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DEPLOYING 3DTV IN 2010

3D TV has generated an enormous amount of interest in the industry following the latest enormous success in the movie theatres. Compared to “3D crazes” of the past, advances in camera and screen technology make it possible to effectively deploy 3D Television to the home. In the past few months a number of broadcasters have announced the launch of dedicated 3D channels this year and many more will follow. Importantly, as well as linear and on demand channels dedicated to broadcasting 3D products from Hollywood, broadcasters are differentiating by their ability to provide coverage of live sporting and cultural events in 3D.

However, television broadcast differs greatly from pre-packaged cinema or Blu-Ray Disc™ content, having to contend with an infrastructure containing numerous, often independent, stages of content repurposing.

How can broadcasters deploy 3D TV channels in such a short period of time?

Delivering 3D Content

Essentially, there are two methodologies for delivering 3D content: *frame compatible 3D* (*“3D-in-2D”*) and *2D compatible 3D.*

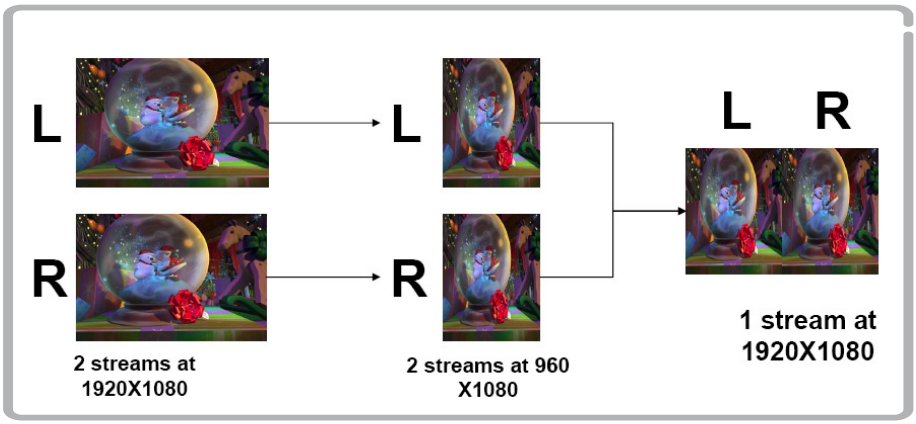
Frame compatible 3D is aimed at delivering 3D content within the bounds of the existing broadcast infrastructure. The announced broadcast / direct-to-home (DTH) 3D services that are planned to launch in 2010 will be based on 3D content that has been created from pre-processing separate left and right eye images in such a way as to appear to existing broadcast equipment and consumer set-top boxes (STBs) as if the 3D content is normal or standard 2D HD content.

Concurrently, there are also industry efforts to deliver full resolution HD 3DTV to the home, typically using methods that enable the same content to be backwards compatible with existing TV’s (all 2D). This is known as 2D compatible 3D. The existing standard for Multi-view Video Coding (MVC), an amendment to the H.264 | MPEG-4 AVC standard, provides an interesting technology avenue for bit-rate efficient, full resolution HD, stereoscopic (3D) transmission. Scalable Video Coding (SVC) has also been suggested as an alternative to MVC to deliver 2D-compatible full resolution 3D material.

Although Blu-Ray Disc™ has announced the deployment of MVC compatible chipsets in its players, the adoption of this or any other standard by the broadcast industry does require the replacement of the enormous existing ecosystem and will therefore hinder any short-term 3D deployment.

Distribution to the home

All of the announced broadcast / direct-to-home (DTH) 3D services that are planned to launch in 2010 will be frame compatible 3D. Production equipment is already available, existing 2D broadcast equipment and consumer STBs can be used, and new 3D TVs are also on sale, with more models being added throughout the year.



In the majority of announced cases, 3D will be packaged into a frame compatible video stream by using horizontal resolution sub-sampling (spatial compression) and then multiplexing the “half resolution per eye” images together. The reverse process is employed in the newly announced 3D TV sets, whereby the TV set is aware that the received content is, in fact, left eye and right eye multiplexed images and internal post-processing (including up-sampling and left/right polarization) is done to render the images as 3D. There are many possible spatial sub-sampling methods defined, but the two most common are side-by-side (half-resolution horizontally) and over/under (also known as top-and-bottom) (half-resolution vertically).

