

VQEG - JEG Hybrid Evaluation Project

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Introduction

Project Synopsis

Objective

The objective of this document is to describe the details of the evaluation of the first call for proposals. The proposal is included in Annex A.

Scope

The scope of the JEG Hybrid group is to evaluate the video quality based on the bitstream and the decoded video, information that is readily available at the receiver side. The first evaluation of the JEG Hybrid group is limited to H.264 video coding and compatible transmission schemes, e.g. over packet based networks.

Target Resolutions

Two video resolutions are selected as primary targets: VGA/WVGA for multimedia and mobile applications and HDTV for multimedia or broadcast applications.

Target Distortions

No limitations on the distortions are imposed provided that all necessary data can be produced reliably. Distortions may include pre- and postprocessing, transcoding (provided that the last step is H.264 compatible), and transmission degradations.

A list of examples for target distortions that may be evaluated can be found in Annex E.

Module input data

The video quality estimation modules will get the Hybrid-Model-Input XML (HMIX) file and the Processed Video Sequence (PVS). Optionally, the captured PCAP file as raw data, the H.264 file in AnnexB format and/or the Source Video Sequence (SRC) may be available.

List of Definitions

may we copy this from the Hybrid testplan?

List of Acronyms

may we copy this from the Hybrid testplan?

Tasks and Schedule

Current open tasks

Complete example of indicator using HMIX file starting from Iñigo's QP model with CSV output

Current assigned tasks

Informations required for indicator developpers to get started:

- Providing example database with HMIX files, PCAP, PVS and MOS scores (Marcus, Romuald, Nicolas: VQEG HDTV Phase I pool 2), status: HMIX file part JM, (subset of) PCAP files, HMIX files part H264bitstreamExtractor (Nicolas: 5th of January) projected deadline: end of January/mid-February
- HMIX file merger (Lucjan, mid-February)

- Include HMIX file structure into testplan (Nicolas: Structure of JM HMIX file, Lucjan: Structure of H264BitstreamExtractor - mid January, Lucjan: Structure of combined HMIX file, mid-February)
- Example of file format for indicator output (Marcus, end of december)
- Possibility for request of HRC creation with specific features (e.g. spatial resolution change, framerate change, color changes...) "Feature request"

Preparation of the evaluation conditions:

- Description of policy when submitting an indicator, rejection, anonymization, withdrawing for the final report, etc. (end of december)
- Description of the indicators' analysis and combination of indicator (end of January)
- Combination of indicators: Bottom-up approach (Margaret, Lucjan, Patrik)
- Identification and structuring of sub-groups (Vladimir)

Preparation of PVS database

- Creation of Virtualboxes containing Bronze HRCs (Marcus, Yao: JM, Framerate reduction, resolution reduction, real playback by screen capturing (Marcus), packing a VirtualBox on a real PC (Yao), playback of PCAP files (Lucjan), packet losses (Nicolas, Lucjan), AnnexBBitstreamExtractor (Lucjan), JM decoder HMIX (Nicolas), add objective MOS scores to Virtualbox (Marcus, Yao))
- Creation of Ivory HRCs (Vladimir? Marcus), Creation of a Virtualbox which converts PCAP files into HMIX files (Marcus, Nicolas, Lucjan)
- Schedule: First Virtualbox producing HMIX and PVS incl. documentation (end of January), Run Virtualbox(es) on all SRCs (Lucjan?, Nicolas - March/April)

Preparation of MOS scores:

- Run objective models on all PVS (March/April/May)
- Deadline for decision whether objective MOS is sufficient: End of May
- Subjective experiments: June/July

For the face to face meeting

Contribution to the combination of indicators (Patrik)

Exchange of SRC sequences (Savvas, Pierre, Margaret)

Work on the testplan (all)

Finished tasks

Current schedule

- PATH 1 (in parallel to PATH 2 further down)
 - Splitting into training and evaluation database
 - Running objective models
 - Analysis of results across several models, identification of easy and critical sequences
 - Organizing subjective experiments on critical sequences
-
- PATH 2 (in parallel to PATH 1 further up)
 - Creation of side information (HMIX files available)
 - Indicator execution (Indicator tables available, e.g. CSV format)
 - definition needed, naming needed)
 - Combination of indicators (a single objective score available per sequence)
-
- Reuniting PATH 1 and PATH 2 (subjective scores and objective scores are available), [deadline in the call for proposals]
 - Analysis of performance of the combination of indicators (state of the art performance for hybrid models)
 - Analysis of performance for various indicators `_isolated_` and `_implemented in combined algorithms_` (valuing individual contributions to the current state of the art)
 - Final report.

SRC Video database

SRC Quality

No restrictions are imposed in general on the SRC video quality. However, SRC content that has a quality lower than a MOS score of 4 is supposed to be treated separately. For example, Full Reference Measurement cannot be used on such kind of content in order to get reliable predictions of subjective scores.

SRC Classification

Ivory sequences

This class is on the same organisational level as the Bronze SRC. It contains all SRC

sequences which are considered in the project that have a MOS value less than 4.0. They are not eligible for use as reference in Full Reference measures. A description of each sequence with 0-10 keywords would be appreciated.

→ action: Sequences of user generated content are interesting in this category and Patrik put some sequences on the ftp server. The sequences can also be exchanged at the face to face meeting. Descriptions may be written (Patrik)

Bronze sequences

Bronze sequences are those SRC which get a MOS value larger than (or equal to) 4.0. They are considered acceptable as reference input to Full Reference measures in order to get potentially reliable MOS predictions. A description of each sequence with 0-10 keywords would be appreciated.

→ action: Get list of videos for
VQEG-HD1: 9 SRC in format 1080p30
VQEG-HD2: 9 SRC in format 1080i60
VQEG-HD3: 9 SRC in format 1080p30
VQEG-HD4: 9 SRC in format 1080i50
VQEG-HD5: 9 SRC in format 1080p25 (Marcus, Margaret)

→ Action: A set of 300 sequences is targeted by mid-December. Exchanging the content on haddisks in the face to face meeting would be appreciated. (Savvas, Margaret)

→ Action: Savvas investigated the possibility of having content of at least Full-HD available from HEVC sequences and the sequences can be exchanged at the face to face meeting (Savvas)

→ Action: A viewing session of interesting and/or critical content for selection might be organized (Savvas, Pierre)

Silver sequences

In order to identify sequences which are particularly representative for a certain type of source content such as colorfulness, spatial detail, movement or type of acquisition such as cartoon, CGI, etc. some of the bronze sequences are bundled in the silver sequence set. This sequence set may have any size that is considered useful by the JEG Hybrid group though the number should be limited to a reasonable value, e.g. 50. It should stay fixed for a certain period in order to allow references to this particular set. The fixed sequence sets will be called SILVER<year><version>, e.g. SILVER11B for the second set in 2011. For each sequence the reason why it was considered as a silver sequence shall be described in 1-3 sentences.

→ Action: Determine the silver sequences of 2011/2012

Gold sequences

The gold sequences are unique sequences from the silver sequence set that are selected for their spread of the identified characterisation ranges. Their number is limited to 12 which allows to include all of them in one subjective experiment. They should not contain Ivory sequences. The sequence set may be updated when new sequences arrive and thus, a similar naming as for the silver sequences is applied as GOLD<year><version>, e.g. GOLD12A for the first set in 2012. For each sequence the reason why it was considered as a silver sequence shall be described in 3-10 sentences.

→ Action: Determine the gold sequences of 2011/2012

<Can we copy the color space and file format section from the hybrid testplan in here?>

HRC Creation and Sequence Processing

General structure of a HRC

A Hypothetical reference circuit (HRC) consists of a connected chain of processing blocks that start from the source video sequence (SRC) and end in the Processed Video Sequence (PVS). The bitstream that is used to create the PVS after decoding should be captured on the network level in a PCAP file.

An HRC may contain, for example:

- Preprocessing of the SRC video
- Video encoding
- A streaming server
- A network impairment tool
- A capture device for the network stream outputting a PCAP file
- Video decoding
- Postprocessing
- Video playback device
- Screen capturing

The details of the HRCs are described in Annex C. They are considered a subset of conditions that may occur for example in the following services:

- IPTV
- Mobile Streaming
- Internet Streaming services
- Adaptive Streaming
- Videoconferencing

The HRCs are classified into Ivory, Bronze, Silver and Gold HRCs depending on their level of repeatability.

Ivory HRCs

Ivory HRCs are HRCs which are not reproducible and may only exist on a limited number of SRC. This is particularly the case for hardware encoder or hardware-based transmission chains. A description of the HRC with at least 3 keywords is required.

