Jason Mayordomo has a tough assignment. A technology manager for the United Nations peacekeeping force in Sierra Leone, he has to make sure information flows seamlessly between the U.N. technical headquarters in Freetown and its far-flung outposts on the remote edges of this war-ravaged country. In addition to dealing with the technical vagaries of remote outpost equipment-disabling lightning strikes and the limited availability of replacement parts, he must also work with the knowledge that peace in this West African nation may very well depend on how well he does his job.

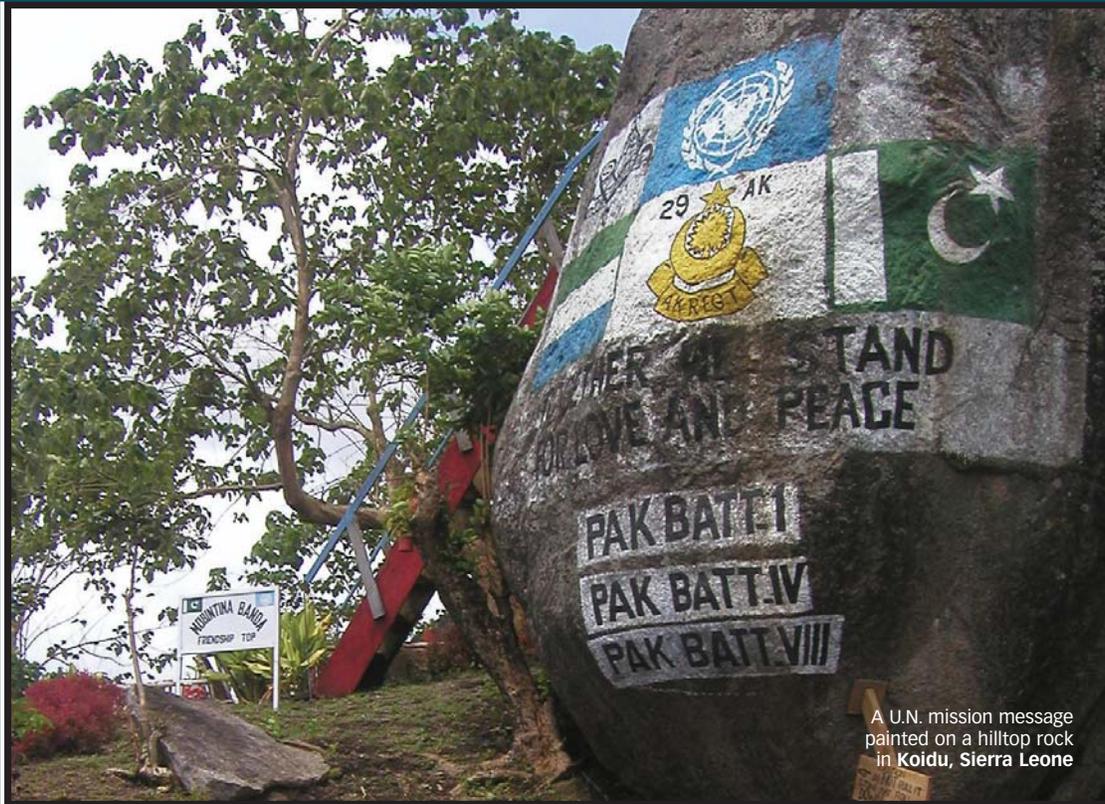STORY AND PHOTOS BY DAVID F. CARR

ON THE EDG

E OF PEACE

A U.N. mission message painted on a hilltop rock in **Koidu, Sierra Leone**

Oct. 29, 2003, United Nations heliport, Freetown, Sierra Leone

Half the seats on the 8:30 a.m. U.N. helicopter flight are taken by Pakistani soldiers returning to their base in Koidu, the Eastern Sector headquarters for the peacekeeping force in Sierra Leone. Crowded among them, along with the journalists and humanitarian workers, are Jason Mayordomo, the U.N. mission's communications and information-technology chief, and two members of his team.

The Koidu base is complaining of congested data-network links, a balky router and malfunctioning wireless-network nodes. Mayordomo and his team take the reports seriously. While such problems can cause headaches in the commercial world, here they can be fatal.

Koidu is a strategically important outpost at the heart of Sierra Leone's coveted diamond-mining territory, which lies less than 30 miles from the porous border with Liberia, a nearly lawless country decimated by two blood-soaked changes in regime in the past 20 years. Sierra Leone's own civil war ended in 2002, after a brutal 11-year struggle between successive government forces and a rebel group known as the Revolutionary United Front (RUF)—made up of the country's rural poor and backed by Liberian militia. The RUF was notorious for using children as soldiers and hacking off the hands of opponents with machetes and axes. Exact numbers are hard to come by, but the U.S. government estimates that more than 2 million of the country's 5.7 million people have been displaced by the conflict and that

"tens of thousands" have been killed. Three years ago rebel forces temporarily took some 500 U.N. staff as hostages.

The United Nations Assistance Mission to Sierra Leone, or UNAMSIL, though, persists. After initially suffering from some of the same bureaucratic ineptitude and military failures that have marred other U.N. missions, UNAMSIL prevailed with a disarmament campaign that allowed Sierra Leone to reestablish a civilian government.

Now the people of this beleaguered African country are counting on the U.N. to maintain the peace.

But to maintain order, U.N military observers in Sierra Leone need to know what's going on. While the peacekeepers are scheduled to pull out of Sierra Leone in 2004, UNAMSIL's military observers in the field need to remain alert for signs of trouble—whether it's infiltration from Liberia or rock-throwing battles between tribes with rival claims to a diamond mine. The quality of the mission's communications and information services determines how quickly the observers can file the full reports that military commanders need to assess threats and allocate resources.

In order to keep information flowing, Mayordomo and his team of civilians must keep open the communications channels that connect 11,000 peacekeeping troops from more than 30 countries—a task compounded by the fact that many nations have brought in their own, incompatible

BASE CASE U.N. ASSISTANCE MISSION TO SIERRA LEONE

Headquarters: Mammy Yoko Hotel, Freetown, Sierra Leone

Mission: The U.N. helped bring an end to this West African nation's civil war in 2002, and U.N. personnel are now charged with keeping the peace and helping the central government regain control over the country.

Top Technology Officer: Jason Mayordomo, chief of information technology for U.N. peacekeeping operations

Financials (for fiscal year ending June 2004): For the mission in Sierra Leone, the U.N. budgeted $543.5 million, of which UNAMSIL is spending $6.64 million for communications and $2.77 million for information technology.

