

# Video for mobiles

The industry needs to act fast to take advantage of this opportunity.

BY ALDO CUGNINI

According to a study released earlier this year by the NAB, broadcast television could reap an additional \$2 billion in revenue by 2012 by delivering content to mobile and handheld devices — but only if an industry standard is adopted and technology is deployed quickly. In fact, the growing interest in mobile video demonstrates that it is at the point where technology is not the limiting factor; business issues are. This month, we'll explore the various delivery methods that now present practical solutions for delivering content to mobile consumers.

## Local vs. regional vs. national

The Open Mobile Video Coalition (OMVC) is an alliance of U.S. commercial and public broadcasters that supports the development of mo-

bile DTV. The OMVC is focusing on four categories of devices to carry mobile video: cellular telephones, in-vehicle devices, laptop computers and portable video players. While all of these can receive video programming, the form factor and usage will define what kind of content is best suited to each — long-form vs. short-form programs, streamed vs. cached, pushed vs. interactive, and so forth.

Mobile video transmission can be broken down into two categories: pedestrian and high speed. Both conditions require a wireless connection to the receiver. For this, three delivery paths are possible: satellite, Wi-Fi and terrestrial broadcast. Until recently, satellite delivery has offered the most viable means for mobile reception, though at an economic cost to the receiver. With a relatively short range, Wi-Fi continues to be limited to pedestrian or fixed receiver applications.

Terrestrial broadcast has also been limited because of the constraints of the various modulation systems. However, all three of these technologies are advancing to the point where the differentiator may become the business model — but more on that later.

As with any transmission system, satellite delivery of video requires appropriate bandwidth and signal robustness. The problem is that high-bandwidth services are constrained to a portion of the spectrum that requires a relatively large antenna and electronics that are relatively expensive for a handheld. Satellite mobile services have so far depended on antennas and tuners that are practical for vehicular use, and have supplemented transmission with terrestrial gap fillers. With mass consumption, the technologies may soon be at the point where the form factor and cost issues are no longer prohibitive.

Also, the FCC has allocated only enough spectrum for mobile services to permit 4Mb/s of downstream bandwidth. This means that MPEG-4/AVC compression is most likely, with video resolutions supporting a handheld device.

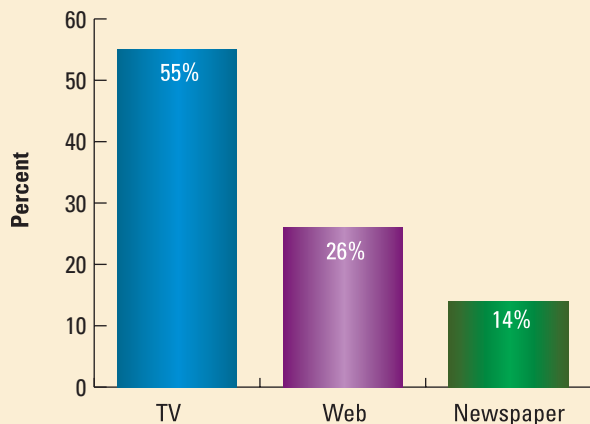
Because Wi-Fi is bidirectional, this medium provides for an inherently more robust connection — as long as the user is within range of the access point. Not only can one communicate in both directions, which is a must for Internet traffic, but the wireless LAN operates much like a wired LAN, with handshaking a key element. The channels are constantly being negotiated so that if there is interference that disrupts the communications, the communicating parties are instructed to retransmit the faulty data. Thus, when the channel goes bad, the data does not get corrupted; the data rate just goes

## FRAME GRAB

*A look at tomorrow's technology*

### Local TV tops viewers' source of news

55 percent of people tune to local TV news for information.