List of Ivory HRCs (to be moved to some Annex later on)

JM encoder fixed QP, Playout capture with mplayer

JM encoder fixed QP, Transmission with real network simulator, decoding with JM decoder

→ Action: Obtain list of HRC creation from Hybrid testplan and ask labs that created HRCs whether they can rerun their HRCs on SRC set of JEG. (email to the jeg list: Marcus)

→ Information: ITU-T G.1050 (<http://www.itu.int/rec/T-REC-G.1050-200711-S/en>) contains a delay variation model that may be interesting to investigate (Savvas, Nicolas?, Lucjan?)

Bronze HRCs

Bronze HRCs are reproducible and should be stored in a way that they can be applied at any time to any source sequence. Reasonable variations in the delay of network packets may be tolerated. One possibility is to create a VirtualBox which fixes the program versions, parameters and options that were used in the creation very efficiently. A description of the HRC with at least 3 keywords is required.

List of Bronze HRCs (to be moved to some Annex later on)

JM encoder fixed QP, JM decoder,

JM encoder fixed QP, Packet Loss simulation without randomness, JM decoder

X.264 encoder, ...

Silver HRCs

The set of silver HRCs is chosen from the Ivory and Bronze HRCs in such a way that they span the range of visual artifacts. For block based coding, this may include a set of fixed Quantization Parameter setting and a set of fixed bitrates. Visual duplicates should be avoided.

→ Action: Are we considering that MPEG2 and H.264 for example have the same “visual appearance”? (not important for JEG-Hybrid at the moment)

→ Action: Determining Silver HRCs

Gold HRCs

Gold HRCs are a selection of HRCs that is carefully chosen in order to include as many “visual artifact dimensions” as possible such as: coding-only, pausing and skipping, postprocessing, etc. The Gold HRCs consists of HRC of at least Bronze level as they may need to be applied on a new set of Gold SRCs in order to create the Gold PVS set.

→ Action: Determining Gold HRCs

PVS classification

The combination between SRCs and HRCs leads to the classification of PVSs in several different categories. The lower value of the class attribute of the HRCs defines the class of the PVS, e.g. a Gold SRC which is impacted by a Bronze HRC is considered a Bronze PVS.

→ Information: We can already use the data from the VQEG HDTV experiment at least as Bronze PVSs

Gold PVS set

According to the definition this set consists of Gold SRCs which are processed by Gold HRCs. Only corresponding year tags should be used in order to get GOLD<year><version> tags. This set is designed as a unique basis that should be run with a high priority on all data processing and generating tools. When calibration or validation results are to be published, they should preferably refer to the Gold PVS set.

Silver PVS sets

Several silver PVS sets may co-exist. Each of them should be named differently, in the form of SILVER<year><version><unique-tag> such as SILVER10B-PL1 for sequences which use SILVER10B or GOLD10B src or hrc and are considered useful for PacketLoss (PL1).

Perceived quality

Two different modes are possible: Subjective assessment and objective measurement

Objective measurement

A PVS is judged by at least 4 conceptually different full-reference objective measurement methods which include a step to align the output to a MOS scale. The median value of all the objective measurements performed is taken as an estimation of the subjective MOS value. If and only if at least three measurements agree within reasonable limits, the score is considered valid. Otherwise the sequence is marked for subjective assessment with the deviation as a criterion of its priority.

A reasonable limit is considered as follows: A typical subjective experiment on a ACR 5 point scale leads to statistically significant differences if two conditions are further apart than 0.5 MOS. Therefore, it can be considered that If the 4 objectively evaluated scores are within a range of 0.5 MOS a subjective experiment would not lead to an accuracy improvement that justifies the effort of a subjective experiment.

→ Action: Fix the limit of agreement for objective measurement algorithms. Work on the question of alignment of different algorithms, maybe they can be aligned to the Gold PVS set. (Lucjan?, Patrik, discuss at face to face meeting)

→ Optional action: Get the distribution of confidence interval size in function of MOS values

Subjective assessment

Subjective assessment with ACR-HR methodology are required on the Gold PVS set and on all sequences that are marked for subjective assessment. In each subjective experiment, at least 20 (to be fixed) Gold PVS shall be included as common set. The 20 sequences may be chosen in function of the visual quality and the type of degradations that are present in the subjective experiment. Further guidelines may be provided.

→ Action: Determine the properties of the common set.

<Can we copy more test setup information from the Hybrid testplan?>

Interface to Objective Quality Indicator Modules

<to be written>

input: HMIX and PVS, optionally PCAP

output: list of quality indicators

The output shall be given in CSV file format with the first column being the PVS name and the further columns being the indicators. The first row is considered as header information and is not processed.

Restrictions on execution platform and execution time in case algorithms are provided (Savvas after the meeting)

The indicators must be bounded and the boundary values must be reported.

(File exchange format might be an interesting question for the face to face meeting)

Combination of Indicators

Interface to combination of indicators algorithms

<to be written>

input: list of quality indicators

(Patrik, Lucjan?)

Combination of indicator algorithms within the evaluation of VQEG

Ideas:

- Split into: individual indicator performance analysis, combination of (small number of) indicators analysis (which indicator best complements my own indicator?), best model building from several indicators
- Use a logit model on each indicator and each combination of indicators
- Use machine learning to combine different indicators
- Feature reduction/selection algorithm from RT-RK (Vladimir?)

Evaluation analysis and result presentation

<to be written>

(Patrik, Lucjan?)

Ideas:

- Perform subset analysis which is more targeted at the metrics scope, for example performing

a metric on resolution reduction only on PVSs which do have reduced spatial resolution;
- Perform combination analysis of different indicators

Annex A: Call for Proposals and Participation VQEG-JEG Hybrid Video Quality Metric

Objective

The **Video Quality Experts Group (VQEG)** has significantly advanced the field of subjective and objective testing methodologies for video quality since its birth in 1997 by submitting reports and liaisons to international standardization organizations such as ITU.

The **Joint Effort Group of VQEG (JEG)** aims at the collaborative development towards standardization of subjective assessment methodologies and objective metrics for perceived video and multimedia quality. The group unites research partners from industry and academia in regular face-to-face meetings and telephone conferences.

The goal of the **VQEG's-JEG-Hybrid group** is to jointly develop a novel objective video quality metric which predicts perceived quality using only client-side information[1]. So far, several Full-Reference and Reduced Reference objective quality metrics have been standardized in ITU-T Recommendations J.144, J.246, J.247, J.249 and J.341. However, these algorithms

require access to the undistorted reference signal which is not available at the receiving (customer) side. In contrast, a JEG-Hybrid model will only use the impaired, decoded video signal and the bitstream.

Mission - Collaborative Approach

The uniqueness of the **JEG-Hybrid group** lies in the collection and combination of best-performing industrial and research algorithms for the prediction of specific video artifacts or transmission conditions. In order to facilitate and focus the research, a modular approach is used:

- First, the received bitstream is parsed to an independent XML file which enables easy and standard-independent access to its information.
- Second, individual indicators for isolated video quality degradations are calculated based on the XML file and the decoded video
- Third, the individual indicators are combined in order to provide an overall quality rating.

The VQEG-JEG-Hybrid invites both individuals and companies to contribute to any of the three parts and to participate in our collaborative approach towards the construction of a novel hybrid objective video quality metric.

Call for Proposals and Participation

An impressive number of research articles target the prediction of perceived video quality. However, each individual publication usually targets a limited view or scope, e.g. H.264/AVC encoding with particular packet loss patterns. As part of its mission, the VQEG-JEG will perform a large scale evaluation of state-of-the-art algorithms for these individual scopes and the combination of the individual contributions towards a universal end-to-end quality metric.

We encourage participation and proposals concerning:

1. Individual or combined indicators for video quality using information from a packet network, e.g. packet delay, loss, etc.
2. Video Quality prediction using video bitstream information, for examples using XML pre-parsed information from H.264/AVC encoded bitstreams or the captured bitstream itself
3. Analysis and detection algorithms of degradations based on the decoded video, e.g. No-Reference video quality indicators
4. Spatial, temporal or spatiotemporal weighting algorithms, for example using visual attention or saliency estimation
5. Algorithms combining the approaches 1-4
6. Data fusion approaches for individual indicators on pixel, frame or sequence level

Interested parties for contributing to this collaborative approach might include:

- PhD students who are interested in evaluating the impact of their research on an overall end-to-end objective quality metric
- Companies who would like to analyse the performance of their algorithms on different

types of degradations in comparison to other state-of-the-art and world-leading algorithms

- Researchers interested in joint collaboration towards creating a novel hybrid objective video quality metric

Schedule

An evaluation of submitted individual indicators will take place in July 2012. The submitted algorithms will be combined using a Generalized Linear Model and by using the contributions from point 6. The performance of the combined models will be evaluated on two video databases in HDTV and CIF format containing more than 5000 video sequences with various typical degradations. The video sequences are evaluated in subjective experiments and/or with full reference models in a transparent way. The impact of individual contributions on the performance of the combined models will be reported with a differentiation of distortion classes. Submissions until May 31, 2012 will be taken into consideration. Training, testing and validation data are available. Specific details on the test setup and the submission details can be found on the JEG-Hybrid Wiki page (<http://wiki.vqeg-jeg.org>).