Challenge: Straighten out the mission's troubled technical infrastructure and improve technical support. Make sure field personnel can depend on network services, starting with the basics of phone and e-mail communications.

BASELINE GOALS:

▸ Keep the peace. Since the peace accord was brokered in 2002, there have been 23 months of relative quiet in the country.

▸ Limit U.N. casualties. To date, 113 members of the U.N. contingent have been killed, including 108 armed soldiers.

▸ Deploy network services for a new mission to Liberia two weeks prior to the arrival of a U.N. team, rather than the month or more it sometimes takes.

▸ Encourage the use of technologies such as voice over Internet Protocol (VoIP) and other technologies that make more efficient use of bandwidth.

INSIDE SIERRA LEONE

LOCATION: On the Atlantic coast of Africa, bordering Liberia and Guinea

SIZE: 27,699 square miles, a little smaller than South Carolina

POPULATION: 5.2 million (44% of the population is 14 years old or younger)

AVERAGE LIFE EXPECTANCY: 45 years

LITERACY: 31.4%

TELEPHONES: 25,000 land lines; 30,000 cell phones

NATURAL RESOURCES: Diamonds, titanium ore, bauxite, iron ore, gold

LAND USE: 6.8% of the land is fit for cultivation; 44% of the population is engaged in agriculture

U.N. DEPLOYMENT (as of Oct. 31, 2003): 11,276 troops, 257 military observers and 130 civilian police. Administration: 320 international staff members and 579 locals.

RECENT HISTORY: Internal unrest has plagued the country since the end of British rule in 1961. The latest conflict began in 1991 when a rebel force supported by Liberia launched a campaign to topple the established government. A civil war was brutal—marked by rapes, mutilations and the abduction and forced enlistment of children. In 1999, U.N peacekeepers entered the country to enforce order and disarm the insurgents. By May 2000, the U.N.'s efforts were successful in disarming about half the rebel force. In January 2002, most of the insurgents had given up their guns and both rebel and government forces declared an end to hostilities. National elections—which Amnesty International reported were "generally free and fair"—were held in May 2002.

SOURCES: UNITED NATIONS, AMNESTY INTERNATIONAL, CIA'S WORLD BOOK OF FACTS, ENCYCLOPEDIA.COM

computing gear. Any equipment failure could have disastrous consequences.

"Think of it," Mayordomo says. "Koidu is overrun by rebels, and we're saying, 'Wait just a minute, someone is changing the network switch.'" If the rebels take to combat or hostage-taking, they won't allow a timeout for reconfiguring a piece of equipment.

While most corporate project managers might not have to worry about battling armed insurgents, many of the difficulties faced by the U.N. mission are similar to the hurdles faced by project managers looking to set up mobile computing environments in remote locations—unreliable power and communications lines that are vulnerable to harsh weather, limited availability of replacement parts and on-site support personnel, and remote users who don't comply with standards and procedures.

But Mayordomo also must deal with the rugged terrain of Sierra Leone—a tropical country slightly smaller than South Carolina that's dotted with forests, swamps and mountains almost 2,000 feet tall. There are few paved roads and only one airport with a paved runway. If computer equipment breaks down in Koidu, there's no running to CompUSA—a replacement has to be flown in.

Mayordomo, a Filipino who originally trained as a mining engineer, was recruited by a U.N. economic-development program in the late 1980s to consult on the use of software he had written to analyze the potential of a mine versus its operational cost. He switched to the Department of Peacekeeping Operations (DPKO) in 1996, after funding for the mining project dried up, and served as a technologies manager to peacekeeping missions in the Republic of Georgia, the Central African Republic and Congo.

In 2000, he was named DPKO's chief of information technology—a title he still holds—and is responsible for computer-vendor and technology choices across all missions. But in June he gave up his New York office for a chance to get back into the field. "When I'm in New York, I put things into effect but never get to see how it's working," he says.

So now he splits his attention between setting DPKO technology plans and overseeing the practical details of keeping the systems in Sierra Leone functioning. While the scale of the mission is smaller, he has the freedom to blur some boundaries, particularly the one between information and communications technology—hard distinctions within the U.N.'s bureaucracy—and focus on technical issues that he feels can make a difference as to whether the peace is

kept in Sierra Leone. He currently is figuring out the best ways to use:

▶ **Voice over Internet Protocol (VoIP) communications.** While DPKO hasn't embraced VoIP on a broad scale, Mayordomo can experiment with it within his own mission. In fact, he thinks it might help solve some of the network congestion complaints from Koidu. By installing a Cisco router capable of transmitting phone calls like data, as Internet packets, rather than using a separate voice communications channel, he hopes to reduce overall bandwidth consumption.

▶ **Wireless communications networks.** Mayordomo thinks wireless can be a key to U.N. rapid deployment since setup is so much faster than for a wired network. He first used the technology after arriving in the Central African Republic in 1998 to find the network in shambles. Cables between buildings were hanging from tree branches—a typical case of technicians improvising a quick setup and never going back to clean up their work. Instead of rewiring, Mayordomo brought in Aironet wireless-networking equipment, back before Aironet was acquired by Cisco.

▶ **Power protection.** Tropical Africa is one of the most lightning-prone areas in the world, subject to more than 200 days of lightning per year. Whether from lightning or an erratic power grid, electrical surges frequently overwhelm the grounding and protective devices the U.N. employs, damaging computer and networking equipment. Mayordomo is looking for solutions. One possibility: dissipation-array technology, which its developers claim can create an electromagnetic shield against lightning.

Power protection, wireless communications, and VoIP are critical to the day-to-day operations at Koidu. Today, in fact, Mayordomo wants to see first-hand how DPKO's existing technology is holding up in the field.

For peacekeeping, the ultimate test of any technology is how well it works on the ground. Mayordomo has made some use of VoIP at UNAMSIL's Freetown headquarters, but putting it in Koidu and requiring it to work over satellite connections is a much more stringent test. And for all his enthusiasm about wireless networking, making it work through Africa's tropical downpours and lightning storms is a challenge.

Mayordomo is traveling to Koidu with two colleagues, Sivabalan Karuppiah and Ambrose Majongwe. Karuppiah, a contractor to the U.N. from Telecommunications Consultants India Ltd., is going to Koidu specifically to address wireless-networking problems. He boards the U.N. helicopter carrying a Panasonic Toughbook ruggedized laptop and a backpack containing a couple of spare Cisco Aironet units to use as a replacement for the malfunctioning wireless communications equipment at the base.

