an optimum viewing distance and position. The construction and the centre seat with its ideal 3h distance point for all screens is shown in *Fig. 1*.

Figure 1
Three display rack with constant distance for central viewing position at 3h distance

Source content

We wanted to show the same content in all three HDTV formats. In order to achieve this, we either had to use three simulation shots with three different cameras at the same time or one camera providing at least a 1080p/50 signal that we later could down-convert to 720p/50 and 1080i/25.

For practical reasons, we chose the latter approach. The first three sequences of our demonstration were part of the "Multi-format Test Set [2]" sequences provided by Swedish Television (SVT). The second three sequences [3] were created by the Technical Department of the EBU in conjunction with EBU Members during the first half of 2006 – soccer preparation games for the World Cup in Basel (Switzerland), festivals in Zurich (Switzerland) and the Eurovision Song Contest in Athens (Greece).

SVT sequences

These were shot on 65 mm film at 50 fps, digitized to 2160p/50 and further down-sampled to 1080p/50, 720p/50 and 1080i/25.

EBU sequences

These were shot with the help of SRG-TPC Switzerland and TVN Germany using a CCD Camera (type HDC1500) with dual-link output for 1080p/50. 1080p/50 material was used as the source for creating the down-sampled 720p/50 and 1080i/25 content. The 720p/50 down-sampling was performed in software via low-pass and sync-window filtering in the DVS server. The 1080i/25 content was generated via box-filtering (line/pixel averaging) over two consecutive frames. Both methods were very close to practical applications in today's cameras.

Coding in MPEG-4 AVC

The uncompressed sequences were coded in MPEG-4 AVC with a software codec. This eliminated the observed variability in performance of manufacturer's current AVC hardware encoders and, furthermore, there is no 1080p/50 hardware coder available. We chose the Heinrich Hertz Institute (HHI) in Berlin as an internationally-recognized partner for the coding of the sequences. The

2. Free download – ftp server managed by Video Quality Experts group (VQEG), **http://www.its.bldrdoc.gov/vqeg/**
3. Available to EBU Members via **http://www.ebu.ch/en/technical**