## MSOs search for a role in PCS delivery

By Fred Dawson
May 1, 1996

The shifting interplay of technical and strategic developments in PCS is redefining the cable industry's options in telephony, posing both a challenge and an opportunity to MSO strategists.

Where much of cable's focus has been on making wireline delivery of telephony technically and commercially viable as a prerequisite to deep involvement in wireless services, developments on the wireless front suggest cable's biggest opportunities may lay in the direction of providing transport for services that avoid a wireline connection to customers altogether.

Nothing better illustrates the new possibilities than the strategy on which NextWave Telecommunications has built its group-leading $3.8-billion bid for personal communications services spectrum in the FCC's "C" block auctions. "We intend to be a carrier's carrier," says NextWave CEO Allen Salmasi, explaining that NextWave will be a "wireless factory" that sells spectrum and new features software to retail service providers for both fixed and mobile access.

"The way we've architected our network, we'll be able to offer PCS as an extension of wireline service," Salmasi says, noting that mobile capabilities will be added later.

Most significantly, from a cable perspective, NextWave is predicating its gambit on the use of transmitter/receivers mounted on coaxial cable links in conjunction with premises-mounted devices to eliminate the need for wireline drops to households.

The design envisioned by NextWave makes use of many other technical innovations as well, including distributed switching components that add intelligent network features on top of basic switching supplied by the public network, thereby maximizing operator control over service features while minimizing capital and even transport costs. For example, Salmasi notes, the design achieves greater bandwidth efficiency by using modular switches to handle all traffic across the several fiber nodes within any given mobile switching center, which means signals can remain in the 8 or 13 kilobit-per-second PCS format without consuming DS-0 (64 kbps) bandwidth.

Even though the NextWave strategy relies on use of HFC networks, Salmasi says local exchange carriers are the largest block of players negotiating for NextWave's services, owing to their recognition that fixed wireless access will offer them a low-cost way to expand network capacity to support demand from service resellers. "The LECs see coax distribution with RADs (remote antenna drivers) as a very appealing option," he says, noting that while there is interest among some MSOs, "the big problem there is they don't have a business plan that fits the opportunity."

Indeed, cable operators have been wary about jumping into wireless when, to do so, they must rely on the untried RAD or, as it is now being labeled by some, CMI (cable microcell integrator) technology. "We've had people tell us they're convinced our technology is solid, but they don't want to be the first ones to put it in the field," says Derek Spratt, executive vice president and a co-founder of PCS Wireless Inc., the original provider of RAD technology that has joined with ADC Telecommunications in a 50-50 venture known as "PCS Solutions."

This is one reason the Sprint venture, which had touted CMI-based PCS as a core part of its strategy, jumped to an all-wireless approach to PCS deployment late last year, Spratt notes. Equally important, he adds, the venture's MSO partners wanted to ensure they could deliver fixed wireline service in tandem with PCS, which meant PCS would have to wait for the resolution of difficult technical issues on the wireline side.

"There's been a real letdown since the Sprint deal came apart," Spratt says, in reference to cable enthusiasm for telephony. "But the Sprint business plan was out of date the moment they came up with it, because they were focused on making wireline telephony work as a prerequisite to adding wireless."

### Fixed wireless access

With "150 minutes of wireline use for every minute of wireless, compared to 139 a year ago," as Salmasi puts it, clearly, the correct strategy isn't to abandon fixed access in favor of mobile. But it may be that choosing fixed wireless over wireline access can overcome the technical hassles that have stymied cable's push into telephony, possibly expanding cable's service marketing and affiliation options as well.

As Rebecca Diercks, an analyst with Business Research Group of Boston, notes, NextWave isn't alone among PCS bidders in pushing for a fixed wireless access approach.

"Many of these companies are shell companies who expect to resell their spectrum to new entrants in the local exchange market, but others are looking to create their own `extended cordless' service as an alternative to mobile services," she says.