Majongwe, a communications technician from Zimbabwe, boards the helicopter carrying a Cisco 3725 router like a suitcase. In addition to replacing a misbehaving router in Koidu, he hopes to put the VoIP capabilities of this one to the test. First, he has to defend it against the workers who want to pack it aboard as luggage. "No, I need to keep this with me," he says, settling into the last available seat, a fold-down contraption just inside the exit hatch.

When the helicopter rotors work up to speed, conversation becomes impossible. Passengers don earmuffs. Mayor-

domo uses a set of earplugs, saved from a transatlantic flight. Majongwe takes a nap, putting his head down on the router balanced on his lap.

Oct. 29, Eastern Sector Command, Koidu, Sierra Leone

Arriving at the Koidu base, Majongwe takes the Cisco 3725 and goes to work in the cramped server room, promising the base administrator the network connection to the outside world will be down a half-hour at most, while he changes the router.

Mayordomo is ushered into the office of Lt. Col. Sohail Hamid, commanding officer for the Pakistani signal battalion assigned to provide communications support for this U.N. base. Before starting on his list of complaints, Hamid

On a helicopter to Koidu, U.N. communications specialist **Ambrose Majongwe** rests his head on a router

emphasizes that he and his staff are trying to be self-sufficient. "We will try to bother you less. And we are bothering you less," he says.

Still, this sector headquarters is responsible for about 4,000 troops at bases throughout the eastern part of the country and three military-observer teams with 15 to 20 members each. Hamid tells Mayordomo he needs more-reliable network services. In addition to the bad router and malfunctioning wireless-network node, Hamid complains about a backlog of e-mail account requests, lost e-mails and overall network congestion. Hamid can't provide his superiors with the quality of communications they expect if he can't rely on the U.N. network.

Mayordomo has his own agenda for this visit, which includes getting unauthorized computers, users and traffic off the network. Some of the congestion the Pakistanis are complaining about is of their own making, he says.

The Pakistanis have been connecting a lot of their own computers to the U.N. network, which is supposed to be against the rules. As a practical matter, U.N. policy on this point is somewhat conflicted, given that Pakistan's government is paid to provide the equipment its troops require, from guns to computers, rather than relying on the U.N. to equip them. Still, the lack of control concerns Mayordomo. "If, for example, your computer has a virus, you only need

THE **PLAYER** ROSTER

Jason Mayordomo
Chief of Information Technology for the Department of Peacekeeping Operations (DPKO); Communications and Information Technology Director for Mission to Sierra Leone

Mayordomo—a Filipino originally educated as a mining engineer—and his UNAMSIL team oversee the purchase, deployment and maintenance of all computer and communications equipment used by peacekeepers in Sierra Leone. He's also assisting the technology setup that will support the U.N.'s mission in neighboring Liberia.

John McKenzie
U.N. Field Service Officer and Interim Communications Manager
McKenzie, who makes his home in Tasmania on the rare occasions when he's not in the field, supervises radio and satellite operations for UNAMSIL. He also serves as Mayordomo's backup, and oversaw both computers and communications when the information-technology chief recently took a vacation.

Erzen Ilijazi
Networking Supervisor
Recruited to the U.N. in Kosovo, Ilijazi was a key member of the rapid-deployment team that set up the technology supporting the new U.N. mission to Liberia. He also helped install servers and routers in a pair of vans that now serve the U.N. missions in West Africa as mobile data-and-communications hubs.

Aleksandar Ljamic
Systems Supervisor
Another recruit from Kosovo, Ljamic flew to Liberia in early November to correct problems with a finance system that had been installed there as part of the U.N.'s rapid deployment into the war-torn country.

Ambrose Majongwe
Communications Specialist
A Zimbabwe native instrumental in bringing voice over Internet Protocol (VoIP) communications to the command post in Koidu, in the Eastern Sector of the Sierra Leone mission.

Sivabalan Karuppiah
Contractor, Telecommunications Consultants India Ltd.
This network technician from southern India has been called on to sort out problems with Cisco Aironet wireless-networking equipment at the U.N.'s base in Koidu.

Lt. Col. Sohail Hamid
Commanding Officer, Pakistan Signal Battalion, Pakistan Contingent III
Hamid is in charge of communications support at the base in Koidu. While he's trying to make his unit more self-sufficient, he still needs a lot of support from the U.N. and is pushing Mayordomo and his team to deliver better service.

HELPERS

Rudy Sanchez
Chief of Communications and Information Technology for the DPKO
Mayordomo's superior in New York. A logistician who oversees information technology, communications and application development, Sanchez approved the plan to use the Sierra Leone mission to stage a technology deployment to Liberia, even before the Liberia mission was officially approved.

Rolf Sjoberg
DPKO Communications Officer
Sjoberg is Mayordomo's counterpart in the "comms" branch of the global communications and information-technology organization. From the U.N. Logistics Base in Brindisi, Italy, he controls a worldwide satellite network, as well as radio and phone communications.

David Andemicael
Global Account Manager, Cisco
Andemicael has worked to help Mayordomo establish a direct relationship with the network-equipment manufacturer and is helping DPKO get better access to Cisco training and support for its requirements.

one to take down a network or propagate to other devices," he says. "I need a list of devices connected to the network, and I'm going to have to insist that they conform to our networking standards." He doesn't really want to ban all non-U.N. equipment, he admits, because that would put more pressure on him to replace it.

To reduce network congestion, there is some phone traffic Mayordomo would like to get off his network entirely—namely, the "welfare calls" that U.N. soldiers make to their families back home. He is encouraging Sierratel, the national phone company, and other carriers to reestablish service to this region, which would let him tell the soldiers to use the public phone system. The Pakistanis ought to be able to get better rates than the U.N. itself is charging. Hamid is interested, as long as access to U.N. phone lines will remain as a backup.

The Pakistanis also complain about a backlog in requests for IBM Lotus Notes e-mail accounts. But Mayordomo explains those accounts aren't free. He pays $35 for each Notes account and the DPKO is already paying IBM $1.2 million per year. Accounts have been multiplying unnecessarily as military personnel rotate in and out of the mission, without the old accounts being deleted. He needs the Pakistanis to provide a list of inactive accounts as soon as possible, and he wants to move to a system where Notes IDs for the military will be assigned by function and location rather than by the name of an individual. If military personnel want individual accounts for personal e-mail, let them use Yahoo Mail, he says.

