conventions for naming and clear semantic definitions. On the surface, these issues appear to be simply soluble by the use of synonyms and individually written mappings between application or user domains. Some of the problems encountered, however, can possibly be illustrated with natural language—if English text is translated into, say, Dutch by one person and then translated back into English by someone else, the resultant text is unlikely to be the same as the original, although its meaning may approximate. Add another language in between and the semantic changes can become very significant indeed. In much the same way, mapping one application's metadata to another or sharing it between many users has to be done

with great care if semantic meaning is to be accurately preserved, and may well require the construction of a semantic “super-domain,” spanning all the users.

Work is now progressing to “clean up” some of the early SMPTE metadata documentation, to fully understand the issues, and to suggest possible solutions for all communities using SMPTE metadata.

### Exchange of Programme Material as Bitstreams

This has been a significant part of the work of the committee and a direct consequence of the final report from the “EBU/SMPTE Task Force for Harmonised Standards for the Exchange of Programme Material as Bitstreams,” published in August 1998.

The major work item in W25 for the past few years has been the Material eXchange Format (MXF). MXF is a new file format developed to meet the currently foreseeable needs of users for a file container for pictures and sound in any format (MPEG, AES audio, uncompressed video, BWAV, DV, etc.), as well as metadata for business, program, or libraries and archives interchange purposes. It is important to be clear that MXF is a container for existing essence formats and not a new audio or video format—a common misapprehension in the industry. While “no smoke” when two “MXF compliant” devices are plugged together is a good thing, it does not mean they will necessarily talk to each other!

MXF continues to be a major part of the committee’s work, with one Working Group (W25.10) devoted to issues arising from the standard’s rollout and implementation. Currently, this group is restricted in scope to resolving implementation issues rather than dealing with new or enhanced requirements as MXF is rolled out and users seek to exploit its potential still further. One particularly thorny problem has been the mapping of AES and multiple flavors of BWF audio into MXF (SMPTE 382), where the help of the Audio Engineering Society was enlisted—they and the W25 editorial team are to be congratulated for their patience and skill at dealing with conflicting specifications and deriving resolutions to the conflicts.

The MXF Standard, SMPTE 337M, was published in 2004, and about 25 other documents for various mappings have now been completed. Work continues on new documents; currently these include the carriage of event-oriented metadata (such as subtitles) within MXF, and mapping for compressions formats developed in other committees. Work on MXF will clearly continue for some time yet!

### Metadata Encoding

In order to carry data or metadata through a system, it has to be encoded into the datastream. This can be done in many ways. Traditionally, SMPTE has approached the problem from a low level—in fact, right at the bit-level. SMPTE 336M (Key, Length, Value encoding) is a current example and also underpins the MXF work. On the other hand, computer-based systems encode at a higher level—by, for example, using XML.

Both KLV and XML encoding are a continuing work item for the W25 Committee. The KLV Standard has recently been updated to take account of developments over the past few years.

An XML-centric Group has, for the past two or three years, been addressing and preparing the documentation required to XML representation in digitally based systems. There have been three principal topics—a high-level view of metadata schemes and the interfacing of KLV-and MXF-based TV gear, computer-based systems representing SMPTE Metadata in Registries and KLV-encoding schemes as XML documents, and ways of harmonizing the frequently conflicting requirements of different sectors of the industry. SMPTE 434, “XML Encoding for Metadata and File Structure Information in

MXF," has already been completed to meet the immediate needs of the industry and work on another, potentially much richer, Standard, Reg-XML, is in progress.

## Object/meta Models

The traditional approach to building analog systems was to develop schematic diagrams of the system and from that, build up the discreet blocks of component parts. This approach, which dates from the early telecommunication days of "posts and wires," has stood the industry in good stead over many decades, but is inappropriate for modern digital systems based on IT infrastructure and networks. The precise nature and behavior of the digital objects within a system have to be defined, as well as their relationships to one another. Currently, W25 is working to standardize an object/meta model, the proponent for which is the Advanced Authoring Format Association (AAF). Because the MXF model is, in effect, a subset of AAF, this work is equally applicable to MXF. Due to pressure on resources, this work has progressed less quickly than anticipated but is now set to move forward quickly in the next few months.

## Legacy

In response to recent requests from the industry to revisit the Digital Picture Exchange Standard (SMPTE 268M), a Working Group was set up in 2006 to determine the nature of the issues involved. The group has established that there is need to clarify SMPTE 268M, that the Standard is likely to be in widespread use for the foreseeable future, and that some enhancements are necessary to meet present-day requirements. As a consequence, a draft document should be available at the end of 2007 that addresses the clarifications required, with a second part available during the following year, to include the new enhancements.



**John Miller**

Miller is currently a product technical specialist in the Rochester Technical Center. He began his career with Kodak in 1977. His first job involved finishing 54-in. wide-rolls of motion picture film to perforated 35mm rolls and he quickly moved into process and product quality work. Miller's work contributed to the introduction of the Kodak Vision and Vision 2 Color Negative Films, non-remjet Kodak Vision Color Intermediate Film, and many other product improvements.

## Film Technology (F2)

*Chaired by John C. Miller*

The F2 committee is involved primarily with motion picture film characteristics for optimum performance in capture, post-production, and presentation. This includes:

Dimensional specifications for cutting 8, 16, 35, 65, and 70mm motion picture films in many perforation formats; camera and film image areas; lenses; soundtrack designations; packaging format and length identification; film latent image print; and cores, reels, and cartridge; along with capacities and designations.

There are currently 48 document standards within this committee, along with a few RP and EG documents.

Most documents within the Film Technology committee are mature. There is currently no new activity other than five-year review.