Primary source of news information used by 2700 local news viewers, ages 25 to 54

Source: Hearst-Argyle Television

[www.hearstargyle.com](http://www.hearstargyle.com)

down. This results in reliable, multirate data communications — provided the channels are there. While a single access point can run on one of 11 or more channels, these channels overlap, so that in practice sometimes only three Wi-Fi networks can coex-

Various other formats are being deployed as well, in which the transmissions are dedicated to the mobile data stream. These include different versions of DMB in China and Korea and QUALCOMM's MediaFLO. The cellular telephone networks provide an ad-

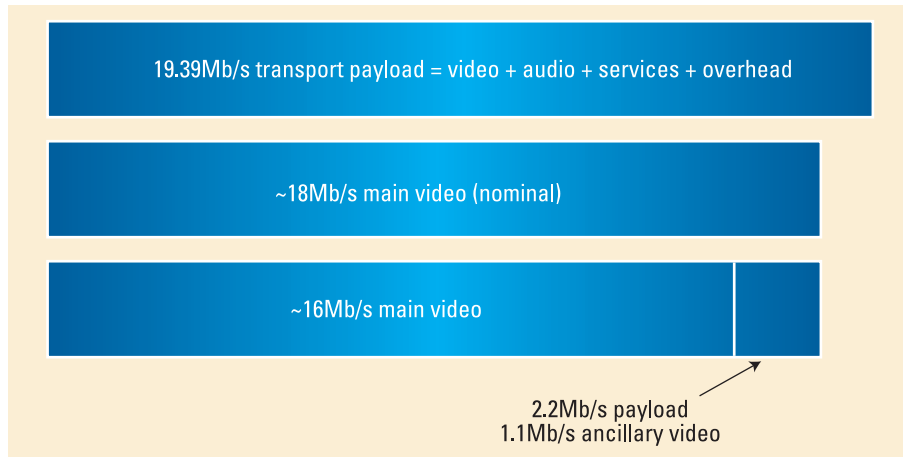
ditional means of delivery to handheld devices, using CDMA and GSM. A key consideration for handhelds is power consumption. ISDB-T and DVB-H accomplish this by means of one-segment and time-slicing operations, respectively. These are means for receiver power cycling, synchronized in such a way that the receiver ignores the unnecessary other data (and modulation) in the stream. (See Figure 2.) The various systems under consideration for ATSC-M/H also include some form of time slicing. The OMVC endorses a single-system approach to mobile video in

### Compression, content distribution and carousels

the United States, and for that reason, it supports the development of the ATSC-M/H standard. The Mobile DTV Alliance is another group that is promoting mobile video, with more emphasis (and membership) coming from product manufacturers. With a potentially worldwide product base, the group supports both ATSC-M/H and DVB-H.

The choice of a compression system will be a critical element in system deployment, especially for the smaller handheld devices. Affecting the design decision are compression quality and efficiency, product support at the user's side and possible licensing terms for the codecs. While downloadable software updates can provide for maximum flexibility, a stable and efficient platform is mandatory, and this may require that the compression decoder be unchanged after deployment. For streaming applications, the most popular codecs are Flash, Windows Media, QuickTime and RealVideo. For non-real-time playback, these codecs, as well as H.264 (MPEG-4 AVC) and H.263/3GPP, are already seeing widespread use.

Several distribution modes are being considered for mobile video. One is unicast, or one-to-one transmission. This method essentially treats communications with each device as a unique channel, allowing video-on-demand and similar services, even if the pro-



**Figure 1. Ancillary video can be added to a terrestrial video transport, as shown here for ATSC.**

ist on nonoverlapping channels. Each access point, however, can serve up to 128 (or more) users.