As mentioned above, any existing headend equipment can process the frame-compatible 3D content as 2D. Questions about the extra bit-rate budget required by the pre-processed content are largely still unanswered. This is essentially dependent on both the content and the efficiency of the compression equipment and, regardless of the method chosen, can add anything from 10% up to 40-50% on the equivalent 2D picture.

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It is therefore paramount that any 3D deployment using frame-compatible methods uses the best available compression technology to maximize the consumer early 3D experience.

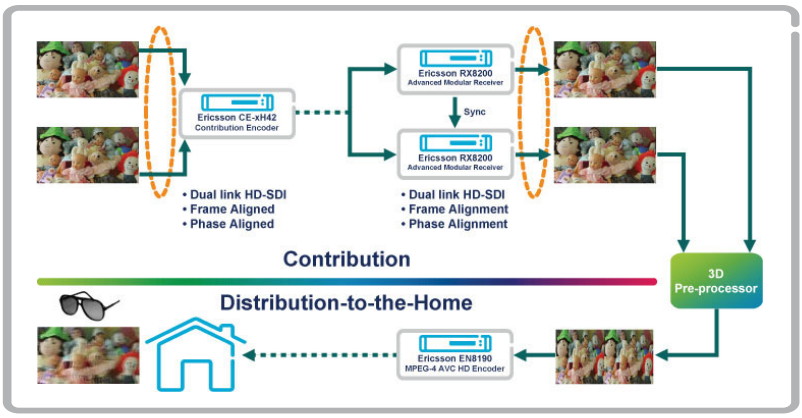
Ericsson EN8190 HD encoder provides the best MPEG-4 AVC HD compression in the world using new in-house technology designed from the ground up to enable conversion to an all-HD world.

Contribution

Over the years, the ability of providing live content directly to the home has differentiated broadcasters and has been one of the main drivers in the adoption of HDTV and large flat panel displays. Early indication shows that the same is going to be true of 3DTV, with a number of dedicated 3D sports channels already announced.

The issues for live 3D Contribution differ greatly from DTH, with the utmost being the need for the best picture quality possible (full spatial resolution, 4:2:2 chrominance, 10-bit precision, etc.) and not compromising for the lowest bit-rate possible or legacy equipment as is often done for DTH applications.

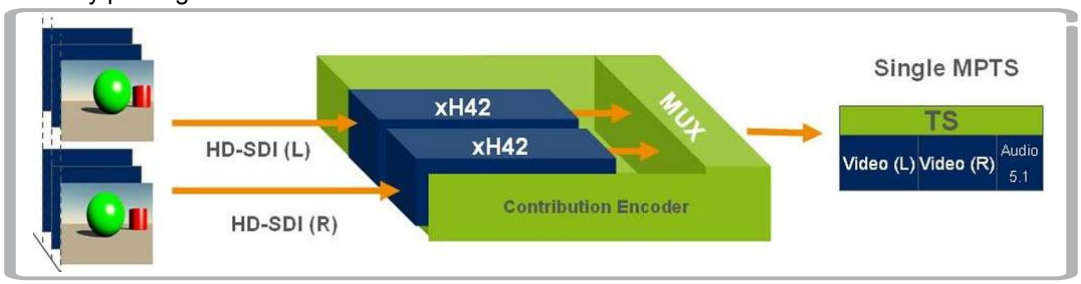
For single operator content coverage, the 3D pre-processing box may be placed on-site at the event and existing (2D) HD-capable DSNG equipment used for backhaul. This approach has the advantage of enabling 3D contribution using existing equipment, although it requires setting up the whole production on-site. Moreover, pre-processing the content at the source will limit its value in post-production, distribution to third-parties and future repurposing. Many operators are therefore likely to deliver a simulcast of full resolution left and right channels as illustrated to the right.



This approach has the advantage of delivering the highest fidelity content in a format easily understood by the many stereoscopic production tools and independent from the chosen final method of delivery.

However, it also require the most care in order to maintain exact frame- and phase-alignment between the Left and Right eye feeds in order to reconstruct the 3D image accurately.

With its multichannel capabilities, **Ericsson's Contribution Encoder** provides a natural platform for 3D contribution links, ensuring full control of encoding parameters, exact synchronisation and time-stamping of the compressed frames and the generation of a fully packaged 3D simulcast.



Likewise, the new "Simulsynch 3D" technology for RX8200 receivers ensures that the exact temporal and spatial relationship between left and right feed is also maintained at the receive end, avoiding possibly severe reductions in early 3D customer experience.

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