But one of Hamid's biggest problems is communicating with a base in Kenema, another diamond-rich town about 50 miles to the south that has seen its share of war and violence. Like the other outposts in the region, Kenema is supposed to coordinate military and military-observer activities with the sector headquarters in Koidu, but electronic communications between the two has been poor. Personnel there can send e-mail, but whenever someone from Koidu tries to write them, the message is delayed or bounces back with an error message.

Mayordomo says he has heard this complaint before. "Remember I told you how to monitor transmission of e-mail, with a receipt for each stop?" he asks one of the junior officers in the room. "That would help us see where the bottleneck is." Maybe messages are being improperly routed to a mail server at headquarters, he says, but that's guesswork—forwarding the error messages would let his staff see the address of each server that handled a piece of mail, which would help them diagnose the problem properly.

The wireless network has also been unreliable, Hamid says, with five of the 14 Aironet boxes used to create the base's wireless local-area network currently out of commission. Some of the locations that have been without network access, such as the officers' quarters, aren't critical, but he wants service restored to an engineering compound and other facilities more critical to the base's operations.

UNAMSIL has experienced other wireless-networking problems. At headquarters in Freetown, palm fronds weighted down by rain blocked an Aironet connection to the heliport. In fact, most of the wireless-networking equipment at headquarters has been demoted to backup status, except for an access point that serves an "Internet café" in the stairwell.

And Mayordomo's own staff has complained about the Proxim wireless bridges he ordered to provide 100-million-bit-a-second wireless connections between the headquarters buildings. One failed to work during storms, even at short range and with the power cranked up. Another proved unable to reach a signal battalion across the bay that should have been well within range.

Mayordomo and Proxim both say the issue must be training, since the same equipment has been used successfully in other missions. Proxim will get a chance to repair its reputation on-site when technical staff come to test a billion-bit-a-second version of its bridges. (See Dossier, p. 50.) Because he has never been able to secure a large training budget, Mayordomo encourages vendors with long-term contracts to bundle training with their products.

But Mayordomo's most immediate problem is the Aironet boxes, wireless bridges used to connect one location with other wireless nodes. He hitches a ride to a nearby engineering compound, where he gets his hands on one of the dead Aironet units. After asking a few questions, he has a good idea of what killed this one.

The Aironet 350 is designed to run off inline power—electric power delivered over an Ethernet connection—much like a telephone that can function on the small amount of current coming over a phone wire. So when a lightning storm whipped up, the Pakistanis apparently thought the device was safe because it wasn't plugged into an electrical outlet. But it was probably jolted by an electrical surge that came over the network connection.

Hamid says his people have been following a directive to unplug equipment during storms. "Still, the lightning phenomenon is so great that sometimes we cannot catch it before the damage is done," he says.

Karuppiah uses one of the spare Aironet units he brought to replace the one that took a lightning jolt. And he is able to get another working again by using his laptop to reprogram it. But he can't fix everything. He will stay over in Koidu so that he can visit some of the other team sites in the region that have reported Aironet problems.

Having equipment burn out is a constant problem. "Bridges, switches and power supplies are consumables for us," Mayordomo says. "When I was in New York, I wondered, 'What, are you eating these for lunch?'" This sector office is the worst because of the intensity of the lightning in the mountains, he says.

He manages this problem by paying Cisco an extra 20% in return for what's essentially a no-questions-asked replacement policy for equipment that burns out within three years of purchase. The replacements he gets aren't necessarily new units, Mayordomo says, "but that's all right—refurbished is good enough."

Mayordomo says he is looking to see what else he can do about lightning strikes. Recently, he read about dissipation-array systems from Lightning Eliminators and Consultants. By discharging charged particles into the air, this technology is supposed to create an electromagnetic umbrella around an area, diverting lightning rather than attracting it like a lightning rod. Lightning Eliminators says Federal Express is using the technology to protect the computer systems powering its shipping hub in Memphis.

Many electrical engineers, however, dispute the science behind dissipation arrays, saying there is no proven way to deflect lightning. They believe Lightning Eliminators customers are protected by the other measures, such as improved grounding, that the vendor installs at the same time. Lightning Eliminators argues its critics are simply narrow-minded. Mayordomo figures the technology is at least worth exploring.

Returning to the base, Mayordomo finds Ambrose Majongwe looking dejected. "My day has been a total waste of time," he laments.

His sole task had been to replace a Cisco 3800 series router with a 3725 that would handle both data and phone calls. But he hasn't been able to get the 3725 to work. "On the bench, back at the office, it was working perfectly well. But it wasn't handling 200, 300 calls an hour then," he says. He keeps getting an error code indicating "IOS Error," meaning a problem with the Cisco Internet Operating System. He is

Mayordomo talking with Pakistani signal battalion officers in Koidu

able to reestablish an Internet connection and download another version of IOS from Cisco's Web site. But that one also crashes, as soon as he reconnects the router to the base's internal network. He downloads yet another IOS version. That crashes, too. "I'm going to have to take it back to the workshop and revive it," he says.

Back at mission headquarters in Freetown, one of Majongwe's colleagues is busy relaying an account of Majongwe's difficulties to Cisco tech support.

Nevertheless, at the end of their stay in Koidu, Majongwe takes two routers on the helicopter flight back—the one he came with and another malfunctioning unit that had been sitting on the shelf. And this time they get stowed like luggage.

Oct. 28, DPKO Headquarters, Freetown, Sierra Leone

The day before Mayordomo is to go to Koidu, he's at the Mammy Yoko Hotel. The place was a luxury hotel back when Sierra Leone was a British colony and a seaside resort. But the pool has been drained of water, and weeds are growing up through cracks in the tennis courts. Vehicles coming in the gates are checked for bombs, and white U.N.

GOTCHA! LIGHTNING STRIKES

Even for organizations back in the U.S., the environment can be hazardous. In 2000, Suncoast Schools Federal Credit Union's data center took a direct hit from lightning. A bolt to a 480-volt utility cable leading into the building vaporized the Tampa facility's electric meter and left the service panel twisted and blackened. But the data center kept running—off a generator. Millions of dollars worth of business could have been lost if the servers and data in that building had been fried, says facilities manager Eric Brendle. Given his investment in a high-end power-protection system cost only about $30,000, Suncoast's experience shows it is possible to protect against even the most severe surges.

