

# HDTV with 720p is better than 1080i

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**The Swiss television (SRG) will be the very first TV-company in Europe to broadcast HDTV-programs in a 720p50 format.**

On the **1<sup>st</sup> of December, 2007** Swiss television will enter the age of HDTV.

**It is noticeable** that only real, *original HDTV-material* will be used for the broadcasts and that “up-converted” PAL-programs will not even be considered.

**And the commerce** may find it considerable that the production company of the SRG has been producing HDTV material with a modern HD equipment truck for more than 1½ years, just to be stuffed away into the archives. But even this material is not enough to run a 24 hour program. To be able to show HDTV productions, a three hour loop is prepared with high quality HD demonstration programs which is intended to fill the inevitable gaps within the first programs.

## One Program - four languages



The new channel will be broadcasted identically all over Switzerland, thus the name **SRG-HD**. But it will be transmitted with four different audio-streams, permitting to listen to the audio track in *German, French or Italian*, independently from the geographical location - or to listen to the *original sound track* of a movie. And, naturally, the audio tracks will be presented in *Surroundsound and Digital Dolby* quality. The broadcast will be available by satellite,

via Eutelsat Hotbird 8, 13° east, transponder 85, frequency 12.398, and every cable network provider will most certainly be very interested in supplying this highly interesting material to his cable customers right from the very beginning to avoid losing them to other forms of distribution. The encoding will naturally be using MPEG-4 H.264 AVC and the generous medium data rate of 12 Megabit per second promises an outstanding image quality.

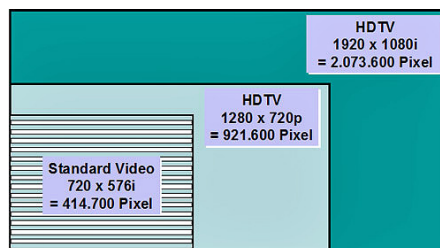
## Popularity boost for HD

*Of course, the European Football Championship of 2008 will be transmitted entirely in HD by the SRG.* To allow the subscriber a smooth transfer into the age of HD, the “Simulcast” technology will be used for three years. This means, that all broadcasts will be converted down to SD quality during this period, permitting owners of older, standard quality television sets to view the material as well.

But an other, historical date has already been fixed. On April the 1<sup>st</sup>, 2015 the transmission by satellite of all SRG broadcasts in SD quality will be suspended, leaving the high definition quality solely available. This will not affect the DVB-T transmissions, which will continue to be exclusively in SD quality and where no upgrade is planned for the future.

## Different from all the others

So far, so wonderful. But some people will certainly frown upon the decision of the **SRG to use the 720p50** format while a large group of European TV stations are using the *1080i50* format for their broadcasts. Well, the responsables should be expressively congratulated for their decision, **because in spite of the lower figure, 720 is far better than 1080.** Of course, in the first moment this seems rather confusing. Who knows some basics on graphics easily considers 1920×1080 to be a far better quality than



1280×720. **But the graphical figures are misleading**, as they only apply for still images. But television is mostly about moving images - and this is a really different picture. While the 1920×1080 format supplies 25 images per second, the 1280×720 doubles this rate, showing 50 images. This allows a far better resolution of moving images. This is not only permitting a much smoother representation of moves, but prevents flickering as well. In particular slow motion sequences and still images gain enormously in

sharpness and precision of the details. The rate of 50 images at 1280×720 versus 25 images at



### The difference between “i” and “p”

In rough numbers, those figures still represent a slight advantage for 1920×1080. But the match is decided by one significant factor:

The 25 images of 1920×1080 can never be viewed entirely, but only in a somewhat deferred manner. Those 1080 image lines are recorded and transmitted in two parts. First the uneven (1, 3, 5, 7, ...) and then the even lines (2, 4, 6, 8, ...). *For the representation with flat-screens, beamers or rear-projectors*, those two “half images” of 540 lines each are superposed and “interlaced” into a full image of 1080 lines. This means, that 50 half images per second will result into 25 full images shown in the same time. But this technique of “interlacing” creates



some problems. If, between the recording the first and the second “half image” something changes within the recorded scene, the two halves do not fit any longer and all moving

1920×1080 translates into a nearly equal information density which is reaching the human eye, being the essential factor for the perception of sharpness. The graphic shows clearly that the difference between 46.1 and 51.8 million of pixels per second is roughly 10 percent.

The time frame, within which a further quality improvement towards the **1080p50 transmission format** may be possible is not foreseeable right now. As the graphic shows, the sheer volume of data generated by this type of transmission (104 million pixels per second) is simply not transportable in an economical way at the present time.

objects appear blurred. And this does not only apply for balls flying through the image:

In the case of zooming or panning, the whole scene is turning into a “moving object”, thus blurred. The (very enlarged) representation show the effect in pause mode. The interlacing method is a relic from the stone age of television, relinquishing the advantages of the higher information density.

So it is no wonder, that the 720p5 format, representing 50 full images (the “p” standing for “progressive”) came out as an outstanding winner in all professionally arranged tests of European broadcasting agencies in the fields of sharpness and detail precision. That the progressively represented full images can be compressed much more efficiently, thus allowing even better results a low data rates, turns out to be a convenient side effect. So it is only logically consistent, that in the face of all those advantages other TV agencies such as **ARD, ZDF (Germany) and ORF (Austria)** chose the same format for their future HD-broadcasts.

### Full HDTV sets remain in the race

Will this make the current full HDTV sets, heavily advertised by the industry, superfluous?

**Not at all**, because different settings apply for movies on Bluray or HD-DVD. If they deliver only 24 images per second, it must be considered that these are full images of 1920×1080 pixels.

Will it lead to problems, if some TV stations will broadcast with 1080i25 and others with 720p50?

**No**, because *all Settop-boxes will switch automatically between the two formats, mostly unnoticed by the viewer.*

Switzerland will not only get the first public, freely available HD television in Europe on the 1<sup>st</sup> of December 2007, it will undoubtedly get the it in the best available format as well.

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