**Decisions made at the VQEG meeting**
**at the NIST facility**
**Gaithersburg, Maryland**
**May 27-29, 1998**

CO-CHAIRS OF VQEG

It was agreed that Arthur Webster and Phillip Corriveau will be the Co-Chairs of VQEG.

ILSC REPORT

Test Scenes were selected: 10 each at 50/525 and 60/625.

Volunteers are needed for HRC processing--especially in the 525 half of the test.
If help is not found to run the 525 HRCs, the test will proceed with only 625 Scene/HRC test conditions.

Funds and/or tape stock and/or labor is needed from the proponents to help get the subjective viewing tapes edited.

A finance committe was established to coordinate the financial aspects of the test:

- Vittorio Baroncini
- Phil Corriveau
- Stephane Pefferkorn
- Laura Contin
- Arthur Webster

DATA PRIVACY ISSUES

On all public documents relating to this validation test:

- Subjective laboratories will be identified by numbers.
- Objective models/proponents will be identified by letters.
- The only results of the objective models to be shared publicly are the prediction results.
- Coder-decoders will not be identified by manufacturer.

METRICS

ANOVA, Kurtosis, and weighted RMS error were eliminated as metrics for objective model evaluation.

The following metrics will be used for objective model evaluation:

- Simple RMS error between model output and the raw (each viewer's difference) subjective scores.
- Pearson correlation coefficient on both the DMOS and the raw subjective scores.
- Spearman rank-order correlation.
- The outlier measure in the current version of the objective test plan.

Regarding the use of complexity as a criterion for algorithm acceptance:

The text will remain as it stands in the Objective Test Plan.

LAB TO LAB COMPARISONS

VQEG will adopt lab-to-lab comparisons as a benchmark in the evaluation of objective measurement methods.

INTELLECTUAL PROPERTY ISSUES

It was agreed that each proponent will send to the reflector a statement that they intend to abide by the ITU patent policy if their algorithm is selected for inclusion in an ITU Recommendation.

This patent policy for the ITU-T can be found in document Resolution 1 at the ITU Web site. (http://ties.itu.int/itudocr/itu-t/wtsc-96/res/001_e_51047.doc)

Accessing this requires a TIES account. If requested I can excerpt the pertinent passages and place them on the ituvidq ftp site.

For the ITU-R I expect a similar document can be found. I would ask someone from ITU-R 10-11Q if they know where this is to be found.

ALGORITHM DISCLOSURE

It was also agreed that for those proponents that are selected for recommendation to the ITU Study Groups for Recommendation, a description of the algorithm is required that will allow full implementation. This could include source code but source code is not required. ITU Study Groups make their own decisions, but it is VQEG's position to suggest that source code will not be necessary.

NON-DISCLOSURE AGREEMENT

A non-disclosure agreement was drafted and accepted. Members of the ILSC will read and agree to the terms. No signatures will be taken—the honor system will be used. The document is to ensure that ILSC members are aware of the information needs to remain confidential. Any persons who, by helping the ILSC to conduct their work, should learn of the test sequences or the HRCs shall become members of the ILSC and must read the non-disclosure agreement.

INSTRUCTIONS TO VIEWERS

Left to the ILSC.

RANDOMIZATIONS

Two, if resources permit--one otherwise.

TEST SCENE LENGTH

8 seconds shown to the subjects. 10 frames will be allowed before and after the 8 second viewing material to allow the codecs to settle down. One second before and after the test sequence will contain the alignment markers provided by Tektronix. The marker data will be saved to allow for data analysis and verification. The marker data may be removed before the objective models

process the data or some other method will be devised to ensure that the models do not utilize any information contained in the marker.

TIME SCHEDULE (see attached table)

All proponents must send to the reflector by June 22, 1998 a statement of their intention to submit a model. With this, a statement must be included stating that they will abide by the ITU patent policy if their algorithm is chosen for inclusion in a Recommendation.

By July 22, 1998 an executable code must be delivered to these two ILSC sites:

CRC
CSELT

The code (or preliminary test code) can be delivered before this date to your independent laboratory to work out any software compatibility problems. For the location of your assigned objective lab please contact:

Phil Corriveau
at CRC, Canada
tel: (613)998-7822
fax: (613) 998-7823
eMail: philc@dgbt.doc.ca

All code must be working by August 7, 1998. No further modifications will be allowed beyond this date. It is recommended that proponents begin working to get their programs running at their assigned objective lab as soon as possible.

OTHER DECISIONS ON SUBJECTIVE TEST PLAN

Validation of Monitors:

Monitors will be checked for resolution, alignment, and chromaticity. Subjective labs will report make and model of monitors to be used for tests before July 1, 1998.