	<u>VQEG-JEG Hybrid Group</u> <u>co-chairs:</u>	
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[1]N. Staelens, I. Sedano, M. Barkowsky, L. Janowski, K. Brunnström, and P. Le Callet, "Standardized Toolchain and Model Development for Video Quality Assessment – The Mission of the Joint Effort Group in VQEG", Proceedings of the Third International Workshop on Quality of Multimedia Experience (QoMEX), September 2011.



Annex B: SRC sequences



Short video sequences

The following set of video sequences is mostly available from the Consumer Digital Video Library Database (CDVL). Various copyrights apply that can be checked on the corresponding CDVL page. Sequences listed here allow at least for free download, changes to the content such as coding, and scientific publications.




Preview	Name & description	Frames / Duration	Web page	Origin
 <p>*</p>	<p>SRC A-00001</p> <p>Subjective Experiment vqeghd1, SRC 1, HRC 00 :</p> <p>Edited sequence showing a man rowing a red kayak on a stream. Footage includes a wide variety of different views, zoom and water flow patterns, resulting in an interesting sequence that is very difficult to code. Highly recommended.</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1193	Red kayak : http://www.cdvl.org/find-videos/details.php?id=1008
 <p>*</p>	<p>SRC A-00002</p> <p>Subjective Experiment vqeghd1, SRC 2, HRC 00</p> <p>Edited sequence showing a poem scrolling vertically on the left (white text, black background), and clips of leaves and grasses blowing in the wind on the right. The sequence is intended to simulate movie or television show credits, which often combine scrolling text with pictures. Some coding algorithms may have dramatically different quality responses to the left and right sides of the image. The poem was chosen for its reference to the wind. May contain too many visual distractions between the many words on the scrolling text, and the rapid scene cuts. Also consider alternative "West Wind Easy".</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1209	NTIA Ode to the West Wind : http://www.cdvl.org/find-videos/details.php?id=1033

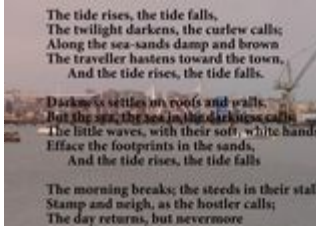
 <p>*</p>	<p>SRC A-00003</p> <p>Subjective Experiment vqeghd1, SRC 3, HRC 00</p> <p>Edited sequence showing a boxer hitting a double end bag, and giving related boxing advice. Scene contains very fast motion, good audiovisual synchronization clues, skin tones, and a male talker. The boxer is expressive and charismatic.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1225	<p>NTIA Double End Bag :</p> <p>http://www.cdv1.org/find-videos/details.php?id=755</p>
 <p>*</p>	<p>SRC A-00004</p> <p>Subjective Experiment vqeghd1, SRC 4, HRC 00</p> <p>Edited sequence showing a wide shot of an enthusiastic crowd on stadium stands cheering and gesturing, followed by two wide shots of a football game.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1241	<p>PSCR Go Football :</p> <p>http://www.cdv1.org/find-videos/details.php?id=987</p>
 <p>*</p>	<p>SRC A-00005</p> <p>Subjective Experiment vqeghd1, SRC 5, HRC 00</p> <p>Animated sequence commissioned by NTIA in the style of a computer generated, 3D cartoon. Includes a smooth gradation of colors intended to show blocking in the color planes. Cartoon is split into two pieces due to size concerns.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1257	<p>NTIA Mr. Fins, Segment 2 :</p> <p>http://www.cdv1.org/find-videos/details.php?id=971</p>
 <p>*</p>	<p>SRC A-00006</p> <p>Subjective Experiment vqeghd1, SRC 6, HRC 00</p> <p>Edited sequence showing music at a football game's halftime show. Middle portion contains audiovisual synchronization clues. Begins with a wide shot of the whole field that conveys the high spatial resolution of 1920x1080.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1273	<p>NTIA Halftime Music at Football Game :</p> <p>http://www.cdv1.org/find-videos/details.php?id=989</p>
 <p>*</p>	<p>SRC A-00007</p> <p>Subjective Experiment vqeghd1, SRC 7, HRC 00</p> <p>Continuous sequence showing a narrow view of a burning house engulfed in flames. May be useful for color and contrast enhancement.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1289	<p>NTIA Burn Close-up :</p> <p>http://www.cdv1.org/find-videos/details.php?id=979</p>




 <p>*</p>	<p>SRC A-00008</p> <p>Subjective Experiment vqeghd1, SRC 8, HRC 00</p> <p>Zoom out, showing a stack of brightly colored bottles on a smoothly graduated background.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1305	<p>Intel - Zoom Out Showing Bottles :</p> <p>http://www.cdv1.org/find-videos/details.php?id=881</p>
 <p>*</p>	<p>SRC A-00009</p> <p>Subjective Experiment vqeghd1, SRC 9, HRC 00</p> <p>This edited sequence is a variant of "Scarlet Oak" that is perceptually easier. Sequence shows two shots of a Scarlet Oak in fall color. Colors are beautiful. Contains two overlays: a still leaf and computer generated text.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1321	<p>NTIA Scarlet Oak Easy :</p> <p>http://www.cdv1.org/find-videos/details.php?id=1012</p>




Preview	Name & description	Frames / Duration	Web page	Origin
 <p>*</p>	<p>SRC A-00010</p> <p>Subjective Experiment vqeghd2, SRC 1, HRC 00 :</p> <p>Edited sequence of a basketball game half-time show, including close-up of conductor, crowd scene, and close-view of women moving pom-poms quickly across the field of view.</p>	1080p60	http://www.cdv1.org/find-videos/details.php?id=1392	<p>PSCR Basketball Halftime with Pom-Pom :</p> <p>http://www.cdv1.org/find-videos/details.php?id=857</p>
 <p>*</p>	<p>SRC A-00011</p> <p>Subjective Experiment vqeghd2, SRC 2, HRC 00</p> <p>Edited sequence showing the controlled burn of a house, with cuts or fades to show the passage of time. Although blocking artifacts are visible in the flames, viewers in subjective tests like this sequence and give the original a very high MOS -- higher than might be expected from an expert viewing of this scene.</p>	1080p60	http://www.cdv1.org/find-videos/details.php?id=1408	<p>NTIA Controlled Burn :</p> <p>http://www.cdv1.org/find-videos/details.php?id=981</p>




 <p>*</p>	<p>SRC A-00012 Subjective Experiment vqeghd2, SRC 3, HRC 00 Animated sequence commissioned by NTIA in the style of a computer generated, 3D cartoon. Includes a smooth gradation of colors intended to show blocking in the color planes. Cartoon is split into two pieces due to size concerns.</p>	1080p60	http://www.cdvl.org/ find-videos/details.p hp?id=1424	<p>NTIA Mr. Fins, Segment 1: http://www.cdvl.org/ find-videos/details.p hp?id=970</p>
 <p>*</p>	<p>SRC A-00013 Subjective Experiment vqeghd2, SRC 4, HRC 00 One of four nearly identical sequences showing a spinning collage of brightly colored objects in a rainbow of hues, filmed separately in 1080i 59.94fps, 1080i 50fps, 1080p 29.97fps, and 1080p 25fps. Turntable spun at a constant rate, and the camera was fixed for all four recordings. Sequences were filmed with the intention of exploring differences between these four formats. A fan was used to cause light items to shift somewhat, for added scene complexity. Otherwise, differences between frame rate versions are limited to the differences in frame rate when recording mechanically repetitious motion. This sequence contains many small objects to focus interest, moving in a circular pattern that modern codecs may find difficult to predict. Objects occasionally move in front of one another. The color scheme contains a vareity of bright colors and sharp black/white edges, to test response to saturated colors.</p>	1080p60	http://www.cdvl.org/ find-videos/details.p hp?id=1440	<p>NTIA Rainbow Collage Zooming In: format 59.94fps interlace : http://www.cdvl.org/ find-videos/details.p hp?id=875</p>
 <p>*</p>	<p>SRC A-00014 Subjective Experiment vqeghd2, SRC 5, HRC 00 Edited sequence using raw footage from a small production move. Shows two boys walking into a store at night, and saying hello so their dad. Interior has</p>	1080p60	http://www.cdvl.org/ find-videos/details.p hp?id=1456	<p>NTIA Two Boys at Night, version A : http://www.cdvl.org/ find-videos/details.p hp?id=1030 NTIA Two Boys at Night, version B : http://www.cdvl.org/</p>