PROBLEM: Not all surge protectors are created equal—and a single layer of protection may not be adequate.
RESOLUTION: Deploy high-capacity surge suppressors. Suncoast Federal deployed serious surge suppressors and hired a specialist, Power & Systems Innovations (PSI) of Orlando, to install them. The highest-capacity units installed at the electric service entrance to Suncoast's data center could take a hit of 200 kiloamps—the highest recorded strength of a lightning bolt is about 250 kiloamps, according to PSI. Behind that first line of defense, PSI added up to six layers of suppressors to protect branch circuits and specific data-center equipment. That way, when a surge blew past the first line of defense, there were other suppressors to protect the equipment.

PROBLEM: Surge protectors are only as good as the grounding system to which they're connected.
RESOLUTION: Test your grounding system. PSI president John West, Sr., recommends that the electrical resistance between the grounding wires and the earth in which they are buried should be no greater than 5 ohms, a measure of resistance. If the resistance is too high and can't be lowered by moving the grounding rods, soil additives such as bentonite clay can boost conductivity, he says.

PROBLEM: Surges may be diverted toward, rather than away from, your equipment if provided with more than one path to the grounding system.
RESOLUTION: Ensure your network and electrical systems are designed to provide a single path to the ground from any given point. Segments of your network and power systems that are connected to different grounds should be electrically isolated to minimize the potential for ground loops.

PROBLEM: Surges come across external network cables and telephone wires, not just power lines.
RESOLUTION: Wires strung between buildings can act like an antenna to attract lightning if not properly shielded. Make sure your surge-protection systems cover network and phone lines as well as power outlets. Between buildings, consider using fiber optic connections, which do not attract lightning because they conduct pulses of light rather than electric signals. —D.C.

vehicles, mostly Toyota 4Runners, are parked helter-skelter around a dirt lot.

When the headquarters staff took over the building, the U.N. restored several floors that had suffered bomb damage, but the interior still looks ragged. Mayordomo points out the exposed network wires hanging from the ceiling, then opens up a plumbing and ventilation closet to show how they're strung between floors. On the way out, he shows a conduit containing strands of fiber-optic cables snaking up the pillars on the hotel's back porch, paralleling some older wiring. "It's really quite messy," he admits.

Peacekeeping missions pose unique challenges. Typically, the peacekeepers come in after years of war and destruction of the local infrastructure. Telecommunications and power systems are unreliable, if they're operating at all, so the U.N. must be capable of providing its own power, phone and Internet services.

Downhill from the hotel is a cluster of prefab buildings, constructed from shipping containers stacked two high, with open drainage ditches running between them. Mayordomo has his office in one of these containers. In the adjacent lot, several satellite dishes study the sky from within a fenced area bracketed by another cluster of these containerized offices. One dish mounted on a trailer sits next to a Ford van meant to function as a miniature, movable computer-and-communications center.

Known as the Mobile Data Telecommunications System, the van was custom-built by Frontline Communications, a company that mostly specializes in television-news vans. It carries about $100,000 worth of servers and satellite-communications equipment. A fold-down panel on the outside provides access to power, phone and Ethernet sockets instead of video jacks. On a full tank of gas, the built-in generator provide 24 hours of power.

This van will help UNAMSIL in the event the mission has to evacuate, taking with it a subset of essential information systems. Over the summer, when the U.N. was gearing up for its peacekeeping effort in Liberia, two similar vans were prepared in this courtyard. Once packed with servers and radio-communications equipment, they were flown to Liberia on Aug. 23 and driven with their satellite-dish trailers in tow to Monrovia, the Liberian capital.

This initiative was part of the reason Mayordomo came to Sierra Leone. In addition to promising to straighten out UNAMSIL's technology problems, he told his boss he would prepare a "virtual mission" containing all the technology that would be needed at the beginning of a new mission in Liberia. Even earlier, on Aug. 4, communications specialists from Sierra Leone had gone to Liberia to prepare.

On the wall in Mayordomo's office is a satellite image of the abandoned U.N. facility, a relic of a previous peacekeeping mission, that they targeted as an initial base of operations. Details of the compound are outlined in red, including the satellite dish inside the walls.

Communications manager John McKenzie joins Mayordomo in front of the map to tell that part of the story. "There are a lot of Liberians in Freetown, and we were able to make contact with a woman who lived right here," he says, pointing to the rooftop of a house just down the street. "We had her walk by every day to see if the dish was still intact. Then we went in light, just a couple of guys. We were lucky—all they had to do was pour gas in the generator and find the satellite."

Strictly speaking, there was no mission to support in August. A regional peacekeeping force, organized by the Economic Community of West African States, was active in Liberia, but the U.N. Security Council didn't provide the mandate or funding for DPKO to intervene until September.

Mayordomo's approach to rapid deployment was to have everything ready before the official word came. He had Internet access, Lotus Notes and other basic systems operational in Liberia two weeks before the assessment team arrived. There was even a finance system so the bureaucrats who would be following close behind the soldiers could account for where the mission's money went. All this helped the assessment team complete its work quickly and get the go-ahead for an Oct. 1 mission startup.

"I'm very proud of what we did there," says Erzen Ilijazi, a network-management supervisor who was part of the team that prepared the technology, then flew into Liberia to set it up. UNAMSIL technical staff spent three days setting up 11 servers and configuring about $100,000 worth of equipment on the server racks in the back of each van.

After flying to Liberia, the UNAMSIL technicians took the van by convoy to their destination in Monrovia. "I think we got there about 4 p.m., and we had everything ready by 9 p.m.—that's anti-virus, network, Internet, satellite dish so they can be online, VHF, UHF, mobile communications, all in five or six hours," Ilijazi says.

Despite the professional rewards, Ilijazi didn't enjoy his time in Monrovia. "I saw a lot of people in civilian clothes, guys on the street, walking around with automatic weapons," he says. "I don't like to see that." He had enough of that in Kosovo, where he lived before using a job with the U.N. as his ticket out of the Balkans.

Oct. 31, DPKO Headquarters, Freetown, Sierra Leone

Mayordomo and McKenzie have a Friday-morning meeting with a group of military officers, a review of how well their communications and information-system needs are being met.

As Mayordomo is hustling up the steps leading to the Mammy Yoko, someone asks how his day is going. "Not so good—we're fired up already," he says, meaning the complaints are rolling in. A network segment is down on the fourth floor of the Mammy Yoko, and whenever that happens at least 25 people are affected. He's thinking it has something to do with last night's lightning storm. It's not until much later that he finds out about a recall of the Cisco 3524 switches the mission uses.