Test conditions:

- The ILSC will seek to have at least 5% but no more than 10% of the conditions be perceptually transparent at the viewing distance.
- All test sequences will be shown full size (no letterbox).
- All reference (source) will be ITU-R 601 format.
- No noisy source scenes will be used.
- Normalization of processed sequences will be as specified in the Objective test plan and further detailed in Document VQEG013.
- Viewing Distance:5H

HRC LIST (see new list attached)

768 in.
VHS out.
Transmission Errors in.
The subjective test will be split into high and low quality level tests.
The ILSC will try, as a guideline, to choose codecs from several manufacturers.

If resources are not found to run HRCs and edit the viewing tapes, some HRCs will be eliminated from the test. The ILSC will decide which HRCs will be deleted if it becomes necessary.

DECISION MAKING PROCEDURES:

The chairs note that the VQEG is an unofficial group of experts meeting to share expertise and resources for the primary goal of expediting technical work leading to the creation of ITU Recommendations. As such it has no rules other than those to which it agrees. The following rules were agreed to at the meeting.

1. In coming to decisions, the chairs will always seek to achieve consensus. Voting is undertaken only as a last resort when no more time is available to work out a consensus.
2. To change a previous decision 2/3 of present voting participants must agree.
3. Turin decisions are considered "previous decisions".
4. One vote is allowed per organization present at a meeting.
5. To make a new decision simple majority of those voting is required.
6. Chairpersons are allowed to vote.

Jean-Pierre Evain is opposed to chairpersons voting.

FUTURE WORK

A number of areas were identified as possible candidates for future work of VQEG. It was agreed that the next effort will involve objective quality measurement of:

Low Bit Rate Video (16 kb/s up)
Transmission Errors
Compressed Source Measurements (aka In-Service)
(a better term for this must be found as "in-service" measurements can be made in some situations with the full Source video available.)

The other areas of future video quality work were:

5 second Scene Length test
Testing using multiple viewing distances (e.g. 3H and 6H)
Still Image transmission objective measures
HDTV objective measurement
Sub-Threshold objective measurement
Audio-video synchronization
Audiovisual quality
Threshold visibility
Continuous quality evaluation
Combining sub-threshold measurements to predict quality

## Schedule

| Action | Who | Dead-line |
|---|---|---|
| Sending patterns for the normalisation to CCETT & CRC | Tektronix | 12 Jun 98 |
| Proponents declare intention and submit patent policy agreement. | All Proponents | 22 Jun |
| Adding patterns to the source sequences and sending them on D1 tapes to HRC processing sites | CCETT & CRC | 3 Jul [1] |
| Executable code to objective labs and ILSC Chairs | All Proponents | 22 Jul |
| Final, working executable code to objective labs and ILSC Chairs | All Proponents | 7 Aug |
| HRC processed sequences and 'patterned' source sequences on D1 tapes to Tektronix for normalization | IRT, RAI, others (TBD) | 8 Aug |
| Normalized D1 material to the editing sites | Tektronix | 11 Sep |
| Normalized source and encoded material on Exabyte (2 Gbytes) tapes to the proponents and objective sites | Tektronix | 28 Sep |
| Normalized source and encoded material on DAT tapes to some of the proponents and objective sites | NTIA | 9 Oct |
| Editing of the test tapes done and sent to the subjective test sites | FUB (?), CCETT(?), CRC(?), NTIA (?) | 9 Oct |
| Subjective tests complete. | ATTC, Berkom, CCETT, CSELT,CRC, DoCatA, FUB, RAI, Teracom | 13 Nov |
| Objective test complete. | ATT & NIST(SGI)<br>FUB&CRC (Sun)<br>IRT (PC) | 11 Dec |
| Individual Labs Statistical analysis of subjective test data complete | CRC, (CSELT), CCETT, NIST | 11 Dec |
| Discussion of results of subjective tests & release of subjective data to the proponents and whole of VQEG | ILSC | 4 Jan 99 [2] |
| Analysis of 'correlation' between objective and subjective data completed. | NIST | 5 Feb |
| Meeting at FUB in Rome to discuss results and the preparation of the final report | VQEG | TBD Feb or March |

[1] In case some of the HRC processing sites are proponents, the source sequences will be delivered by the 7th of August, instead of the 3rd of July and a one month delay will be introduced into the rest of the schedule.