	bright colors and arcade games. Some lip synch.			find-videos/details.php?id=879
 <p>*</p>	<p>SRC A-00015</p> <p>Subjective Experiment vqeghd2, SRC 6, HRC 00</p> <p>Zoom in on a book laying on a stone table, set in a patio with a breeze blowing through.</p>	1080p60	http://www.cdv1.org/find-videos/details.php?id=1472	<p>CRC Patio Breeze :</p> <p>http://www.cdv1.org/find-videos/details.php?id=860</p>
 <p>*</p>	<p>SRC A-00016</p> <p>Subjective Experiment vqeghd2, SRC 7, HRC 00</p> <p>Edited sequence, showing grass blowing in the wind, then a bee flying among white flowers. Sequence contains some interesting camera motion.</p>	1080p60	http://www.cdv1.org/find-videos/details.php?id=1488	<p>Intel - Flowers and Bee, with Blowing Grass :</p> <p>http://www.cdv1.org/find-videos/details.php?id=862</p>
 <p>*</p>	<p>SRC A-00017</p> <p>Subjective Experiment vqeghd2, SRC 8, HRC 00</p> <p>One of four nearly identical sequences of a spinning purple collage of objects, filmed separately in 1080i 59.94fps, 1080i 50fps, 1080p 29.97fps, and 1080p 25fps. Turntable spun at a constant rate, and the camera was fixed for all four recordings. Sequences were filmed with the intention of exploring differences between these four formats. A fan was used to cause light items to shift somewhat, for added scene complexity. Otherwise than the random wind motion, differences between frame rate versions are limited to the differences in frame rate when recording mechanically repetitious motion. This sequence contains many small objects to focus interest, moving in a circular pattern that modern codecs may find difficult to predict. Objects occasionally move in front of one another. The color scheme is predominantly purple, because this is a rare color and it occupies a very small portion of the YUV colorspace.</p>	1080p60	http://www.cdv1.org/find-videos/details.php?id=1504	<p>NTIA Purple Collage Narrow View & Wind:</p> <p>59.94fps interlace :</p> <p>http://www.cdv1.org/find-videos/details.php?id=872</p>




 <p>The tide rises, the tide falls, The twilight darkens, the curlew calls; Along the sea-sands damp and brown The traveller hastens toward the town, And the tide rises, the tide falls.</p> <p>Darkness settles on roofs and walls, But the sea, the sea in the darkness calls; The little waves, with their soft, white hand Efface the footprints in the sands, And the tide rises, the tide falls.</p> <p>The morning breaks; the steeds in their stalls Stamp and neigh, as the hostler calls; The day returns, but nevermore</p> <p>*</p>	<p>SRC A-00018</p> <p>Subjective Experiment vqeghd2, SRC 9, HRC 00</p> <p>Scene "Harbor under Grey Skies" showing a harbor with slowly moving boats and small waves. A poem is overlaid in black text, and scrolls upward slowly. The poem is "The Tide Rises, The Tide Falls" by Henry Wadsworth Longfellow.</p>	1080p60	http://www.cdvl.org/find-videos/details.php?id=1520	<p>Intel - Harbor with poem "The Tide Rises, The Tide Falls" :</p> <p>http://www.cdvl.org/find-videos/details.php?id=878</p>
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Preview	Name & description	Frames / Duration	Web page	Origin
 <p>*</p>	<p>SRC A-00019</p> <p>Subjective Experiment vqeghd3, SRC 1, HRC 00 :</p> <p>Edited sequence showing a aspen trees with their leaves turned yellow for fall. The leaves are blowing in the wind, and the scene cuts are rapid, to produce a sequence that is challenging for some coders.</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1842	<p>NTIA Aspen Trees in Fall Color, Rapid :</p> <p>http://www.cdvl.org/find-videos/details.php?id=972</p>
 <p>*</p>	<p>SRC A-00020</p> <p>Subjective Experiment vqeghd3, SRC 2, HRC 00</p> <p>Continuous sequence (no scene cuts) showing a free throw in a basketball game. Camera is still, and the hoop cannot be seen.</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1858	<p>PSCR Basketball Point :</p> <p>http://www.cdvl.org/find-videos/details.php?id=880</p>
 <p>*</p>	<p>SRC A-00021</p> <p>Subjective Experiment vqeghd3, SRC 3, HRC 00</p> <p>Elephants Dream is the story of two strange characters exploring a capricious and seemingly infinite machine. The elder, Proog, acts as a tour-guide and protector, happily showing off the sights</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1970	<p>http://www.elephantsdream.org/</p>





	and dangers of the machine to his initially curious but increasingly skeptical protege Emo. As their journey unfolds we discover signs that the machine is not all Proog thinks it is, and his guiding takes on a more desperate aspect.			
 *	<p>SRC A-00022</p> <p>Subjective Experiment vqeghd3, SRC 4, HRC 00</p> <p>Animated sequence commissioned by NTIA in the style of an old, hand-painted cartoon. Has simple audio.</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1874	<p>NTIA Fox and Bird, All Available Footage :</p> <p>http://www.cdvl.org/find-videos/details.php?id=969</p>
 *	<p>SRC A-00023</p> <p>Subjective Experiment vqeghd3, SRC 5, HRC 00</p> <p>Continuous sequence depicting a wide view of a football halftime show, including most of the football field. This sequence conveys the high spatial resolution of 1920x1080.</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1890	<p>NTIA Halftime Music, Wide Shot :</p> <p>http://www.cdvl.org/find-videos/details.php?id=990</p>
 *	<p>SRC A-00024</p> <p>Subjective Experiment vqeghd3, SRC 6, HRC 00</p> <p>Close view of a a spinning wire cage of ivory against a black background, surrounded by brightly colored feathers blowing in wind. The cage contains several items to catch the interest, including an amber necklace and a crystal bottle. The camera was loaded with the "Musikvid" settings, which gives</p>	1080p30	http://www.cdvl.org/find-videos/details.php?id=1906	<p>NTIA Collage with "Musikvid" Settings :</p> <p>http://www.cdvl.org/find-videos/details.php?id=882</p>



	the sequence saturated colors and a different feeling. The vertical bars mimic the ITU Popple sequence. May be useful for upscaling to 4K.			
 <p>*</p>	<p>SRC A-00025</p> <p>Subjective Experiment vqeghd3, SRC 7, HRC 00</p> <p>Edited sequence showing a boxer hitting a speed bag, and giving related boxing advice. Scene contains very fast motion, strong black-on-white edges, good audiovisual synchronization clues, skin tones, and a male talker. The boxer is expressive and charismatic.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1922	<p>NTIA Speed Bag :</p> <p>http://www.cdv1.org/find-videos/details.php?id=1021</p>
 <p>*</p>	<p>SRC A-00026</p> <p>Subjective Experiment vqeghd3, SRC 8, HRC 00</p> <p>Continuous sequence pointing up at the sun showing through clouds, with text overlay scrolling horizontally. Text is from poem "The Cloud" by Percy Bysshe Shelly. May be useful for color and contrast enhancement.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1938	<p>NTIA The Cloud :</p> <p>http://www.cdv1.org/find-videos/details.php?id=1026</p>
 <p>*</p>	<p>SRC A-00027</p> <p>Subjective Experiment vqeghd3, SRC 9, HRC 00</p> <p>Continuous sequence showing a football game play that ends in a touchdown resulting from a pass. After the touchdown, the camera follows the jubilant players.</p>	1080p30	http://www.cdv1.org/find-videos/details.php?id=1954	<p>PSCR Touchdown Pass :</p> <p>http://www.cdv1.org/find-videos/details.php?id=1029</p>





Preview	Name & description	Frames / Duration	Web page	Origin
 *	<p>SRC A-00028</p> <p>Subjective Experiment vqeghd4, SRC 1 :</p> <p>Continuous sequence (no scene cuts) following the ball in a woman's basketball game. Narrow view of the play.</p>	1080i50		<p>PSCR Basketball</p> <p>Narrow View of Action :</p> <p>http://www.cdvl.org/find-videos/details.php?id=843</p>
 *	<p>SRC A-00029</p> <p>Subjective Experiment vqeghd4, SRC 2 :</p> <p>Continuous sequence (no scene cuts) showing a flock of Mallard ducks, close up, swimming in a pond on a winter's day. Slight camera motion present, as camera is held on the shoulder.</p>	1080i50		<p>NTIA Duck Close :</p> <p>http://www.cdvl.org/find-videos/details.php?id=828</p>
 *	<p>SRC A-00030</p> <p>Subjective Experiment vqeghd4, SRC 3 :</p> <p>Edited sequence showing an Asian Elephant eating hay on a winter day.</p>	1080i50		<p>NTIA Elephant :</p> <p>http://www.cdvl.org/find-videos/details.php?id=830</p>
 *	<p>SRC A-00031</p> <p>Subjective Experiment vqeghd4, SRC 4 :</p> <p>Animated sequence commissioned by NTIA in the style of an old, hand-painted cartoon. Has simple audio.</p>	1080i50		<p>NTIA Fox and Bird, All Available Footage :</p> <p>http://www.cdvl.org/find-videos/details.php?id=969</p>
 *	<p>SRC A-00032</p> <p>Subjective Experiment vqeghd4, SRC 5 :</p> <p>Edited sequence showing a red parrot in a simulated, indoor rainforest. Some noise from dim lighting conditions. On close-up of parrot's head, the background is intentionally blurred. This pretty scene is a "crowd pleaser". May be useful for color, contrast, and detail enhancement.</p>	1080i50		<p>NTIA Red Parrot :</p> <p>http://www.cdvl.org/find-videos/details.php?id=836</p>


