Motion Imagery Standards Board **Recommended Practice** **Annotation Universal Metadata Set**	**MISB RP 0602.1** **13 June 2007**

1 Scope

This Recommended Practice documents the basic SMPTE KLV metadata sets used to encode Video Annotation data associated within a motion imagery data stream. This RP provides direction on the creation of "Annotation" KLV metadata to allow for the creation, dissemination, and display of visual cues to enhance the exploitation of MISP compliant motion imagery data.

2 References

2.1 "Extended Toolkit for Video (XTV)", KLV Annotation Standard DRAFT, PAR Government Systems Corporation, 12 November 2003.

2.2 ISO/IEC 13818-1, Information Technology – Generic coding of moving pictures and associated audio information: Systems, 2000.

2.3 MIL-STD-2301A, Computer Graphics Metafile (CGM) Implementation Standard for the National Imagery Transmission Format Standard, 5 June 1998.

2.4 MIL-D-28003A, Military Representation for Communication of Illustration Data: CGM Application Profile, 15 November 1991.

2.5 SMPTE 335M-2001, Metadata Dictionary Structure.

2.6 SMPTE 336M-2001, Data Encoding Protocol Using Key-Length-Value.

2.7 SMPTE RP210.8-2004, Metadata Dictionary (DRAFT).

3 Introduction

Video Annotation is the process of visibly providing added information about objects appearing in a motion imagery data stream. Each annotation consists of data which describes an object in the data stream. This annotation object is associated with the subset of frames for which the annotation object is valid. Video annotation objects may be added to an ISO 13818-1 MPEG data stream by adding an elementary data stream. A motion imagery data stream will be considered annotated when there is an associated stream of encoded video annotation messages.

The SMPTE 336M-2001 standard defines a Key-Length-Value (KLV) metadata encoding protocol for representing data items and data groups independent of the application or data transport method used. The video annotation data shall be implemented as SMPTE 336M-2001 compliant Universal Sets.

Multiplexing of the annotation private data stream is not detailed in this document. Annotation private data streams shall be multiplexed in accordance with the relevant MISP-compliant practices in place for KLV data streams.

4 Video Annotation Components

A video annotation data stream is comprised of a sequence of the following KLV data items.

4.1 Preface Items

The following KLV items provide ancillary information to help decoders interpret the Video Annotation Universal Set data that follows. These preface items shall be inserted in a video annotation data stream immediately prior to a Video Annotation Universal Set if they have not been inserted within the previous quarter second of program timeline. Inclusion at this minimum frequency is only necessary when Video Annotation Universal Set items are being included in the annotation data stream.

More frequent inclusion of preface items is permitted and may be desirable to enhance random accessibility.

- Byte Order (06.0E.2B.34.01.01.01.01 03.01.02.01.02.00.00.00)
- Active Lines per Frame (06.0E.2B.34.01.01.01.01 04.01.03.02.02.00.00.00)
- Active Samples per Line (06.0E.2B.34.01.01.01.01 04.01.05.01.02.00.00.00)
- One or more Video Annotation messages.

The Byte Order will always be big endian ("MM").

The Active Lines per Frame and Active Samples per Line will be from the original essence data image parameters prior to compression.

4.2 Video Annotation Universal Metadata Set

This section defines a metadata set consisting of mandatory and optional elements required to create video annotation messages describing a video annotation object. Each Video Annotation Universal Metadata set will have the designator:

- Video Annotation Universal Set (06.0E.2B.34.02.01.01.01.0E.01.03.03.01.00.00.00)

4.3 Video Annotation Mandatory Elements

Each Video Annotation metadata set will include two mandatory elements:

- Locally Unique Identifier (06.0E.2B.34.01.01.01.01 01.03.03.01.00.00.00.00)
- Event Indication (06.0E.2B.34.01.01.01.01 05.01.01.02.00.00.00.00)

The Locally Unique Identifier identifies the annotation object with which the annotation message is associated.

The Event Indication defines a specific event described in the message; allowable events are: "NEW", "MOVE", "MODIFY", "DELETE", and "STATUS".

The frames for which an annotation object is valid are described by a set of events, each of which occurs at a particular frame of the video. The creation of an annotation object is initiated with a "NEW" event. Updates to the annotation object's position within the viewport are

described with a “MOVE” event. Changes to the annotation object’s data are described with a “MODIFY” event. Periodic messages describing the current contents and location of the annotation object are described with a “STATUS” event. The “DELETE” event is used to indicate the termination of the associated annotation object.

4.4 Video Annotation Variable Elements

The variable annotation elements of the Video Annotation metadata set consist of:

- MIME Media Type (06.0E.2B.34.01.01.01.07 04.09.02.00.00.00.00.00)
- MIME Data (06.0E.2B.34.01.01.01.01.0E.01.02.05.01.00.00.00)
- Modification History (06.0E.2B.34.01.01.01.01.0E.01.02.05.02.00.00.00)
- X viewport position in pixels (06.0E.2B.34.01.01.01.01 07.01.02.03.01.00.00.00)
- Y viewport position in pixels (06.0E.2B.34.01.01.01.01 07.01.02.03.02.00.00.00)
- Annotation Source (06.0E.2B.34.01.01.01.01.0E.01.02.05.03.00.00.00)

The MIME Media Type describes the MIME Encoding type of the accompanying MIME Data. Presently this MIME Media Type will be restricted to “cgm”.

The MIME Data will contain the MIME encoded data of the annotation message. This MIME data will be binary encoded CGM as described in the reference document, MIL-STD-2301A.

The Modification History will contain information identifying the author of the most recent significant event such as “NEW”, “MODIFY” and “DELETE. The specific contents are user definable.