[2] Considering Christmas holidays, it's maybe better to move this dead-line to the 11th of January and the correlation analysis to the 12th of February [LC]

**HRC LIST (new numbers)**
**Shaded area is overlap between Low(A) and High(B) tests.**

| | A | B | BIT RATE | | RES | METHOD | COMMENTS |
|---|---|---|---|---|---|---|---|
| 1 | x | | 768 kb/s | | CIF | H.263 | Full screen |
| 2 | x | | 1.5 Mb/s | | CIF | H.263 | Full screen |
| 3 | x | | 2 Mb/s | @ | ¾ | mp@ml | This is a horizontal resolution reduction only |
| 4 | x | | 2 Mb/s | | ¾ | sp@ml (**) | |
| 5 | x | | TBD by ILSC | | | mp@ml | with errors TBD (see note 4) |
| 6 | x | | TBD by ILSC | | | 422p@ml | I only, with errors TBD (perhaps a lower bit rate)(see note 4) |
| 7 | x | | 4.5 Mb/s | @ | | mp@ml | |
| 8(*) | x | x | 3 Mbit/s | | | mp@ml | |
| 9(*) | x | x | 4.5 Mb/s | | | mp@ml | Composite NTSC and/or PAL |
| 10 | | x | 6 Mb/s | @ | | mp@ml | |
| 11 | | x | 8 Mb/s | | | mp@ml | Composite NTSC and/or PAL |
| 12 | | x | 8 & 4.5 Mb/s | @ | | mp@ml | Two codecs concatenated |
| 13 | | x | 12 Mb/s | @ | | mp@ml | |
| 14 | | x | 19/PAL(NTSC)-19/PAL(NTSC)-12 Mbit/s | | | 422p@ml | PAL or NTSC 3 generations |
| 15 | | x | 50-50-….-50 Mbit/s | @ | | 422p@ml | 7th generation with shift / I frame |
| 16 | | x | 19-19-12 Mbit/s | | | 422p@ml | 3rd generations |
| 17 | | x | n/a | | | n/a | Multi-generation Betacam with drop-out(4 or 5, composite/component) |

Notes:

1) A, B = two different test groups, n/a = not applicable, TBD = to be determined
2) Different codecs should be used for the various HRCs as much possible
3) All scenes are to be shown full size, specifically refers to HRC 1 and 2
4) For HRCs 5 and 6, artifacts are to be kept within the same quality range as the other impairments in the test. However multiple perceptible errors should occur within the sequence. Due to the technical concern over inclusion or not of these HRCs they are considered to be a pilot study. Results from these HRCs will be analyzed for consistency of its subjective data in order to determine if they should be included in the overall report of results.
5) 525 and 625 versions are required for all HRCs.

(**) If we don't find the SP it's enough to avoid the B frames.
(*) Condition tested in both tests (low and high range of quality)

If not enough resources are available for encoding, HRCs will be removed based on the following:

1. They are considered not in the ‘core’.
2. They could represent an overlap with other conditions.
3. No volunteers are available for that particular HRC.

The ILSC will make final decisions on the HRC list.

# List of participants

| | | |
|---|---|---|
| Jamal Baina | TDF-C2R, France | Baina@c2rsmtp.c2r.tdf.fr |
| Vittorio Baroncini | FUB, Italy | Vittorio@fub.it |
| John Beerends | KPN Research, Netherlands | j.g.beerends@research.kpn.com |
| Michael H. Brill | Sarnoff Corporation | mbrill@sarnoff.com |
| Laura Contin | CSELT, Italy | laura.contin@cselt.stet.it |
| Philip Corriveau | CRC, Canada | philc@dgbt.doc.ca |
| Frank de Caluwe | KPN Research, Netherlands | |
| Evain, Jean-Pierre | EBU | evain@ebu.ch |
| Charles Fenimore | NIST, USA | fenimore@eeel.nist.gov |
| David K. Fibush | Tektronix, USA | davef@tv.tv.tek.com |
| Alan S. Godber | Engineering Consultant,USA | agodber@idt.net |
| David Harrison | ITC, UK | harrison@itc.co.uk |
| John Libert | NIST, USA | libert@eeel.nist.gov |
| Jeffrey Lubin | Sarnoff Corporation, USA | jlubin@sarnoff.com |
| Al Morton | AT&T Laboratories, USA | acmorton@att.com |
| Ricardo M. Nishihara | CPQD Telebras, Brazil | nishihar@cpqd.com.br |
| Stephane Pefferkorn | CCETT (CNET), France | stephane.pefferkorn@cnet.francetelecom.fr |
| Mihir Ravel | Tektronix, USA | mihir.ravel@tek.com |
| Ann Marie Rohaly | Tektronix, USA | ann.m.rohaly@tek.com |
| Alexander Schertz | IRT, FRG | schertz@irt.de |
| Ernest Schmidt | Delta Information Systems, USA | eschmidt@delta-info.com |
| Massimo Visca | RAI, Italy | m.visca@rai.it |
| Andrew B. Watson | NASA, USA | abwatson@mail.arc.nasa.gov |
| Arthur Webster | NTIA/ITS, USA | awebster@its.bldrdoc.gov |
| Stefan Winkler | EPFL, Switzerland | winkler@ltssg3.epfl.ch |
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