 <p>*</p>	<p>SRC A-00033</p> <p>Subjective Experiment vqeghd4, SRC 6 :</p> <p>Edited sequence showing a close-up of a young man's face in a restaurant, then him making a shot at a pool table.</p>	1080i50		<p>NTIA Poolhall : http://www.cdv1.org/find-videos/details.php?id=868</p>
 <p>*</p>	<p>SRC A-00034</p> <p>Subjective Experiment vqeghd4, SRC 7 :</p> <p>One of four nearly identical sequences of a spinning purple collage of objects, filmed separately in 1080i 59.94fps, 1080i 50fps, 1080p 29.97fps, and 1080p 25fps. Turntable spun at a constant rate, and the camera was fixed for all four recordings. Sequences were filmed with the intention of exploring differences between these four formats. A fan was used to cause light items to shift somewhat, for added scene complexity. Otherwise than the random wind motion, differences between frame rate versions are limited to the differences in frame rate when recording mechanically repetitious motion. This sequence contains many small objects to focus interest, moving in a circular pattern that modern codecs may find difficult to predict. Objects occasionally move in front of one another. The color scheme is predominantly purple, because this is a rare color and it occupies a very small portion of the YUV colorspace.</p>	1080i50		<p>NTIA Purple Collage Narrow View & Wind: format 50fps interlace : http://www.cdv1.org/find-videos/details.php?id=852</p>
 <p>*</p>	<p>SRC A-00035</p> <p>Subjective Experiment vqeghd4, SRC 8 :</p> <p>Only a part of : This clip contains a portion of 6 minute video provided by Sveriges Television AB (SVT) in multiple formats. This AVI file contains 8-bit stereo audio.</p>	1080i50		<p>SVT 1080p 50fps frames 14001 to 15000 of 18677 : http://www.cdv1.org/find-videos/details.php?id=1813</p>


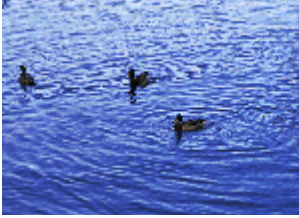


 <p>*</p>	<p>SRC A-00036</p> <p>Subjective Experiment vqeghd4, SRC 9 :</p> <p>Only a part of :</p> <p>This clip contains a portion of 6 minute video provided by Sveriges Television AB (SVT) in multiple formats. This AVI file contains 8-bit stereo audio.</p>	<p>1080i50</p>		<p>SVT 1080p 50fps frames 1 to 1000 of 18677 :</p> <p>http://www.cdv1.org/ find-videos/details.p hp?id=1798</p>
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Preview	Name & description	Frames / Duration	Web page	Origin
	SRC A-00037 Subjective Experiment vqeghd5, SRC 1 :	1080		http://www.bigbuckbunny.org /
 *	SRC A-00038 Subjective Experiment vqeghd5, SRC 2 : Continuous sequence (no scene cuts) showing a wide shot of an entire basketball court. Scene was filmed in an interior stadium. The crowd is dimly lit.	1080i50		PSCR Basketball Wide View, interlaced : http://www.cdv1.org/find-vid eos/details.php?id=846
	SRC A-00039 Subjective Experiment vqeghd5, SRC 3 :	1080i50		Not yet available
 *	SRC A-00040 Subjective Experiment vqeghd5, SRC 4 : This continuous sequence follows a cheetah walking in front of a chainlink fence. The cheetah is clearly in focus, except for motion blur on the legs. The fence is blurred by horizontal motion except when the cheetah pauses.	1080i50		NTIA Cheetah : http://www.cdv1.org/find-vid eos/details.php?id=824
 *	SRC A-00041 Subjective Experiment vqeghd5, SRC 5 : Edited sequence of a lion on a sunny rock, with a light sprinkling of snow.	1080i50		NTIA Lion : http://www.cdv1.org/find-vid eos/details.php?id=826
 *	SRC A-00042 Subjective Experiment vqeghd5, SRC 6 : One of four nearly identical sequences showing a spinning collage of brightly colored objects in a rainbow of hues, filmed separately in 1080i 59.94fps, 1080i 50fps, 1080p 29.97fps, and 1080p 25fps. Turntable spun at a constant rate, and the camera was fixed for all four recordings. Sequences were	1080i50		NTIA Rainbow Collage Wide View: format 25fps progressive : http://www.cdv1.org/find-vid eos/details.php?id=820





	<p>filmed with the intention of exploring differences between these four formats. A fan was used to cause light items to shift somewhat, for added scene complexity. Otherwise, differences between frame rate versions are limited to the differences in frame rate when recording mechanically repetitious motion. This sequence contains many small objects to focus interest, moving in a circular pattern that modern codecs may find difficult to predict. Objects occasionally move in front of one another. The color scheme contains a vareity of bright colors and sharp black/white edges, to test response to saturated colors.</p>			
	<p>SRC A-00043 Subjective Experiment vqeghd5, SRC 7 :</p>	1080i50		Not yet available
 <p>*</p>	<p>SRC A-00044 Subjective Experiment vqeghd5, SRC 8 : Only a part of (after frame rate conversion) : This clip contains a portion of 6 minute video provided by Sveriges Television AB (SVT) in multiple formats. This AVI file contains 8-bit stereo audio.</p>	1080i50		<p>SVT 1080p 50fps frames 5001 to 6000 of 18677 : http://www.cdv1.org/find-vid eos/details.php?id=1804</p>
 <p>*</p>	<p>SRC A-00045 Subjective Experiment vqeghd5, SRC 9 : Edited sequence showing fast paced views of a variety of animals at the zoo. Transitions include fades to and from black, for additional scene complexity. Scene includes Zebras, Snow Leopard, African Lion, Grizzley Bear, and Elephant Crane. May be useful for contrast and detail enhancement.</p>	1080i50		<p>NTIA Zoocuts : http://www.cdv1.org/find-vid eos/details.php?id=827</p>




Preview	Name & description	Frames / Duration	Web page	Origin
 *	SRC A-00046 Subjective Experiment vqeghd6, SRC 1 : Continuous sequence (no scene cuts) following the ball in a woman's basketball game. Narrow view of the play.	1080i50		PSCR Basketball Narrow View of Action : http://www.cdv1.org/find-videos/details.php?id=843
 *	SRC A-00047 Subjective Experiment vqeghd6, SRC 2 : Edited sequence showing an Asian Elephant eating hay on a winter day.	1080i50		NTIA Elephant : http://www.cdv1.org/find-videos/details.php?id=830
 *	SRC A-00048 Subjective Experiment vqeghd6, SRC 3 : Continuous sequence (no scene cuts) zooming out to follow a goose walking down a rocky slope to the bank of a pond with many Mallard ducks, on a winter day.	1080i50		NTIA Goose Walk : http://www.cdv1.org/find-videos/details.php?id=833
 *	SRC A-00049 Subjective Experiment vqeghd6, SRC 4 : Edited sequence showing an exotic green bird sitting near a waterfall. The setting is indoors, in a simulated rainforest.	1080i50		NTIA Green Bird : http://www.cdv1.org/find-videos/details.php?id=834



Preview	Name & description	Frames / Duration	Web page	Origin
 *	SRC A-00050 CrowdRun : Start of a crowd running.	1080p50		SVT CrowdRun

 *	SRC A-00051 ParkJoy : People are running in front of trees during a left to right camera movement.	1080p50		SVT ParkJoy
 *	SRC A-00052 DucksTakeOff : Ducks are on water and take off.	1080p50		SVT DucksTakeOff
 *	SRC A-00053 IntoTree : Helicopter flight approaching an old castle building	1080p50		SVT IntoTree
 *	SRC A-00054 OldTownCross : Sky view of Stockholm	1080p50		SVT OldTownCross

Preview	Name & description	Frames / Duration	Web page	Origin
 *	SRC-A-00055 Barrier Gate: Car approaching a barrier to a parking lot	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC





	SRC-A-00056 Basket: A basket ball game with a camera pan	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00057 Boxers : .A boxer's training, containg extensive body movements	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00058 Hall: A large plan view of an entrance hall using a perspective from the ceiling	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00059 Lab: Chemical lab with many small objects, two persons working, camera is changing white point during the sequence	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC



Preview	Name & description	Frames / Duration	Web page	Origin
	SRC-A-00060 News report: Two persons sitting at a table, reading out news	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00061 Phone call: Person picking up a phone call while seated at an office desk	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00062 Soccer: Goal shooting exercise filmed from behind the goal with high freuquency compoonents due to the goal's net	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC

	SRC-A-00063 Tree branches: Leaves of a tree filmed from below in medium wind conditions	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC
	SRC-A-00064 Umbrella: Person on the walkway of a street opening an umbrella	1080p25	http://www.irccyn.ec-nantes.fr/spip.php?article1052&lang=en	LUNAM Université de Nantes, IRCCyN/IVC

Open Source Movies

The table below lists a number of (short) movies which are released as open source to the community (e.g. Creative Commons license). As such, these movies can be shared, copied, distributed, remixed and adapted freely.