The military officers include Pakistanis, Bangladeshis, a Nigerian and a Brit. The group works its way down the

agenda, noting which problems have been solved or partly solved. One of the Pakistanis is from Koidu, and he repeats complaints about the backlog in Lotus Notes IDs and networking failures. Mayordomo recaps his concern about needing to control the proliferation of e-mail accounts. The Aironet issues have been fixed, he says, and the problem router should be replaced today.

McKenzie takes the rap for some recent problems, such as an outbreak of the MSBlaster computer worm. He's here as the communications representative, but filled in as I.T. di-

UNAMSIL is helping to keep **the streets of Koidu** peaceful
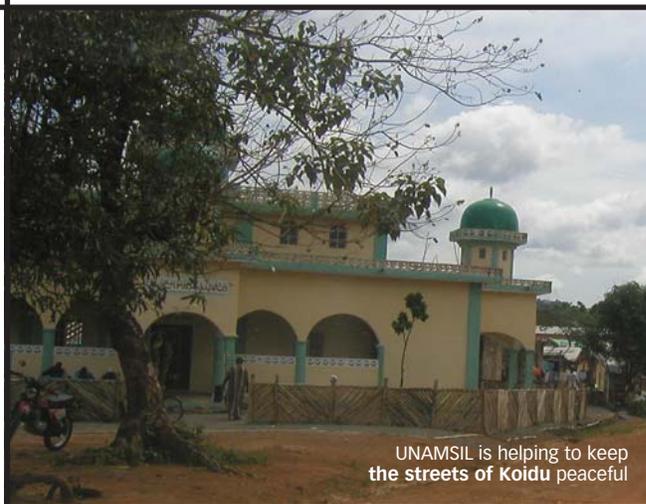
rector while Mayordomo was on a recent vacation. "And I can't spell I.T.," he says, repeating a favorite catchphrase. "When we got a virus, I ran for the med kit."

Putting on his comms hat, however, McKenzie argues the network is congested partly because some of the regional sites, including Koidu, are overloading it. Just as Mayordomo had noted unauthorized computers on the Koidu network, McKenzie has noticed a proliferation of phones. The Pakistanis must prioritize which phones really need trunk lines with dedicated connections, he says.

As the meeting is breaking up, the British officer, Lt. Col. Ian McKend, pulls Mayordomo aside to talk about the unreliability of document sharing over the network. When the commanders come in at 6:30 a.m., all the military and military-observer reports from the field that they need to condense into situation reports for the daily briefing are supposed to be at their fingertips. But when something goes wrong—for example, when the shared network drive where those reports are stored is slow or unresponsive—there's no one around from I.T. to help.

Although the help-desk staff doesn't get in until 7:30, Mayordomo tells him there's always someone designated to be on call. This is news to McKend, who scribbles down the pager number saying, "This may be a big part of the solution right here."

"And let me know if there's any reluctance to come in," Mayordomo tells him. "If it's, 'Can't it wait?' or 'I'll be there in a couple of hours'—no, not good enough. They're supposed to come right in."

Mayordomo spends much of the rest of his day trying to finalize plans to visit Liberia and see how the rapid deployment of technology he arranged for the new mission there has panned out.

At dusk, when his staff assembles for barbecue and beer on a wooden deck out by the satellite farm, Mayordomo spots Ambrose Majongwe, just back from a return engagement in Koidu.

"Ambrose!" he shouts. "Is VoIP working in Koidu?"

Majongwe isn't ready to celebrate just yet, though it was working when he left. "Let's just wait until Monday, OK?"

It turns out that when Majongwe tried installing several alternate versions of IOS, he was attempting to solve the wrong problem. The router operating system crashed because it didn't have memory allocated properly for the hardware that had been installed, not because it was the wrong operating system.

At last report, the new router was still working in Koidu, handling both data and phone calls as Internet packets. Yet Mayordomo says network congestion on the link to Koidu remains a problem—perhaps other traffic has rushed in to grab whatever bandwidth was freed up.

Cisco's global account manager to the U.N., David Andemicael, says he believes the technicians in Sierra Leone and throughout DPKO need better training to be more successful with Cisco technology. "We're now providing them with a lot of courses we usually charge for," he says.

Majongwe's misadventures with the 3725 router in Koidu prove the point, since he skipped the crucial memory-configuration step, Andemicael says. "It's not trial and error, the way they tend to want to operate."

Nov. 1,
En route to Liberia

It's taken Mayordomo all week to secure his Movement of Personnel sheet, an official form that says he's entitled to a seat on the 10 a.m. flight to Liberia. But when he gets to the heliport Saturday morning, the travel staff immediately informs him the flight has been changed to 11. So after the chopper flight to the airport across the harbor, he spends most of the time in the waiting room on his cell phone trying to secure passage back on a 4 p.m. cargo flight rather than the passenger flight at 2. Otherwise, there won't be time to do or see much of anything in Monrovia, which is typically a 45-minute drive from the airport.

Monrovia still lacks electric power and running water, and if he doesn't come back tonight, the next flight isn't until Monday.

Systems supervisor Aleksandar Ljamic, who is also traveling to Liberia today, doesn't have the luxury of making this a day trip. Ljamic, another international staffer recruited out of Kosovo, wears a pea-green shirt that reads "United

ROADBLOCK: WHO'S IN CHARGE?

THE OBSTACLE

With information-processing and networking equipment converging at a quickening pace, deciding whether a technology should be handled by a computer department or a communications unit is a sticking point for many organizations.

Within the U.N., for example, there's long been a division between the "comms guys" and the "I.T. guys." Jason Mayordomo, information-technology chief for the U.N.'s Department of Peacekeeping Operations (DPKO), decides what computer and local-area network technologies should be adopted across all U.N. peacekeeping missions. Rolf Sjoberg, the DPKO's communications chief, oversees phone and radio communications as well as satellite operations.

So who takes charge of voice-over-Internet-Protocol (VoIP) technology, where phone calls are routed as Internet data packets? And who should oversee wireless networking, where Internet packets are sent via radio? And if one thinks a particular computer or communications technology offers a better solution to a particular problem, how does he convince his counterpart that it should be adopted by the entire operation?

THE RESPONSE:

Combine the functions for particular projects: In Sierra Leone, the U.N. has asked Mayordomo to oversee both computers and communications. This provides him with an opportunity to get his hands dirty with the latest communications devices and experiment with new networking technologies.