"Licensees will definitely be looking to spend as little as possible on their networks after what they've had to pay for spectrum," adds Ira Brodsky, president of Datacomm Research Co. "People are expecting there will be competition in local telephone service, which means there will be demand for wireless access owing to the anticipated resistance to multiple wireline networks at the community level."

In late January, the FCC proposed a rulemaking which would allow commercial mobile radio licensees to provide fixed wireless local loop service, leaving for further discussion the question of how this route to competing with the local exchange carriers would be regulated. "This proposed rulemaking has altered the whole equation in calculating what C Block spectrum is worth," says an executive with one would-be licensee, asking not to be named.

What applies to new PCS licensees applies to the general telecom landscape as well when it comes to the rapidly changing technical scenario in fixed wireless access. "There's a new phase in development of wireless local loop technology that's focused on markets where wireline service already exists, such as the U.S.," says Jack Scanlon, executive vice president and general manager of Motorola Corp.'s Cellular Infrastructure Group. "We'll have a lot to say about this in the near future."

"We are working with a number of (PCS) operators to develop services that would take advantage of a low-cost, fixed-wireless access approach to the business," adds Bill Marsh, a digital products manager in Scanlon's group. "Some operators are going to have to look at that, because a given region is not necessarily going to support five to seven pure mobile plays."

The biggest problem with fixed wireless access in the minds of cable operators and U.S. telcos alike has been its failure to supply the intelligent management functions envisioned for next-generation wireline networks, leaving the impression that fixed wireless is strictly an off-shore product for startups in underserved countries. But, in Hungary, Motorola is taking initial steps toward changing that perception by supplying a wireless local loop system that can remotely manage devices at the customer premises.

"You can view the box, which has a (jack) connection on one side and an antenna connection on the other, as the beginning of the subscriber side of the network or as the end of the outside infrastructure," Scanlon says. "Operators want to deal with it as the end of the infrastructure."

Moreover, he adds, Motorola has found a way to allow the network operator in Hungary to provide power to the premises equipment in the wireless

environment, though he won't say what the method is at this point. In any event, he adds, customer-supplied power isn't a drawback in the U.S. the way it is in less well off countries, so long as there is reliable battery backup to ensure lifeline service in the event of power failures.

Another firm responding to demand for wireless access solutions is start-up Dynamic Telecommunications Inc. Based in Germantown, Md., Dynamic will begin producing intelligent wireless access units for digital cellular systems by June, moving to PCS spectrum interfaces as demand develops, says CEO Paul Kline.

Using such systems, operators will be able to communicate over the wireless connection to the home-mounted terminals to find out the condition of premises gear and power supplies and to modify service options, among other things. Says Kline: "There is nothing you can do to manage telephony over wires that can't be done in the wireless mode, so why not extend that capability all the way to the premises?"

### The mobile side

As market conditions encourage new thinking about wireless fixed access, the push for a cable-based solution on the mobile side is heating up again, owing in large measure to the problems PCS licensees are having in securing sites for their transmitters. Wireless trade publications and industry sources are reporting widescale procedural delays as municipalities begin to focus on the issues raised by construction of multiple PCS networks, in some instances, adopting new zoning restrictions, and in others, tying up the process while they weigh their options.

"The situation is only going to get worse when you consider all the PCS licensees in any given market who are going to be trying to get transmitter site permits," Spratt says. Perhaps most important for cable's near-term perspective on use of CMI technology, Sprint, after deciding upgraded cable plant wouldn't be available on a broad enough scale soon enough to support its PCS rollout schedule, has renewed its search for a cable solution in the wake of encountering unexpected problems in arranging for antenna sites throughout its territories.

"Directors from all 20 plus Sprint PCS markets are reporting zoning and leasing problems, often at sites where they thought they had it wrapped up," says a cable industry official, asking not to be named. Spratt concurs, saying, "They're reporting about 30 percent of the sites they'd expected to secure in '96 aren't going to be ready in that timeframe, and they're projecting it could go to 50 percent in '97."

