INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANIZATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC1/SC29/WG11
CODING OF MOVING PICTURES AND ASSOCIATED AUDIO

Source : Requirements Group
Title : Guide for the Video Work
Purpose: Report

This document extracts from the general requirement listing only those requirements that directly impact the development of video coding standard and the testing thereof.

1. Syntax

The syntax of MPEG-2 should implement the notion of "maximum-core" that supports as many different application profiles as possible.

2. Picture Format

    2.1 Color ratio

MPEG-2 must support interlaced and sequentially scanned source material, use of 4:2:0, 4:2:2 and 4:4:4 color ratios and application specific pixel array aspect ratios and image aspect ratios. These should all be supported in the syntax.

    2.2 Progressive Source

It is expected that 24 fps movies and progressive source material will be efficiently coded as frames. MPEG-2 syntax should support sufficient indication in the video stream to mark such progressive video frames.

    2.3 Movie Timing

In the specific case of a 24Hz movie encoded as frames, some indication that the progressive frame represents two or three video fields in a 60Hz sequence is required.

3. Picture Quality

The target quality for MPEG-2 is commensurate with the data rate.

4. Range of Use

MPEG-2 video can be used at bit rates up to 10 Mbit/s. The standard shall be optimized for CCIR 601 interlaced image sources.

There must be provision for high quality (near lossless) modes for example via downloadable weighting matrices and alternative quantizers.

5. Data Rate Control

MPEG-2 should support constant bit rate and variable bit rate applications. The model for the latter is constant-quality coding over B-ISDN channels that support Usage Parameter Control (UPC).

6. Codec Delay

Low encoding and decoding delay moderation are required.for real-time video communications such as telephony, conferencing, monitoring and synchronization with real-time sound. Total encoding and decoding delay of less than 150 milliseconds is required for low delay mode operation.

For model development, any core experiment that impacts the quality of the low delay image should be demonstrated in low-delay mode; those that do not should provide argument to support such an assertion.

7. Random access/channel hopping

MPEG-2 should support random access and/or channel hopping when necessary.

8. Scalability

Scalability (as defined in the general requirements listing document) is a requirement of the MPEG-2 syntax. It is required for some entertainment/broadcast and technical/computer applications.

It is important that core experiments demonstrate the impact of any proposed alteration of the coding model on scalable decoding. For the purpose of testing, we strongly urge all core experiments that do not directly address scalability to demonstrate decoding a reduced rate bitstream at an agreed upon reduced rate, thus showing picture quality at both full rate and with partial decoding.

9. Complexity

Low complexity is a requirement that should be addressed by core experiments. The standard should be flexible enough to allow combinations of high performance / high complexity and low performance / low complexity.

10. Compatibility

We identify three relevant aspects of compatibility (as as defined in the general requirements listing document):

    1) forward compatibility with MPEG-1 and H.261
    2) backward compatibility with MPEG-1 and H.261
    3) upward/downward compatibility with EDTV, HDTV and SDTV.

It is recognized that there are many possible solutions to the various compatibility requirements including simulcasting, scalable bitstreams and programmable decoders.

MPEG-2 will seek to provide compatibility with CD11172.

At present, there is no consensus about what specific systems MPEG-2 must be compatible with or the optimal manner to do so.

11. Editing Encoded Bitstreams

It is desirable that as many operations on the undecoded bitstream as are practical be supported to avoid the expense and quality costs of re-coding. Editing, and concatenation of encoded bitstreams with no recoding and no disruption of the decoded image sequence is desired.

12. Trick Modes

All special access, search and scan modes of MPEG-1 (CD 11172) remain requirements of MPEG-2.

13. Error Resilience

Error resilience is deemed to be a feature (requirement) of the source coding itself. In particular, cell loss resilience in ATM networks and resilience to channel errors in storage and transmission media of up to one part in 10E-4 (ENG, STV, TTV) are required. Therefore testing should provide for graceful recovery in the face of missing video bits or data packets.

Broadcast applications that require graceful degradation in proportion to CNR are addressed both here and through reference to scalability.

For model development, any core experiment that impacts the quality of an image with such an error rate should be demonstrated; those that do not should provide argument to support such an assertion.

END