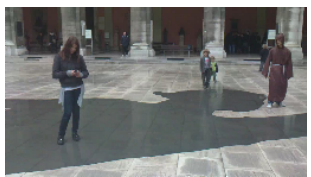
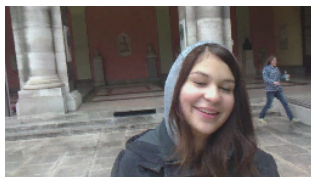

Preview	Name and description	Frames/Duration	Website	License
	SRC B-00001 Elephants Dream	1080p24 00:10:53	http://orange.blender.org/	Creative Commons
	SRC B-00002 Big Buck Bunny	1080p24 00:09:56	http://www.bigbuckbunny.org/	Creative Commons Attribution 3.0
	SRC B-00003 Sintel	1080p24/2k 00:14:48	http://www.sintel.org/	Creative Commons Attribution 3.0
	SRC B-00004 Valkaama	1080p 01:33:14	http://www.valkaama.com/	Creative Commons by-sa

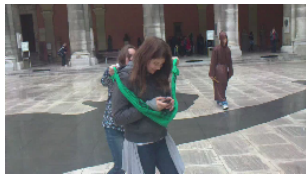



	<p>SRC B-00005 Sita Sings the Blues</p>	<p>1080p24 01:21:31</p>	<p>http://sitasingstheblues.com/</p>	<p>Creative Commons Attribution-Share Alike License</p>
	<p>SRC B-00006 La chute d'une plume</p>	<p>1080p25/2k 00:10:23</p>	<p>http://lachuteduneplume.free.fr</p>	<p>Creative Commons BY-SA</p>

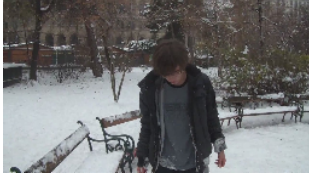
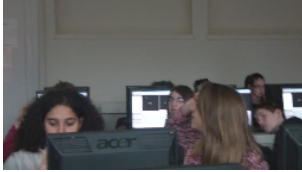
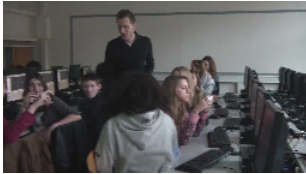
User generated content

The table below lists a number of (short) movies which are released by several contributors, notably the University of Vienna. The particularity of the sequences is that they have been created as typical content that is produced by end customers. This may refer either to a lower quality camera or to a shooting process, for example a shaky camera. These movies can be shared, copied, distributed, remixed and adapted freely.

Preview	Name & description	Frames / Duration	Web page	Origin
	SRC C-00001 Escalators User generated content, Hall with three escalators with strong brightness contrasts due to point reflections, handheld camera	1080p25		University of Vienna
	SRC C-00002 Arkadenhof1 User generated content, Girl is stumbling around and Talking to the camera. There is some camera shaking.	720p24		University of Vienna
	SRC C-00003 Arkadenhof2 User generated content, girl walking down a ramp and talking to camera. There is light camera shaking.	720p24		University of Vienna
	SRC C-00004 Arkadenhof3 User generated content, 2 girls and one boy discussing in front of camera. There is some camera shaking.	720p24		University of Vienna
	SRC C-00005 Arkadenhof4 User generated content, 2 girls pushing each other and getting interrupted by boy dressed as monk running by. There is light camera shaking.	720p24		University of Vienna

	<p>SRC C-00006 Arkadenhof5</p> <p>User generated content, a girl lying on a bench and gets woken by an other girl. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00007 Arkadenhof6</p> <p>User generated content, a Girl with sunglasses is lying on a bench and talks to an other girl. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00008 Arkadenhof7</p> <p>User generated content, two girls pretending to fight and get interrupted by a boy dressed as monk interrupted. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00009 Arkadenhof8</p> <p>User generated content, a Girls talking in front of camera and gets interrupted by other girl pretending to be drunk. There is light camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00010 Arkadenhof9</p> <p>User generated content, two girls pushing each other around. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00011 Arkadenhof10</p> <p>User generated content, a girl Talking to camera an other girl stumbling around in background. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00012 Arkadenhof11</p> <p>User generated content, two girls pushing each other around. There is some camera shaking.</p>	720p24		University of Vienna

	<p>SRC C-000013 Arkadenhof12</p> <p>User generated content, a girl chasing another girl. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000014 Arkadenhof13</p> <p>User generated content, a girl lying on bench and gets colored she gets very upset about it. There is heavy camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000015 Arkadenhof14</p> <p>User generated content, a girl is shouting at another girl. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000016 Arkadenhof15</p> <p>User generated content, a girl captures another girl with scarf. There is heavy camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000017 Arkadenhof16</p> <p>User generated content, a boy dressed as monk is walking around. There is heavy camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000018 Park1</p> <p>User generated content, a boy is chasing another boy and tackles him to catch him and they land in snow. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-000019 Park2</p> <p>User generated content, a boy kicks other boy who is lying in snow. There is some camera shaking.</p>	720p24		University of Vienna

	<p>SRC C-00020 Park3</p> <p>User generated content, a boy talking in front of cam. There is some heavy camera motion.</p>	720p24		University of Vienna
	<p>SRC C-00021 Workshop1</p> <p>User generated content, Kids sitting in front of PC's and get tutored. There is some camera shaking.</p>	720p24		University of Vienna
	<p>SRC C-00022 Workshop2</p> <p>User generated content, Kids sitting in front of PC's. There is some camera shaking.</p>	720p24		University of Vienna

Game content

The table below lists a number of (short) movies which are released by several contributors, notably the University of Vienna. They show typical examples of video game sequences. This type of sequences may be seen either in transmissions of gaming events, in music videos, or in cloud gaming applications. These movies can be shared, copied, distributed, remixed and adapted freely.

Annex C: SRC dataset descriptions

Gold set 2012:

This Gold set was created by experts and was used in the creation of the JEG264HMIX1 database. The choice is documented in the following publication:

[Marcus Barkowsky, Nicolas Staelens, Lucjan Janowski, Yao Koudota, Mikołaj Leszczuk, Matthieu Urvoy, Patrik Hummelbrunner, Iñigo Sedano, Kjell Brunnström, "Subjective experiment dataset for joint development of hybrid video quality measurement algorithms"](#), Third Workshop on Quality of Experience for Multimedia Content Sharing (QoEMCS), Berlin, July 2012.

They can be downloaded at: <ftp://ftp.ivc.polytech.univ-nantes.fr/JEG264HMIX1/>

SRC B-00005

SRC A-00038

SRC A-00056

SRC A-00040

SRC A-00041





SRC A-00042







SRC A-00059

SRC A-00044

SRC A-00045

SRC C-00001

Nr	SRC	Thumbnail	Description
1	SRC B-00005		Sita Sings the Blues: Colorful animation with limited motion
2	SRC A-00038		Basketball court: Attention is on small objects moving fast (players)
3	SRC A-00056		Basket: Fast moving players with recognizable faces, fast camera pan
4	SRC A-00040		Cheetah: Diagonal structure in chainlink fence behind object of interest, slow camera pan

5	SRC A-00041		Lion: Strong contrasts due to sun on snow, scene cuts
6	SRC A-00042		Rotating collage: Objects with saturated colors spinning on a turntable, strong color and brightness contrasts
7	SRC A-00059		Lab: Highly structured due to small objects, camera adapts to illumination change
8	SRC A-00044		Manor house: Several shades of green with finely textured trees, helicopter shot with zoom-like motion
9	SRC A-00045		Zoo: Rapidly changing shots of animals in a zoo, wide variety of scene contents
10	SRC C-00001		Escalators: User generated content, Hall with three escalators with strong brightness contrasts due to point reflections, handheld camera

Annex C: HRC description

The HRC description list can be found in the following spreadsheet:

<https://docs.google.com/spreadsheet/ccc?key=0ArzgrjHcemZYdER6S3JpQ01xZUJKdjd0ZE9yOGIvaWc#gid=0>

If you need access for editing this file, please contact the JEG co-chairs.

