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**SERVICE PROVIDERS AND
CHIP VENDORS TARGET
THE HANDSET, BUT IS
THAT THE BULL'S EYE?**

Mobile video: Participants follow multiple paths

By Maury Wright, Editor at Large

MEASURED BY SALES VOLUME, the mobile handset remained the most important consumer product throughout 2004. That success and the computing horsepower in the device make the handset a magnet for other compelling technologies, such as music or streaming video. Consumers can now get low-frame-rate TV on some handsets from Sprint and Cingular, and companies such as Qualcomm and Texas Instruments have even grander plans. Still, the handset will not be the only mobile target and ultimately may not even prove to be the most prevalent video target. Designers working on everything from handsets to PMPs (portable media players) to automotive electronics should closely monitor the video-delivery schemes. And, as usual with digital-media technologies, the power brokers include everyone from chip vendors to end-product suppliers to service providers to content owners.

Despite the obvious obstacles—tiny displays, balky networks, high subscription prices, and others—many expect a bright future for mobile video. Analysts at EDN's sister business In-Stat predict that US subscribers to mobile-video services will cross the 5 million mark in 2006 to 2007 (Figure 1). Moreover, In-Stat's research indicates that 13.2% of users indicate that they are either "extremely or very interested" in subscribing to video services for their mobile phones. That number may seem low, but it's high compared with other potential handset services. For example, In-Stat's research indicates that only 11.4 and 6.5% of users are "extremely or very interested" in subscribing to music/audio or games services, respectively. A Yankee Group survey, meanwhile, finds that 24% of subscribers in the "young-adult segment" are ready to pay to watch live TV on their mobile handsets.

Not surprisingly, the handset-TV revolution began in

Japan, where so many other consumer products and even cellular services have taken off. Vodafone has for more than a year offered a series of handsets from Sharp that integrate traditional analog-TV



AT A GLANCE

- ▶ With new phones and true 3G networks, TV streams can support 30-frames/sec video on handsets.
- ▶ Content and how it's presented will determine winners and losers in mobile video.
- ▶ Battery life continues to be a huge logistics problem and, with video, calls into question whether consumers could watch long programs on a handset.
- ▶ The early announcements in technology for new videocentric networks highlight the argument over which technology manufacturers will deploy.

Sprint phones, such as the Sanyo MM-7400, can play video content from sources such as MobiTV, including TV channels such as Discovery and MSNBC.

tuners. But the future for mobile video is surely digital delivery, whether the target is a handset, a car, or a PMP.

DEFINING MOBILE DIGITAL VIDEO

Before digging deeper into mobile digital video, however, it's necessary to define the scope of the discussion. At the Jan 6 to 9 CES (Consumer Electronics Show) in Las Vegas, there was a plethora of announcements of so-called mobile video that don't belong in this discussion. (See **sidebar** "Sirius and Comcast target the car" in the Web version of this article at www.edn.com.) In fact, mobile video is nothing new in one sense. Consumers have long been able to mount DirecTV systems in vehicles with relatively compact, roof-mounted antennas that automatically track the satellites.

This discussion concerns only video services that are transmitted via cellular networks or the planned overlay networks that transmit video via digital-TV schemes, such as DVB-H (Digital Video Broadcasting-Handheld, www.dvb.org), ISDB-T (Integrated Services Digital Broadcasting-Terrestrial, www.dibeg.org), and Qualcomm's MediaFLO (Media Forward Link Only). DVB-H and ISDB-T, respectively, are part of the terrestrial-digital-TV specifications in Europe and Japan.

Sprint was first to offer live TV—Sprint TV—over cellular networks in North America. Sprint TV is the MobiTV service that Idetic developed, although Idetic will likely soon rebrand itself with the MobiTV name. Sprint began it in August deploying MobiTV to Sprint Vision customers and now offers it via most handsets from Samsung, Sanyo, LG, and Nokia, although not on Palm- or Pocket-PC-based phone PDA combinations. Vision is Sprint's 2.5G CDMA2000 service, often referred to as CDMA 1xRTT, which offers typical download speeds of 50 to 70 kbps.

The video-over-cellular experience confounds some because, as you might expect, the frame rate is far from the home-TV experience, and the screens are small. For instance, the state-of-the-art Samsung A700 sports only a 176×220-pixel display—a far cry even from, say, a QVGA 320×240-pixel display on a PDA. Richard Dougherty, engineer turned analyst with The Envisioneering Group (Seaford, NY), states, "You can do [video over cellular], but it really does choke the

network, and it's a so-so experience."

Indeed, MobiTV is underwhelming at first glance. Some of the more basic Sprint phones have screens as small as 128×128 pixels. Moreover, refresh rates vary based on the model of phone and the network connection. Some of the older models that MobiTV supports lack a powerful application processor or specialized graphics processor. So, those phones are limited to 1- to 2-frame/sec video via Java or Qualcomm-Brew video applets. Even the most advanced Sprint offerings today top out at 7 frames/sec—limited by the Sprint network.