A Sprint spokesman rejects such assertions. "We're making great headway in site selections, and our presentations before zoning boards are proving to be very fruitful," says Mark Bonavia. "We're very confident things will move at the pace we've set."

But Sprint is acting on the cable option with new urgency, setting up a test of CMI technology with Cable Television Laboratories and Tele-Communications Inc. in Lakewood, Colo. west of Denver. "There's an emphasis on using cable plant wherever possible," says Scott Burnett, project manager for wireless technology at CableLabs. "These tests should make it easier to determine the right approach in any given market."

Where, previously, Sprint and others had taken an all or nothing approach to using cable networks, now, the emphasis is on PCS system designs that would take advantage of upgraded cable plant in pockets within a market, mixing use of CMIs and tower- or roof-mounted transmitter/receivers in whatever arrays make the most sense. "A lot of cable systems are like the Denver system, where some segments are upgraded to state-of-the-art specs at 750 MHz with a lot of fiber, and others are still operating at lower capacity," Burnett says.

In addition to the field trial, CableLabs will conduct lab tests using a newly developed apparatus that simulates various operating conditions and types of cable plant to "determine where any given system falls apart," Burnett says. "That gives everybody a sense of what the tradeoffs are between upgrading cable plant for PCS or using standard transmitters."

The cable industry is looking at two categories of strand-mounted CMIs, one with power output at one-half to one watt, and another at 2.5 watts. The difference in radial coverage range between the two versions is about 900 feet versus 2,500 feet, depending on local conditions.

The Lakewood field trial will largely replicate what's already been done by Cox Communications in the San Diego area, Burnett says. The MSO's PCS operation, winner of a pioneer's preference license for the southern California major trading area, has begun commercial construction and recently completed its first calls over the new segment.

"Cox is very busy getting ready to launch services and doesn't have the time or resources to share its findings with the rest of the industry on a regular basis," Burnett says. "We'll be able to do that, plus we'll be operating in a different environment, which will broaden the industry's experience with variations in terrain and RF usage characteristics."

### New supplier

Another factor contributing to the improved prospects for use of CMI technology in cable is the emergence of a second supplier in the field. Sanders Telecommunications, a division of Lockheed Martin Corp. with experience in CDMA (code division multiple access) technology for the military, has chosen the HFC platform as the most promising market arena for its move into commercial systems and is already delivering product for field trials.

"We realized there was going to be tremendous competition for cell sites in network buildouts by as many as six licensees per market," says Chris Cole, manager of marketing for telecommunications systems. "It's hard to imagine anybody would be allowed to put up enough towers in any market to support all these systems, which is why cable represents such a great opportunity."

Sanders officials also note cable makes a good fit for their technology because of CDMA's usefulness in overcoming the upstream noise problems of coax. "The spread spectrum waveform is designed to operate below the noise floor in the over-the-air environment, which allows it to get through the ingress in the cable upstream as well," says Michael Orr, program manager for CMI products.

In fact, notes CableLabs President Richard Green, PCS is a bit easier to accommodate over cable systems than wireline telephony, given the robustness of the spread spectrum CDMA signal. "The standard has been designed to noise specs that are tougher than the noise impediments in the cable plant return path," he says.

Sanders, which expects to move to full production for commercial PCS deployments starting in the third quarter, is in the market with production gear ahead of PCS Wireless, which will have equipment in production later in the year and should be first to market with a 2.5-watt power version of CMIs, according to Spratt. "We've delivered over 200 RADs in various (air interface) flavors, working with the cable industry to sort through the best approaches," he says.

"Lockheed Sanders focused on nothing but CDMA and so was able to get a product to market a little ahead of us."

But Spratt quickly adds that Sanders' entry is good news for PCS Wireless. "We look on Lockheed Sanders' entry as a positive thing, because it lets the industry know the idea has backing from another credible source," he notes.