The X and Y viewport position in pixels will be the location of the MIME Data reference point (origin of the CGM’s VDC). The X and Y position will be referenced based upon a (0, 0) origin in the upper-left corner of the original essence data image.

The Annotation Source key describes the source method of the annotation. This four byte bit masked field will only be required during a “NEW” and “STATUS” event. Current mask values are:

Value	Definition
0x0000	Manually Annotated
0x0001	Automated from BE/RWAC
0x0002	Automated from user defined latitude / longitude center point
0x0004	Automated from user defined AOI
0x0008	Automated from pixel intelligence

4.5 Video Annotation Event Messages

Each Video Annotation Event message will consist of all mandatory and the following variable elements.

The “NEW”, “MODIFY”, and “STATUS” event messages will include all of the variable message elements: MIME Media Type, MIME Data, Modification History, X Location, and Y Location.

The “MOVE” event message will include only the X and Y Locations.

The “DELETE” event message will include only the Modification History element.

5 Video Annotation Message Metadata

This section further defines the Video Annotation Metadata elements described in Section 4.

5.1 Video Annotation Message Group

Registry	Description	Purpose
1	UL header and designator	06.0E.2B.34.02.01.01.01 Universal Set
2	Group designator	0E.01.03.03.01.00.00.00 MISB Registry entry
3	Group name	Video annotation message
4	Group description	A single annotation message for an annotation object specifying a new annotation, a change in position of an existing annotation, a modification of an existing annotation, a status update of an existing annotation, or the deletion of an existing annotation.
5	Parent	Null
6	Allowed syntax	(1 item) 01 – Universal Set
7	Mandatory Contents	(2 items)
7.1	UL Key	06.0E.2B.34.01.01.01.01 01.03.03.01.00.00.00.00 Locally Unique Identifier
7.2	UL Key	06.0E.2B.34.01.01.01.01 05.01.01.02.00.00.00.00 Event Indication
8	Variable Contents	(6 items)
8.1	UL Key	06.0E.2B.34.01.01.01.07 04.09.02.00.00.00.00.00 MIME Media Type
8.2	UL Key	06.0E.2B.34.01.01.01.01.0E.01.02.05.01.00.00.00 MIME Data
8.3	UL Key	06.0E.2B.34.01.01.01.01.0E.01.02.05.02.00.00.00 Modification History
8.4	UL Key	06.0E.2B.34.01.01.01.01 07.01.02.03.01.00.00.00 X Viewport Position in Pixels
8.5	UL Key	06.0E.2B.34.01.01.01.01 07.01.02.03.02.00.00.00 Y Viewport Position in Pixels
8.6	UL Key	06.0E.2B.34.01.01.01.01.0E.01.02.05.03.00.00.00 Annotation Source

5.2 Video Annotation Message Data Description

16-byte Metadata Label or 16-byte Set Designator	Name	Definition	Type	Value Length (bytes)	Value Range	Usage
06.0E.2B.34.01.01.01.01 03.01.02.01.02.00.00.00	Byte Order	Byte order of the metadata.	Int16	2	"MM" Big Endian	See section 4
06.0E.2B.34.01.01.01.01 04.01.03.02.02.00.00.00	Active Lines per Frame	Total number of lines (rows) in the active portion of a frame in the video pixel matrix.	UInt16	2		See section 4
06.0E.2B.34.01.01.01.01 04.01.05.01.02.00.00.00	Active Samples per Line	Total number of samples (columns) in the active portion of a line in the video pixel matrix.	UInt16	2		See section 4
06.0E.2B.34.02.01.01.01. 0E.01.03.03.01.00.00.00	Video Annotation	Video Annotation Universal Set.		Variable		All Object Messages
06.0E.2B.34.01.01.01.01 01.03.03.01.00.00.00.00	Locally Unique Identifier	A 4Byte locally unique id.	UInt32	4		All Object Messages
06.0E.2B.34.01.01.01.01 05.01.01.02.00.00.00.00	Event Indication	Describes what the event is as a part of the process.	ISO/IEC 646:1991; ISO 7-Bit Coded Character Set	1 (32 bytes max)	0x31=NEW 0x32=MOVE 0x33=MODIFY 0x34=DELETE 0x35=STATUS	All Object Messages
06.0E.2B.34.01.01.01.07 04.09.02.00.00.00.00.00	MIME Media Type	MIME media type as defined by IETF.	ISO/IEC 646:1991; ISO 7-Bit Coded Character Set	Variable	"cgm"	NEW MODIFY STATUS
06.0E.2B.34.01.01.01.01. 0E.01.02.05.01.00.00.00	MIME Data	MIME encoded data of annotation message.	Opaque	Variable	Binary encoded CGM	NEW MODIFY STATUS

06.0E.2B.34.01.01.01.01.0E.01.02.05.02.00.00.00	Modification History	Identification of most recent significant event's author.	ISO/IEC 646:1991; ISO 7-Bit Coded Character Set	Variable (127 bytes max)	Free text	NEW MODIFY DELETE STATUS
06.0E.2B.34.01.01.01.01 07.01.02.03.01.00.00.00	X Viewport Position in Pixels	Position of an object within the viewed image.	Int16	2		NEW MOVE MODIFY STATUS
06.0E.2B.34.01.01.01.01 07.01.02.03.02.00.00.00	Y Viewport Position in Pixels	Position of an object within the viewed image.	Int16	2		NEW MOVE MODIFY STATUS
06.0E.2B.34.01.01.01.01.0E.01.02.05.03.00.00.00	Annotation Source	Source of the specified Annotation Object	Int32	4		NEW STATUS