MobiTV co-founder Paul Scanlan, however, believes that many consumers disagree with Dougherty about the experienced. For many consumers, according to Scanlan, a first look at MobiTV is the first time they have viewed anything compelling on the color handset screen. Scanlan states, "If you compare it with what you can do with that phone on that network, it blows people away." Scanlan claims that Sprint TV is the fastest selling Sprint Vision application, although the price—\$25/month—is double the cost of other offerings, such as interactive games. Scanlan also points out that MobiTV works to ensure that audio is perfect in its programming, regardless of the video frame rate.

Sprint won't reveal subscriber numbers for Sprint TV, but the idea is sufficiently compelling that both Cingular/AT&T Wireless and Western Wireless just announced MobiTV offerings. And quality varies with the phone and speed of the network. AT&T Wireless, for instance, recently rolled out EDGE (Enhanced Data for Global Evolution), a 3G version of its GSM network that boasts typical download speeds of 100 to 130 kbps. Scanlan claims that MobiTV can deliver 10-frame/sec streams over EDGE networks. But AT&T has been selling EDGE service to businesses for notebook connections. It's unclear since the Cingular acquisition when EDGE will roll out in consumer handsets.

Verizon Wireless, meanwhile, has the fastest of the North American cellular services in its 3G CDMA 2000 service, often called 1xEV-DO (Evolution-Data Optimized) or just EV-DO. Thus far, Verizon, like AT&T Wireless, has concentrated on business applications with 3G services. At

January's CES, however, Verizon announced a broader 3G deployment and, presumably in February, availability of the VCast video service that will cost subscribers \$15 per month. Verizon's EV-DO network boasts typical downloading speeds of 300 to 500 kbps and, on phones—only three at launch—equipped with the requisite graphics support and EV-DO radio, should deliver TV-like frame rates.

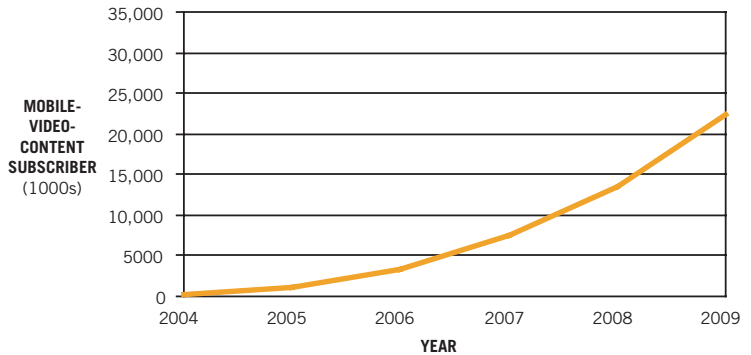
CONTENT IS ALWAYS KING

Verizon and MobiTV, however, offer different content models. Verizon bills VCast as a "video-on-demand" service. Verizon will make 300 individual videos available each day. The mix will include content from sources such as MTV, NBC, and Fox, including news programming and even dramatic series adapted for the mobile handset.

MobiTV developers, conversely, model the service more along the lines of TV. According to Scanlan, the company presents itself to content owners as a cable company, and that positioning was key to winning their support. The company offers more than 20 channels 24 hours a day with a mix that includes offerings from Discovery to MSNBC. And, although it initially derived all of the channels from TV offerings, the company recently partnered with NBC for a mobile-specific news channel and with the owners of the Improv comedy clubs to develop the Comedy Time channel. Scanlan believes that a user experience analogous to watching TV channels at home is a key differentiator. Scanlan states, "TV is the most successful consumer product ever. We call it the 75-year-old killer application." (See **sidebar**, "MobiTV plumbing: video in 18-kbps streams" at the Web version of this article at www.edn.com for more MobiTV details.)

From the users' perspective, a TiVo-like content model might be better than either VCast or MobiTV. But caching content in a handset would be a challenge, for sure. The winning content model will not simply come down to what consumers might ideally prefer. Doug Grant, director of business development at handset-IC vendor Analog Devices, notes that, in other 3G markets, such as Hong Kong, short video clips of sports rather than full-length televised games or matches are popular. The small screen and video quality are only parts of the reason. Grant states, "Battery life is a problem for watching a full game." Indeed, any user of a service such as Sprint Vision can attest to the quick drain on the otherwise-excellent battery life.

Logistics aside, can cellular networks now or in the near future supply the bandwidth needed for truly compelling video? The carriers badly need some new services to take off and to produce revenue; they all have run up huge bills moving toward 3G while cannibalizing voice revenue through fierce



SOURCE: IN-STAT/MDR, MAY 2004

Figure 1

In-Stat predicts that US subscribers to mobile video services will exceed 5 million by 2006 to 2007.

market-share battles. But in the long term, plenty of players are betting on alternative networks for mobile-video delivery.

OVERLAY NETWORKS WILL BOOST QUALITY

Consider Qualcomm, a close partner with every carrier in the CDMA camp and the leading vendor of chip sets for CDMA handsets. Moreover, the company's Brew middleware is key for companies such as MobiTV that need to develop and port applications such as video players. Yet, last fall, Qualcomm announced plans to roll out the separate MediaFLO network in the United States for video delivery. Qualcomm created MediaFLO USA as a subsidiary and intends to ultimately spin off the company to shareholders—potentially including partners—to help fund what's expected to be an \$800 million investment over the next four to five years. (For more MediaFLO details, see **sidebar** "MediaFLO uses 700-MHz spectrum" on the Web version of this article at www.edn.com.)