The details of the JM encoder configuration can be found in a separate document. Status: Bronze HRC, Configuration: VirtualBoxHRC2000.vdi

Annex D: Available PVS

The list of available PVS can be found in the file containing the algorithm indicators:

<https://docs.google.com/spreadsheet/ccc?key=0ArzgrjHcemZYdFIKNS1lYUt6djd5VXIJTU1xVGE2UUE#gid=0>

Annex E: Available objective algorithms

This Annex lists all algorithms that have been run so far on the database. The corresponding algorithms are assigned a letter according to their usage restriction and a monotonously increasing number. For each of the algorithms, one or several columns are reserved in the JEG-Hybrid Results File (HRF). The column header shall correspond to the algorithm followed by a monotonously increasing number of 3 digits. These 3 digits are meant for storing the final value (preferably as 000) and individual output values (if any).

The description of some algorithms requires a distinction between the author of an algorithm (individuals or a company) and those who submit results obtained from these algorithms. The term “author” is employed for describing the algorithm’s owner, the term “evaluator” is used for naming those who made the results of the algorithm available to JEG-Hybrid. Both “author” and “evaluator” may be represented by the same person or company.

The algorithm classes A and B are meant to span the complete range of possibilities.

The algorithms listed serve for various purposes, therefore, their type is not restricted, FR, RR, NR, bitstream, parametric, and all combinations may be used.

Algorithm Class A: Source Code publicly available

The following algorithms are publicly available as source code for download. This class applies both to source code which is in the public domain as well as source code which requires a license to run, for example ITU-T J.341. The download location needs to be mentioned in the text as well as the date of the download in order to avoid version conflicts. If their license allows for it, the downloaded source code and the compiled executable used for creating the results shall be stored in the JEG-Hybrid ftp space for future reference. If that is not possible, those who run the program shall store and archive a local copy of the source code as well as their compiled program and associated documentation on a permanent media (Tape, CD).

A00001: JEG Hybrid XML algorithm1

Source: JEG-Hybrid

Authors: Iñigo Sedano, Patrik Hummelbrunner, Marcus Barkowsky

Evaluators: Marcus Barkowsky

Class: Bitstream

Description: Using the QP values as parsed from an HMIX2 file and a fitting based on an analysis of the VQEGHD Pool 2, this algorithm outputs an estimation of the MOS value when only coding degradations are present.

Indicators:

000: Estimation of MOS (ACR 1-5 scale)

Further information: The source code is short enough to be provided for information

```
# Author: Inigo Sedano, Patrik Hummelbrunner
# Version 3.2, 27-04-2012
# Usage: python hybrid_v4_qp.py [XML file or XML file in .gz to parse]
# Python 3.2
# Python 2.x change __next__() to next()

import xml.etree.cElementTree as ET
import time
import sys, gzip

if len(sys.argv) < 2:
    print("No file name specified as argument")
    sys.exit()
else:
    ## using gzip.open to be able to open gzip
    if sys.argv[1].endswith(".gz"):
        fileToParse = gzip.open(sys.argv[1])
    elif sys.argv[1].endswith(".xml"):
        fileToParse = open(sys.argv[1])
    else:
        print("Fileformat needs to be .gz or .xml")
        sys.exit()
start = time.time()

# get an iterable
context = ET.iterparse(fileToParse, events=("start","end"))

# turn it into an iterator
context = iter(context)

# get the root element
### if use python 2.x need to use .next()
event, root = context.__next__()

# output file
outputFile = open("hybridQP_"+fileToParse.name+".csv","w")

# QP module ----
numPictures = 0
totalMacros = 0
maxQP=0
minQP=100
sumQP=0.0
avgQP=0.0
# ---- QP module

for event, elem in context:
```

```

if event == "end" and elem.tag == "Picture":

    # QP module ----
    # This version is a modified version of the paper:
    # Analysis of Freely Available Subjective Dataset for HDTV including Coding and Transmission
    Distortions, Fifth International Workshop on Video          # Processing and Quality Metrics for Consumer
    Electronics (VPQM-10), Scottsdale, Arizona, January 13-15 2010.
    # Authors: Marcus Barkowsky, Margaret Pinson, Romuald Pepion, Patrick Le Callet.
    # The modification calculates the average QP when the QP is not constant.
    qpList = elem.findall("./SubPicture/Slice/MacroBlock/QP_Y")
    for macroQP in qpList:
        if int(macroQP.text) > maxQP:
            maxQP = int(macroQP.text)
        if int(macroQP.text) < minQP:
            minQP = int(macroQP.text)
        sumQP = sumQP + int(macroQP.text)
    numPictures = numPictures + 1
    totalMacros = totalMacros + len(qpList)
    # ---- QP module

    root.clear()

# QP module ----
print("Number of pictures: "+str(numPictures))
print("Total number of macroblocks: "+str(totalMacros))
if maxQP != minQP:
    print("Max QP macroblock value: %i" % maxQP)
    print("Min QP macroblock value: %i" % minQP)
    print("The QP (Quantization Parameter) is not constant, using the average QP (sum of the QP
    values of the macroblocks divided by the number of macroblocks)")
    avgQP = sumQP / totalMacros
    print("QP value: %.2f" % avgQP)
    if avgQP < 28:
        print("The MOS (Mean Opinion Score) estimated is higher than 4.4 (range 1-5)")
        # in .csv should be only a digit output
        outputFile.write(fileToParse.name+";4.7")
    elif avgQP > 44:
        print("The MOS (Mean Opinion Score) estimated is lower than 1.7 (range 1-5)")
        # in .csv should be only a digit output
        outputFile.write(fileToParse.name+";1.3")
    else:
        estimatedMOS = -0.172 * avgQP + 9.249
        print("Estimated MOS (Mean Opinion Score): %.2f (range 1-5)" % estimatedMOS)
        outputFile.write(fileToParse.name+";"+estimatedMOS)
# ---- QP module

elapsed = (time.time() - start)
print("Time elapsed (approx): %i seconds\n" % elapsed)

```

Algorithm Class B: Closed Source, commercially available license

The following algorithms are only commercially available, no source code or algorithm description is available.

At least one member of VQEG had access to the corresponding software or hardware at a given moment. The evaluator assured that the author of the program would be willing to share information about the algorithm if this indicator was found particularly important for a future standard such as the ITU and the author was inclined to support such a future standard by agreeing to license his algorithm under equal and fair terms as required by e.g. the ITU. At the time of the evaluation by the evaluator, any usage restrictions (such as patents) on the program and its algorithm are accepted by the evaluator. The evaluator assures that the results (data values) of the algorithm (evaluated by the evaluator) are eligible for publication. As much information as possible on the program, its version, the underlying algorithm, and its author shall be provided by the evaluator and if applicable, the program shall be stored and archived by the evaluator including the associated documentation on a permanent media (Tape, CD).

B00001: H.264 Blockiness, Blurriness

Source: AccepTV

Authors: Mathieu Carnec

Evaluators: Marcus Barkowsky

Class: NR

Description: Evaluates MOS based on a fitting for H.264 coding for blockiness and blurriness using a model of the HVS.

Indicators:

000: Estimation of MOS (0-100 scale)

001: Blurriness indicator

002: Blockiness indicator

Further information: The evaluation was performed by Marcus Barkowsky (IRCCyN). The program has been saved to a permanent media. No (encrypted) source code was provided.

Algorithm Class C: Algorithm description publicly available

The following algorithms are publicly available as description of the algorithm. This may either be

a scientific publication, such as an IEEE journal paper, or a downloadable standards document, such as ITU-T J.246. The publication location needs to be mentioned in the text as well as the date of the acquisition in order to avoid version conflicts. If their license allows for it, the downloaded algorithm description used for creating the results shall be stored in the JEG-Hybrid ftp space for future reference. If a reimplementation was done, the verification procedure (if any) shall be documented. The evaluator who runs the program shall store and archive a local copy of the source code as well as their compiled program and associated documentation on a permanent media (Tape, CD).

C00001: PSNR as defined in ATIS T1.TR.PP.74-2001-A3

Source: NTIA / ITS. (2001). A3: Objective Video Quality Measurement Using a Peak-Signal-to-Noise-Ratio (PSNR) Full Reference Technique. *ATIS T1.TR.PP.74-2001*, .

Authors: NTIA/ITS

Evaluators:

Class: FR

Description: PSNR algorithm as defined in Eq.5 of the document, only the luminance component of a YCbCr signal is evaluated, and a Ypeak value of 235 is used..

