

Creating the Optimal Video Experience for Mobile TV

TECHNOLOGY OVERVIEW

Automating Conversion Processes for Seamless Content Repurposing

Although different video formats have always been an issue in the creation and production of content, traditional broadcast distribution formats have been relatively homogeneous. Today, however, the explosion of new content distribution platforms has created an environment in which each platform, and in some cases each consumer device, may require video content to be repurposed in a specific way in order to achieve the best result.

While there is a huge business driver for content owners to monetize their assets across multiple distribution platforms, having to repurpose content into an ever-increasing number of distribution formats adds a high degree of complication, cost and time to the equation.

Mobile TV provides the perfect example of this situation. Unlike a satellite TV application in which all the receivers are the same, there is a huge variety of mobile telephones in a typical network. Each type of phone may have different characteristics such as screen size, shape and resolution; processor speed; available memory and on-board video decoding.

Another challenge is that video is a bandwidth-hungry application. Whether an operator is using 2.5G, 3G, DMB, DVB-H or Media-Flo, bandwidth is a major consideration. This puts special emphasis on the fidelity of the video compression in any content repurposing system.

Perhaps most significant is that the way content is being created for broadcast is changing, and this change in turn has a major impact on how content looks on the small screens of mobile phones. Today, many major events, particularly sporting events, are being produced in widescreen HDTV. This means, for example, that content shot for an interlaced 1920x1080 display must be quickly and efficiently repurposed for small screens such as the 176x144 (progressive) resolution of a typical mobile telephone. When these widescreen images are reproduced on a mobile phone, it is often difficult to follow the action, particularly with sports content such as soccer, where it's sometimes impossible to find the ball on the small display.

All these factors create major challenges for content owners and network operators who want to tap into the mobile TV market.

In order to create a profitable business, they must be able to deliver to each consumer the content they want (and are happy to pay for), in a form that provides the best viewing experience. Doing this manually would be a costly and time-consuming process. So, how can content owners achieve their dream of creating a single master and subsequently repurposing it for distribution anywhere and on any device? This sounds like a simple goal, but it is in fact a formidable technical challenge.

Helios™: Master Once, Distribute Anywhere

In response to these challenges, Snell & Wilcox has created the Helios file conversion platform. Helios, a highly scalable software-based system, leverages the company's 30-plus years of expertise in image processing, video compression and standard and format conversion to address quality and bandwidth issues in the emerging mobile TV market.

For mobile TV applications, the Helios platform enables mobile operators to deliver better quality video at lower bandwidths to their customers. Significantly, Helios enables mobile operators to deliver video content to their customers in a format that provides them with the best possible viewing experience, given the constraints of network bandwidth and handset functionality.

Helios is more than a simple compression or transcoding system. It is the first premium, no-compromise solution that totally automates video conversion from content creation to the viewer. Key to its high performance is the integration of sophisticated motion estimation and video compression technologies developed by Snell & Wilcox for professional broadcasting applications.

Helios uses these technologies to analyze incoming content and to identify and track the "area of interest" within it. Once the area of interest has been identified, Helios can "dynamically reframe" the content. In other words, Helios can zoom in on the area of interest within the content so that the mobile TV viewer gets the tighter shots they need to have a pleasing small-screen experience.

This functionality replaces the need for additional cameras that might otherwise be used to create the tighter shots required for mobile TV. It also eliminates the need for a separate mobile TV production crew, complete with its own video switcher and operator, used to re-cut shows on the fly to make them more suitable for mobile TV.



When compressing the resulting images for mobile TV, Helios can create higher-quality images in lower bit rates than any other system on the market. Key to this performance is its dynamic ability to separate the foreground and the background within the video image and to treat each separately in order to concentrate the energy of the compression encoder on the parts of the image that are most important to the viewer.

It is important to note that in a typical sporting event, the compression encoder must deal with both the action on the field and the crowd in the background. Because the crowd can form a fairly large part of the image, and is by definition random in nature, it actually consumes, and therefore wastes, a significant portion of the available bit rate of a compression system. This becomes a huge factor in bandwidth-constrained mobile TV applications in which every bit is precious.

Helios eliminates this problem by using a concept borrowed from high-end cinematography. Through the use of Ph.C™ motion estimation, Helios analyzes incoming images and effectively “pulls focus” on to the area of interest in the foreground of the image, such as the showjumper in Figure 1, while defocusing the crowd in the background. As a result, the available encoding bitrate is concentrated on the area of the image that is important to the viewer. This results in a significantly enhanced viewing experience for the end user, even at very low bit rates (as seen in Figure 3).

Helios can perform all of the above activities in real time, in an automated way, with no human intervention. Consequently, the introduction of Helios will have a profound impact on the business models surrounding the emerging mobile TV market.

With Helios, the viewing experience of the end user is made the best it can be. Consumers will now see a high-quality image that is reformatted for the small screen and features highly fluid motion.

At the same time, Helios delivers significant savings for content owners and mobile TV operators, who can now deliver better-quality and more reliable video services to their customers while utilizing less bandwidth and eliminating the high cost associated with additional equipment and production services. Furthermore, Helios can create multiple outputs from the same source. This means that operators can use Helios to take the content they have and turn it into the content that delivers the best possible viewing experience to their customers.

Snell & Wilcox has long specialized in creating solutions that deliver the best possible images for its customers. The Helios platform extends this tradition into the rapidly emerging mobile TV market by enabling users to deliver a better product at lower cost.



Figure 1. In a typical sporting event, the “area of interest” to the viewer can be very small relative to the crowd in the background. In low-bit rate applications such as mobile TV, this means that a compression encoder may waste a large percentage of the available bits on the background.



Figure 2. Helios uses Ph.C motion estimation to identify and track the “area of interest” within the content. It then dynamically reframes the image and processes the background to concentrate the energy of the compression encoder onto that area of interest.



Figure 3. Helios output. By dynamically reframing the image and processing the background, Helios produces better results than other systems and delivers high-quality images with fluid motion, even at very low bit rates.

Snell & Wilcox Inc.
3519 Pacific Ave.
Burbank, CA 91505
Tel: +1 818 556 2616
Fax: +1 818 556 2626
americas@snellwilcox.com

Snell & Wilcox Ltd.
Southleigh Park House,
Eastleigh Road, Havant,
Hampshire PO9 2PE, UK
Tel: +44 (0)23 9248 9000
Fax: +44 (0)23 9245 1411
info@snellwilcox.com

Snell & Wilcox (Hong Kong) Ltd.
Room 603, Tai Tung Building,
No.8 Fleming Road,
Wanchai, Hong Kong
Tel: +852 2356 1660
swhk@snellwilcox.com.hk

Company policy is one of continuous product improvement. Specifications are therefore subject to change without notice.

Snell & Wilcox, Putting Pictures to Work, Helios and Ph.C are trademarks of the Snell & Wilcox Group. All other trademarks mentioned herein are duly acknowledged.