It's only a matter of time before PCS providers recognize the advantages of using CMIs, says Bruce Crair, vice president and general manager of Cox of California PCS. "It takes less than a week to put in the CMIs to provide coverage equivalent to that of a macrocell," Crair notes. "It takes 12 to 24 months to do it with a macrocell transmitter."

Moreover, adds Cole, PCS network construction using upgraded cable facilities should cost 50 percent of what it would cost to build an all-wireless network. "Our calculations show there's a phenomenal market potential for this technology," he says.

### Modular switching

Complementing the CMI and fixed wireless access in opening new approaches to telephony over cable are the modular switching systems that have entered telecommunications as adjuncts to telcos' Class 5 central office switches. Over the past decade, ever more computing power in microprocessors, along with new software, made it possible for LECs to add intelligent network features by tying PC-based switches to the main switches, and to do so on an incremental targeted market basis that minimized costs.

"We can put together a starter kit, including hardware and software, for $45,000–$65,000 that will get you going with service over 1,776 time slots (voice circuits)," says Anthony Squeglia, investor relations director for Summa Four Inc., one of the leaders in the market. The firm's switches can be linked to manage up to 30,000 time slots, he adds, noting that AIN (advanced intelligent network) capabilities are built into the switch.

Excel Inc., another leading supplier with a similar approach to programmable switch arrays, supports combinations of individual multi-port units into a PC-controlled platform that operates as a single logical switch, says Russell Levesque, director of product management. "Operators can stack up to eight switch controllers to support as many as 128,000 non-blocking ports at a service node," he says.

Officials at both companies say the big growth area for their products is wireless, where cellular companies are expanding service features and new PCS players are looking to tie mobile and fixed wireless access capabilities together. "Business has been fairly flat on the wireline side, but it's growing by leaps and bounds in wireless," says Squeglia.

A hint of where things might be going in using such switches to expand wireless service into the home can be found in Southwestern Bell Mobile Systems' use of distributed computing from another supplier, Celcore Inc. SBMS is preparing to introduce a combination cellular/cordless, one-number service throughout its territories in the second quarter, says Mark Webster, director of wireless products.

The analog service employs "personal base stations" in the home in combination with a Celcore-supplied network management unit that interfaces the base stations with the mobile network through the public telephone switched network. When the customer is off-line at home, the call is routed through the wireline network to the base station and transmitted to the cellphone over the standard 800 MHz cellular frequency. When the phone is outside the reach of the base station, the service switches over to the mobile network.

SBMS plans to charge a flat monthly "feature charge" of between $4.95 and $8.95 on top of the regular cellular rate for its service, Webster says. There is no charge for air-time on incoming or outgoing calls when the phone is used as a cordless, he notes.

Dubbed "FreedomPlus," the service represents the next step "in the natural evolution to anytime/anywhere communications," Webster says, noting the company is talking with vendors about extending the capability into the digital domain in conjunction with introduction of TDMA (time division multiple access) air interface services in the cellular and PCS modes. "We see this service as especially viable for the work-at-home and small business markets," he says.

SBMS' move comes as the pioneer in the field, GTE MobileNet, prepares to expand its long-running Tele-Go one-number service to all 11 of its territories. With more than 200,000 Tele-Go customers in six territories at year end, GTE has demonstrated tremendous market appeal for the service, says Jeff Keller, spokesman for GTE MobileNet.

While one-number service has yet to be embraced by other carriers in the analog mode, it is an essential part of the PCS vision, notes Motorola's Scanlon. Only, with the wireless loop capabilities his company and others are developing, the service provider will be able to bypass use of the public wireline network altogether.

Whether or not cable networks become the key to enabling this bypass remains to be seen. But, based on the breadth of interest in HFC-based wireless deployment represented by players such as Sprint and NextWave, it's hard to imagine cable operators won't take a long look at a wireless approach that combines fixed access with mobile services.

**Back** | **Print**