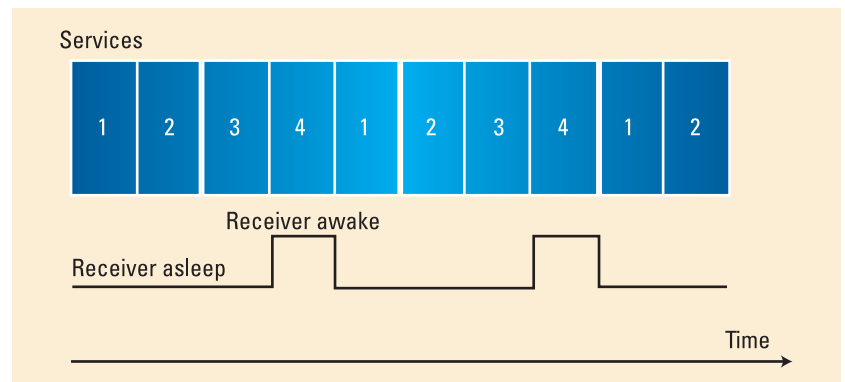
Interference with nonintentional radiators (e.g. microwave ovens) and intentional radiators (such as Bluetooth devices) can compromise reliability. In addition, the connection range of the earlier Wi-Fi technologies is typically no more than 100ft. More recently, a new Wi-Fi system, WiMAX, has been developed, enabling a connection range of at least a few miles from an access point. Still, the size and power consumption of the WiMAX receiver are not yet practical for the handheld device market.

Terrestrially, ATSC-M/H (United States), DVB-H (Europe and Asia) and ISDB-T (Japan) are emerging as viable solutions for video delivery to handheld and mobile devices. These systems all borrow data bandwidth from a parent television transmission. Therefore, the addition of enhanced services will subtract from the total data rate by an amount that includes additional overhead, and that amount is dependent on the modulation system and the amount of robustness needed. (See Figure 1.)

ditional means of delivery to handheld devices, using CDMA and GSM.

A key consideration for handhelds is power consumption. ISDB-T and DVB-H accomplish this by means of one-segment and time-slicing operations, respectively. These are means for receiver power cycling, synchronized in such a way that the receiver ignores the unnecessary other data (and modulation) in the stream. (See Figure 2.) The various systems under consideration for ATSC-M/H also include some form of time slicing.

The OMVC endorses a single-system approach to mobile video in



**Figure 2. Time slicing saves power by switching the receiver off between bursts of data.**

gram is not viewed in real time. This type of subscriber granularity places the highest demand on system bandwidth, with a large audience of interacting subscribers requiring an enormous amount of data throughput.

Another option, multicast transmission, alleviates this issue somewhat. With it, communications to a smaller group of devices can be pooled. An à la carte subscription to different pack-

**The choice of distribution mode will be closely tied to the physical infrastructure.**

ages reduces the number of options for individual programs, but serves a network of users more efficiently.

Finally, a broadcast mode services viewers in the familiar broadcast television format, requiring little or no interactivity, but carrying the least

flexibility for user choice.

The choice of distribution mode will be closely tied to the physical infrastructure as well as the content agreements by the service providers. Broadcast mode services, by definition, do not require a back channel to the service provider and may be entirely advertiser supported. The most interactive services, however, will require a return path, so a reliable cellular or Wi-Fi connection would be needed. In between these two scenarios could be a system where users place orders from an interconnected site, such as the home or office, and then receive the content at other times.

Users can also get a highly interactive experience by means of carousels, whereby content is repeatedly cycled on various channels, much the way that program guides are distributed on existing DTV systems. By allowing a customer to preorder content, a near-VOD experience can be provided. The content distribution can be dynamically scheduled, depending

on user pull.

System architectures and their geographical distribution will dictate how portable a service can be. From this respect, some business models will parallel the existing wireless television transmission methods, with the proportion of local vs. national content being driven by ad sales.

### Which way to go?

Open standards, widespread availability of devices and experience with video services should point the way to a viable business. While it's risky to make predictions about this growing opportunity, the sheer number of interested heavyweights makes it all but certain that services will continue to expand from the limited trials now underway. Sitting on the sidelines is no longer an option.

**BE**

*Aldo Cugnini is a consultant in the digital television industry.*



Send questions and comments to:  
[aldo.cugnini@penton.com](mailto:aldo.cugnini@penton.com)