

MEETING RECORD
Video Compression Measurements Subcommittee G-2.1.6
Audio Video Techniques Committee G-2.1
Broadcast Technology Society
Institute of Electrical and Electronics Engineers
Ad-Hoc Meeting
NASA – Ames Research Center
Sunnyvale, CA
July 23, 2001

Attendees

Andrew Watson – NASA
Vitorrio Baroncini - FUB
Phil Corriveau – Intel
Marilyn Driggers – Intel
David Fibush - Tektronix
Alan Godber – Consultant & Chairman G-2.1.6
Doug Lung – Telemundo & Secretary G-2.1.6

The Ad-Hoc meeting of G-2.1.6 at Dr. Andrew Watson's laboratory at NASA Ames Research Center began at 9:15 AM. The purpose of the meeting was to allow G-2.1.6 to review the methods in proposed *IEEE Standard P1486 for the Subjective Measurement of Visual Impairments in Digital Video Using a JND Scale* using equipment at NASA.

The group was provided with a description and demonstration of the P1486 draft standard as implemented at NASA Ames Research Center. Data was collected from three of the attendees and compared with prior data collected from the "normal" population at NASA. Details on the tests and results from the three attendees and the NASA subjects is available in Andrew Watson's August 14, 2001 *Report of demonstrations of JNDVIS method for G-2.1.6 Committee at NASA Ames Research Center*. This report is available in the private working documents area of the IEEE G-2.1.6 website at <http://grouper.ieee.org/groups/videocomp>.

It was agreed that one set of sequences would be used for the attendees. The set used was VQEG SRC 15 with HRC5. Previous tests showed this combination contained 4.07767 JNDs, with a standard deviation of 1.07525.

During the demonstration, other topics related to P1486 were discussed.

There was considerable discussion about the equipment required for other laboratories to validate the method. This is documented in the draft standard, although there are other options. While an SGI Octane computer was used at NASA, a Pentium 4 may be powerful enough. An SDI (ITU BT-601) output board is needed. It would also be possible to use a video server with sequences with different levels of degradation stored on it.

Mathematica and a software package designed by Andrew Watson are used to choose the sequence to be played based on feedback from the observer. Program code is required to play back the selected sequence. If this is done with a video server, a powerful computer is not needed. A feedback box with three buttons is required. An interface is required to provide information from the box to the computer running Mathematica

and to Andrew Watson's software and the Mathematica voice feedback device. The interface to the three button joystick and the interface to the video server are the only items that keep this from being an "out-of-the-box" system.

While verification from other laboratories is not essential before the draft standard is sent to ballot, it was agreed that if other laboratories are ready to do verification tests in September, it may be worth waiting for them. Verification will be required before calibrated test materials can be standardized.

Issues related to the calibrated test materials created using this draft standard were discussed. Unfortunately, at this time there is no standard file format for 601 video. The digital cinema format (DPX?) has too many options. Each server has its own digital format. The Abekas format for uncompressed storage of the video sequences looks promising and it may become a standard. Once the material is in some readable format, users can translate it to another format as required. It was noted that it is now possible to play back uncompressed video on a PC with a \$1,000 video card and a fast hard disk.

There was a recommendation that sequences with low luminance levels be avoided. It was noted that if the luminance level is too low, the results become unstable at low JND values. One reason for this is low luminance sequences are more dependent on room lighting, particularly light reflected on the screen. This could be a problem since not everyone will have a lab to view the calibrated test material in.

It was agreed that there was value in having a variety of HRCs. It was not clear, however, whether lower quality HRCs such as the H.263 HRC are appropriate for broadcast material. ITU standard H26L, with a 30 Hz frame rate down to 500 kbps data rate was suggested as an alternative.

There is a need to specify the resolving power of the calibrated materials. This can be done using the methods in T1A1.1 Draft Technical Report [A5], document T1A1.1/2001-046.

As results from the first trials conducted with Phil Corriveau and Marilyn Driggers became available, it was clear both found more JNDs in the test material than did the test subjects used in the NASA testing. This is described in Andrew Watson's August 14, 2001 *Report of demonstrations of JNDVIS method for G-2.1.6 Committee at NASA Ames Research Center*.

These results led to a discussion of whether expert or non-expert viewers should be used.

The definition of expert and non-expert was discussed. If the draft standard specifies non-experts, then we need a definition of a non-expert viewer before we can finish it. However, it was recommended we obtain more data from experts before we write a definition. While someone who works in the field could be considered an expert, the difference observed here seems to be knowledge of the image and the types of artifacts. People who work primarily with video waveform monitors could be considered video experts, but for this purpose they could be considered non-experts.

It was noted that that Phil Corriveau and Marilyn Driggers were familiar with the image, the type of artifacts and when and where to look for them. They were also motivated to identify the artifacts. It was suggested that we conduct an experiment to investigate how this affects results. Find out what Phil and Marilyn focused on, then conduct the test with a naive observer that does not have this knowledge. After giving the observer the information gathered from Phil and Marilyn, repeat the test and compare the results.

It was suggested that observers that had results that disagreed significantly from the mean, either in the wrong direction or in magnitude, be thrown out. Another option would be to have a have people observe the sequence as a group and vote on it.

Andrew Watson agreed to continue work on the draft standard and have it available for review during the August 17 telephone conference.

Submitted by:

Doug Lung
Secretary, G-2.1.6