Crown Castle and Nokia, meanwhile, are in trials in the Pittsburgh area on a deployment based on the DVB-H standard. Crown Castle is a major operator of cellular towers in the United States and Australia and a partner to all of the North American cellular carriers.

You might assume that the carriers despise these overlay networks in the same way that they earlier did Wi-Fi. Of course, they've since all developed Wi-Fi offerings. But they've had little to say about alternative video networks.

Envisioneering's Dougherty notes that the carriers are still reeling from investments in 3G and privately are unhappy about the new networks. Dougherty states, "Cell-phone carriers hate this." Mimicking a likely thought from a carrier, Dougherty continues, "You are bypassing me and using up all of my battery."

But not everyone is so sure that separate video networks can succeed without the cellular carriers.

For example, Texas Instruments in November announced the Hollywood IC to add support for DVB-H or ISDB-T video in its handset chip sets. Kush Parikh, worldwide strategic marketing manager at Texas Instruments, believes that the new networks would be symbiotic with the carriers' businesses: "Carriers have the marketing channel to the consumer, and handsets can handle authentication via the cellular network. Having TV on the handset can also enable other applications—for example, interactive voting for a show like *American Idol*."

PMPs AND AUTOS OFFER ROBUST TARGETS

Still, devices such as PMPs with relatively larger screens and automotive-video systems could be far more popular than handsets as video targets. Assuming that the video network is separate from the cellular network, why use the handset? Parikh agrees that such deployment may happen but insists that sheer handset volumes would ensure its place as the most prevalent client for any mobile-video service.

The overlay networks should be able to offer 10 to 20 30-frame/sec video channels perhaps in a mix with some audio-only channels. Because the networks will inherently multicast content with relatively high transmit power, far fewer transmitting towers than cellular systems will be able to cover a given geography. Qualcomm claims one MediaFLO tower for every 30 to 50 cellular towers.

Unfortunately, these video networks may be years away for most consumers in North America—excepting those in early trial areas. The network builders have work to do, as do the IC vendors. As usual in mobile technology, however, other parts of the world will move more quickly. According to DiBEG (Digital Broadcasting Experts Group), Tokyo broadcasters TBS, Nippon TV, TV Asahi, Fuji Television, and TV Tokyo will by the end of this year be transmitting to mobile handsets.

ROADBLOCKS IN THE HANDSET

For the most part, state-of-the-art handset ICs are now capable of 30-frame/sec video. Indeed, handsets are even mixing in graphics-accelerator chips in the way PCs did 15 years ago. Alternatively, vendors such as Analog Devices have built new architectures that are tuned for multimedia and communications. Analog Devices' Grant states, "On a Blackfin processor, we've demonstrated MPEG-4 QCIF decode at 30 frames/sec with baseband running at the same time."

Texas Instruments' Parikh states, "I wouldn't say handsets are there today, at

least in terms of 30-frames/sec video and acceptable battery life." Again the troublesome power issue pops up, and everything from greater range, faster data rates, and bigger video screens requires more power. Still, Texas Instruments' announcement of the Hollywood focused on the DVB-H- and ISDB-T-capable receiver chip being married to today's OMAP-2 processor.

It was a bit curious that both Texas Instruments and Qualcomm were so vocal in late 2004 about technologies due in volume in chip sets in 2006. About the timing of mobile TV, Dougherty states, "Other than MobiTV, all bets are being placed on 2007."

In the end, TI and Qualcomm's duel over the direction of network deployment could be driving the timing of the announcements more than the need to provide early dissemination of the chip information. And history shows that Qualcomm heavily favors the proprietary route.

Assuming that these new networks roll out on schedule, you'd have to expect MobiTV to be worried about its future. Scanlan, however, warns, "Don't compare the capabilities of what MediaFLO may offer in two years with what we do today on a four-year-old network with a two-year-old phone." In short, there will be further advancement in the cellular systems.

Whether via 3G, or overlay networks or at all, it's far from a sure thing that mobile video will succeed in North America. Despite the mildly bullish forecast from In-Stat, Allen Noguee, principal analyst in the cellular area, isn't so sure, either. Noguee states "In Asia [Korea, Japan, and, possibly, China], it will be a big success. Outside of that, I have my doubts. I think, at first, it will be a novelty, and eventually it will play a role with advertisers and others delivering a short message—say, a promo for an upcoming network-TV program. Video on a cell phone is novel and interesting, but in the United States, when is the last time that you have seen someone watch TV on a portable LCD TV? Those have been around for years, and you never see them."

Noguee may well be right, although usage in the United States will likely depend on image quality.

Digital delivery could offer the pristine signal that portable LCD TVs never did, especially if some of the displays exhibited at Electronica in November get to market at an affordable price. The product designers will likely need to solve the battery problem, as well—with a battery offering at least enough juice for a sports fan on the go to catch a complete game and still be able to make a call afterward. □

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