Indicators:

000: PSNR result

Further information: The program used for this evaluation has been written in Matlab 2013 as follows: <insert code here>

Annex F: Available objective scores

The available scores can be found in the following spreadsheet:

<https://docs.google.com/spreadsheet/ccc?key=0ArzgrjHcemZYdFIKNS1lYUt6djd5VXIJTU1xVGE2UUE#gid=0>

Annex G: Subjective experiments

The subjective experiments that were conducted and led to MOS score annotations on the created database are listed in this Annex.

Subjective Experiment Class A: Experiments performed in standardized lab conditions

The following experiments have been conducted using ITU conforming lab conditions.

A00001: JEG264HMIX1

The details of this subjective experiment can be found in:

Barkowsky, M., Staelens, N., Janowski, L., Koudota, Y., Leszczuk, M., Urvoy, M., et al. (2012).

Subjective experiment dataset for joint development of hybrid video quality measurement algorithms. In *QoEMCS 2012 – Third Workshop on Quality of Experience for Multimedia Content Sharing* (pp. 1–4). Berlin, Germany.

available online:

<http://www.irccyn.ec-nantes.fr/spip.php?article1033&lang=en>

<https://biblio.ugent.be/publication/2985277>

<http://hal.archives-ouvertes.fr/hal-00717861>

Annex H: HMIX file format description

In general, a hybrid objective video quality metric takes as input the original encoded video bit stream, the decoded video stream and information on the delivery channel (network information).

Using this approach requires that the objective metric parses the video bit stream and the network parameters itself in order to extract all necessary parameters, which is not a straightforward task. Therefore, the JEG developed a new XML-based data exchange file format, referred to as the Hybrid Model Input XML (HMIX) file, which contains all available information from the encoded (impaired) video bit stream and the network level.

Using the XML markup language enables easy processing of the file contents without the need of writing a complete bit stream parser and leads to a faster development of new objective metric building blocks.

In order to monitor and gather information at the video and the network level, as much information as possible is collected from the encoded video bit stream, the decoded video signal and the network level. Different software tools are provided and developed within the JEG which can be used to automatically gather all the required information.

Information on the encoded and decoded video bit stream is gathered during the decoding process by using an adjusted version of the JM Reference decoder, which is available on the VQEG Tools and Subjective Labs website (<http://vqegstl.ugent.be>).

Currently, the following information is extracted during the decoding process and stored in an XML-based trace file:

For every non-picture (NALU type ≥ 6)

- NAL unit information

NAL unit information:

- Num - *NAL unit number according to position in the bit stream*
- Type - *NALU type as defined in Table 7-1 of ITU-Rec. H.264*
- TypeString - *String identifying NALU type (Redundant information)*
- Length - *Size of the NALU in bytes*

For every picture:

- id
- poc - *Picture Order Count*
- GOPNr - *GOP number to which this picture belongs*
- SubPicture information
(Represents frame or field data. In case of interlaced content, each picture

contains two <SubPicture> elements for the top and bottom field.)

For every subpicture:

- *structure - integer indicating whether the subpicture contains frame or field data (0 = frame data, 1 = top field data, 2 = bottom field data)*
- *Slice information*

For every slice:

- *num*
- *Type - Slice type as defined in Table 7-6 of ITU-Rec. H.264*
- *TypeString - String identifying the slice type (Redundant information)*
- *NAL unit information*
Note: this information can occur up to three times in case of data partitioning
- *Macroblock information*

For every macroblock:

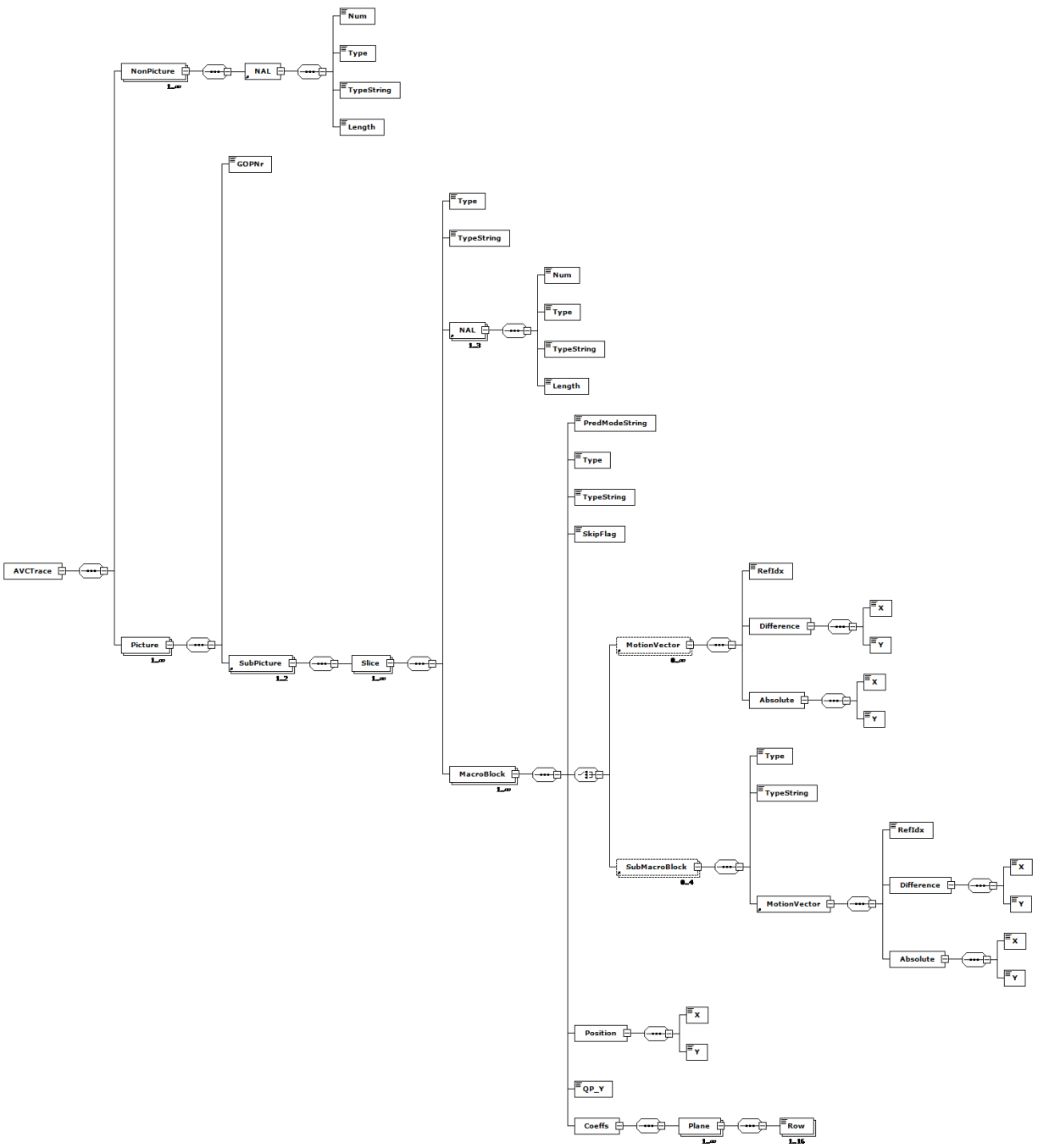
- *num*
- *QP_Y*
- *Type - Macroblock type as defined in tables 7-11, 7-12, 7-13 and 7-14 of ITU-Rec. H.264*
- *TypeString - String identifying the macroblock type (Redundant information)*
- *PredModeString - String identifying the macroblock prediction mode (I, SI, P or B)*
- *SkipFlag - true if the current macroblock is a P_SKIP or a B_SKIP*
- *Position - X and Y coordinate (in pixels) of the current macroblock*
- *Coefficients*
- *MotionVector information*
or
Submacroblock information (in case of B_8x8 or P_8x8 macroblock)
- *Coefficients*

For every submacroblock:

- *num*
- *Type - Submacroblock type as defined in tables 7-17 and 7-18 of ITU-Rec. H.264*
- *TypeString - String identifying the submacroblock type (Redundant information)*
- *MotionVector information*

For every motion vector:

- *list - list 0 or list 1 prediction*
- *RefIdx - index in reference picture list of the reference picture to be used for prediction*
- *Difference - horizontal and vertical motion vector component difference*
- *Absolute - horizontal and vertical motion vector component*



In order to collect information from the network, the H264AnnexBExtractor tool is used which extracts the following information:

Annex I: Examples of target distortions

Some of the distortions of interest include but are not limited to:

- Coding Artifacts
- Packet Loss
- Error Concealment strategies and their performance
- Blur associated with coding, resizing, spatial blur, temporal blur
- Color analysis
- Chroma errors
-