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

ISO/IEC JTC1/SC29/WG11
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Source: Requirements Group
Title: Guide for the Video Work, Rio Revision
Purpose: Report

This document extracts from the general requirement listing all normative requirements that are mandated for the development of the video coding standard and the testing thereof. In addition, we have included some optional recommendations. See MPEG92/229(revision), "Information on Requirements for MPEG-2 Video", for background information

1. Syntax and Toolkit

The syntax of MPEG-2 shall support all the normative features listed in this document by means of single, integrated syntax.

The syntax shall also provide extension capabilities for implementation of recommended features in this document.

The requirements group recommends the notion of "maximum-core" that supports as many different application profiles as possible (as stated in the 16th WG11 meeting report, document ISO/IEC/JTC1/SC29/WG11-N0140, annex VI.).

Any core experiment on any mode of operation of MPEG-2 that affects or precludes another mode either syntactically or in operation shall demonstrate that effect or provide argument to show its impact.

2. Picture Format

2.1 Color ratio, video format

The MPEG-2 syntax shall support interlaced and progressively scanned source material, use of 4:2:0, 4:2:2 and 4:4:4 color ratios and application

specific pixel aspect ratios, image aspect ratios and siting of luminance and chrominance samples. Horizontal and vertical array dimensions up to 64K (K = 1024) pixels shall be supported in the syntax but need not be tested by experiment.

2.2 Progressive Source

The MPEG-2 syntax shall support sufficient indication in the video stream to mark such progressive video frames.

2.3 Movie Timing

In the specific case of a movie encoded as frames, sufficient indication shall be carried in the syntax for adequate display timing. For example, some indication that the progressive frame represents two or three video fields in a 60Hz sequence is required.

2.4 Display Format Control

The MPEG-2 syntax shall support means to specify a display window within the encoded raster as, for example in the case of pan and scan.

3. Picture Quality

High picture quality is a primary requirement for MPEG-2.

There shall be provision for near lossless modes for example via downloadable weighting matrices and alternative quantizers.

4. Evaluation

The MPEG-2 standard shall be optimized for CCIR 601 interlaced image sources with minimal loss of efficiency for other formats. Video is encouraged to test film original, computer-generated pictures and cropped high resolution images.

5. Data Rate Control

The MPEG-2 syntax shall support constant bit rate and variable bit rate applications. A model for the latter is near-constant-quality coding over B-ISDN channels subject to Usage Parameter Control (UPC).

6. Low Delay Mode

A low encoding and decoding delay mode is 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.

7. Random access/channel hopping

The MPEG-2 syntax shall support random access and channel hopping.

8. Scalability

The MPEG-2 syntax shall support bit-stream scalability.

9. Compatibility with DIS11172 and H.261

The MPEG-2 syntax shall support backward compatibility with DIS11172 and H.261.

The MPEG-2 standard will seek to provide forward compatibility with DIS11172 and H.261 syntax.

10. Compatibility with higher and lower resolution formats

The MPEG-2 standard shall support upward/downward compatibility to higher/lower resolution video formats.

11. Complexity

The MPEG-2 standard shall support combinations of high performance/high complexity and low performance/low complexity decoders.

All core experiments that impact the complexity of the decoder shall describe that change.

12. 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.

13. Trick Modes

The MPEG-2 syntax shall support all special access, search and scan modes of DIS 11172.

14. Error Resilience

The MPEG-2 syntax shall support error resilient modes relevant to cell loss in ATM networks and bit errors (isolated and in bursts) in transmissions.

Error resilience shall include graceful degradation in proportion to bit error rate (BER) and graceful recovery in the face of missing video bits or data packets.

Note: All Items may require additional support at the system level.