Prove your point: Mayordomo believes Internet voice communication promises more efficient use of bandwidth, but he has yet to convince Sjoberg that it can match the voice quality of a traditional phone connection. One way for Mayordomo to make a case for his ideas is to deploy his own Internet voice equipment out in the field and record the results for presentation back to Sjoberg.

Break down divisions: Mayordomo encourages the information-technology staff to get training on basic radio fundamentals and learn how to climb transmission towers like their communications counterparts. Meanwhile, the comms guys are learning more about Internet protocols, a digital technology.

Don't be afraid to laugh: In Sierra Leone, Mayordomo and the mission's interim communications manager, John McKenzie, tease each other on the virtues of computer technology versus communications. As McKenzie puts it, "I.T. guys want to stay up all night playing with their toys. A comms guy just wants to put the equipment in, go down to the bar and have a beer." —D.C.

Colors of Benetton." He will be staying at least a few days to troubleshoot the financial software the UNAMSIL computing team installed as part of its rapid-deployment effort.

On arrival at Robertsfield airport in Liberia, Mayordomo learns that there will be no 4 p.m. cargo flight today. Worse, immigration is taking forever processing his passport. He finally pins down the man responsible for procuring transportation. Will there be time for even a brief visit to Monrovia? "My drivers are very fast," he's assured.
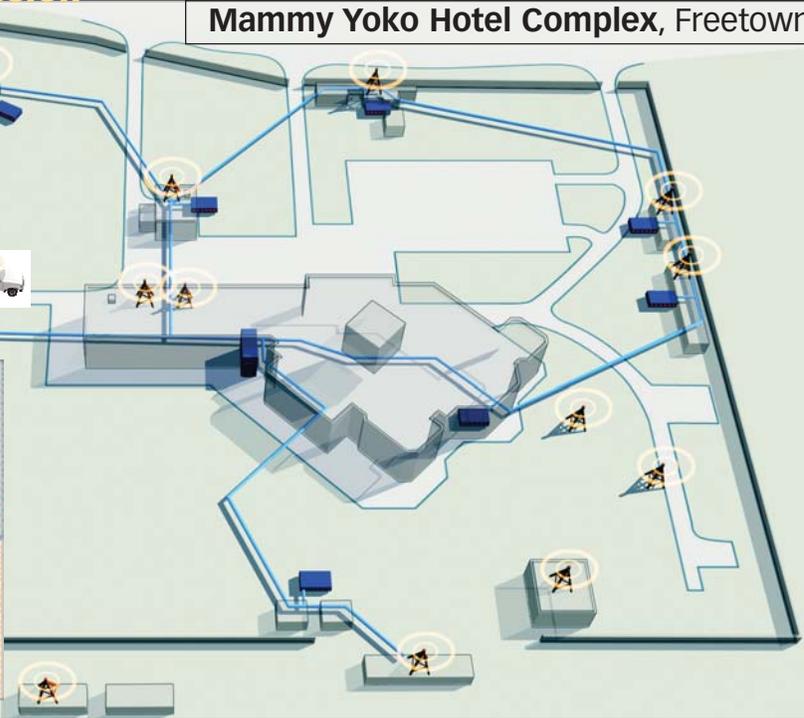
PROJECT PLANNER
YOUR BACKUP PLANS CALL FOR A DATA CENTER ON WHEELS. HERE'S HOW TO GET ROLLING (SEE FOLDOUT).

Moments later he's in a white U.N. minivan roaring down a long, reasonably straight two-lane road. The speedometer reads 110 kilometers per hour, sometimes ►►

United Nations On a Mission

The U.N. mission in Sierra Leone has equipment at various sites around the country to support its peacekeeping operation. Here's a look at some of the technologies deployed to the outposts mentioned in this story. *(Dollar figures are estimates.)*

Mammy Yoko Hotel Complex, Freetown

TECHNOLOGY	SIERRA LEONE	ALL PEACE-KEEPING
Routers and switches Currently deploying Cisco 3700 series routers with voice-over-Internet-Protocol (VoIP) support, replacing existing 3800 series routers. VoIP should free up bandwidth by creating a more-flexible division between phone and data traffic. Several other Cisco router and switch models are used, including Cisco 3500 series for local-area network traffic.	$530K	$25.0M
Wireless access points/bridges Cisco Aironet 340 and 350 series; beginning to deploy 1200 series with 802.11g support and backward compatibility to 802.11b. The wireless bridges are used to establish network connections between buildings without the need for wiring, while the access points are for use within a building (for example, an "Internet café" in the stairwell of the Mammy Yoko Hotel).	$380K	$6.5M
Broadband wireless bridges Proxim Stratum 100, a 100-megabit model, at UNAMSIL headquarters in Freetown, with plans to deploy a gigabit version, Proxim's Tsunami 480, to a disaster recovery site. The Stratum 100s at UNAMSIL headquarters serve as a backup to the fiber-optic network that runs between buildings at the compound.	$180K	$3.2M
Ruggedized servers Primarily Hewlett-Packard DL-380s and ML-530s, customized with extra cushioning. Major applications run on the ML-530s, while the DL-380s are useful for lightweight applications such as Web servers, user authentication, at remote offices and for rapid deployment.	$650K	$18.0M
Server racks Hewlett-Packard model 10642 racks, customized to be shipped with servers and cabling in place. They also come with extra fans to keep servers cool and to blow away dust.	$40K	$1.8M
Ruggedized laptops The U.N. gives Panasonic Toughbooks to some remote workers, such as military observers, as well as communication and information-technology field technicians.	$80K	$1.4M
Secure document management Hewlett-Packard's Digital Sender 9100C transmits document images over e-mail, making better use of limited bandwidth than a fax, which requires a phone connection. Widespread use of encrypted Digital Sender transmissions is allowing the peacekeeping organization to scale back its use of the traditional diplomatic pouch delivered by a courier. This category also includes Fujitsu scanners, as well as tape libraries and storage area networks.	$280K	$2.5M
Enterprise e-mail The mission uses IBM Lotus Notes, but is trying to control the growth in new Notes user accounts. Used for administrative communications within headquarters and between headquarters and outposts such as Koidu.	$140K	$1.2M
Mobile Data Telecommunications System Ford van custom-built by Frontline Communications carries servers and satellite-communications equipment. One van on standby for disaster recovery in Sierra Leone; two deployed to Liberia to assist with mission startup.	$350K each	

OTHER: ▲ **Satellite equipment**   ■ **Radio equipment**

TOTAL TECHNOLOGY BUDGET FOR U.N. IN SIERRA LEONE*

	COMMUNICATIONS	INFORMATION TECHNOLOGY	TOTAL
2003-2004	$6.64 million	$2.77 million	**$9.41 million**
2004-2005	$3.80 million	$1.24 million	**$5.05 million**

ILLUSTRATION BY GARRY MARSHALL

sneaking up to 120 (about 75 m.p.h.). The roads here are much better than in Sierra Leone. Still, the driver zigzags around deep potholes, honks his horn to scare pedestrians off the roadway, and passes cars, veering back into the right lane just in time to miss oncoming vehicles.

Despite the speed, it's 1 p.m. by the time Mayordomo arrives at the German Embassy building DPKO has taken over. He should be returning to the airport already. Still, he finds the person responsible for arranging transportation on this end and bargains to be allowed 15 minutes.

He had hoped to see the mobile data van at work here, but it's gone. It had been moved to this location a few weeks into the mission, but apparently it's been moved again. The van is only meant to act as a data and communications hub for the first 30 to 90 days of a mission, at most, and the U.N. is starting to settle into more permanent quarters. The trailer-mounted satellite dish that the van brought is still here, now connected by cables leading into the building.

Inside, Mayordomo darts upstairs and finds the equipment room. But there's no one here to talk to. Servers and communications equipment are piled on the floor. He's turning to leave when a burly U.N. official pokes his nose in. "Gentlemen, how's our comms and I.T. setup?" he asks, puffing on a big cigar.

Pleas for peace
line the roads in Liberia

Mayordomo explains he's a visitor from UNAMSIL who worked on the rapid deployment. "Now, we need to get some racks in here," he adds. "It's not good to have this stuff lying on the floor."

"All I know is when you punch '9' you get a New York dial tone," the man says, referring to the way the U.N.'s satellite network can patch calls into the phone system at the headquarters building in New York City. "I think that's pretty good."

Two days later, the cigar smoker turns up on a video documentary produced by DPKO public relations that's playing in the lobby of the Mammy Yoko: Jacques Klein, U.S. Air Force Major General (retired) and former Defense Department and State Department official, now serving as the Secretary General's Special Representative to Liberia. He's best known for playing a similar role in Bosnia and Herzegovina.

But at the time, Mayordomo doesn't recognize him—which is good, because if he had stopped to talk he would have missed his plane.

DOSSIER: PROXIM CORP.

LOOKING FOR NEW CONNECTIONS

By any measure, 2003 was a breakout year for many wireless-communications companies. For Proxim, it was a year of trying to put the pieces back together.

Proxim replaced its chief executive officer, closed two out of three manufacturing facilities, and cut its workforce in half—to 330 workers. The wireless local-area network equipment company also continued a string of losing quarters—for the second and third quarters of 2003, it lost a total of $84 million on revenue of $70 million.

Meanwhile, other wireless-communications vendors saw unit sales increase. In the third quarter alone, wireless-hardware unit shipments were up 22% over the previous quarter, according to market watcher In-Stat/MDR.

So if wireless is going gangbusters, why does Proxim continue to post losses?

Analysts say the company's challenges include the fact that wireless networking has become a commodity and that, unlike many competitors, it doesn't have a wireline offering. "[Wireless-equipment] prices have just plummeted, so there's not a huge profit margin—and there's no significant differentiation between the players," says Tim Scannell, president of Shoreline Research, a research and consulting group. For instance, wireless access points, which connect wireless devices to a wired network, cost as much as $500 two years ago but now go for about $150.

Ken Haase, Proxim's director of product marketing, acknowledges that margins are getting squeezed, and says the company has staked its future on "convergence": seamlessly uniting wireless voice and data transmissions from outdoor to indoor networks.

THE COMPANY

HEADQUARTERS: 935 Stewart Drive, Sunnyvale, CA 94085

PHONE: (408) 731-2700

TICKER: WMUX (NASDAQ)

URL: www.proxim.com

EMPLOYEES: 330

BUSINESS: Offers wireless-communications equipment for local- and wide-area networks.

FOUNDED: 1979 (as Western Multiplex)

MAJOR INVESTORS: Warburg Pincus and Broadview International jointly own 25% (with options to increase their ownership stake to 58%).

TOP EXECUTIVE: CEO Frank Plastina was most recently with Warburg Pincus; he spent 15 years at Nortel Networks.

FINANCIALS: Revenue of $109.9M; net loss of $97.7M (first nine months of 2003).

MAIN PRODUCTS: Orinoco access points and gateways for indoor use; **Tsunami** bridges to connect multiple buildings.

MARKET SHARE: 8.9% of the $1.8B enterprise market for wireless local-area network equipment (Synergy Research Group, 2002).

COMPETITORS: Cisco Systems; D-Link Systems; Symbol Technologies; 3Com.

PROXIM CORP. OPERATING RESULTS*				OTHER FINANCIALS**	
	2003FYTD	2002	2001		
Revenue	$109.89M	$144.66M	$105.73M	Total assets	$131.07M
Gross margin	-0.20%	33.40%	47.14%	Stockholders' equity	-$47.05M
Operating loss	-$88.48M	-$236.54M	-$31.09M	Cash & equivalents‡	$13.60M
Net loss	-$97.69M	-$239.85M	-$25.60M	Long-term debt	$1.18M
Net margin	-88.90%	-165.80%	-24.21%	Shares outstanding	121.32M
Earnings per share	-$0.81	-$2.33	-$0.44	Market value, 1/13	$294.48M
R&D expenditure	$19.03M	$45.26M	$25.51M		

*FISCAL YEAR ENDS 12/31; FYTD REFLECTS RESULTS FOR FIRST NINE MONTHS OF 2003; 2001 REFLECTS COMBINED RESULTS FOR WESTERN MULTIPLEX AND PROXIM INC.

**AS OF 9/26, EXCEPT AS NOTED
‡ INCL. SHORT-TERM INVESTMENTS

SOURCES: COMPANY REPORTS, EDGAR ONLINE

That plays to the company's strength. **Proxim is an amalgam of three wireless-equipment vendors.** In March 2002, Western Multiplex, a supplier of inter-building wireless-networking products, acquired Proxim Inc., a struggling provider of wireless gear for consumers and businesses. The combined company took Proxim's name, then in June 2002 purchased the Orinoco line of adapters and access points from Agere Systems.

The reborn Proxim Corp. tried to cherry-pick the best equipment of its forebears, and now offers customers both indoor and outdoor wireless gear

also relied on a single controller component; if that went down, so did every unit in the network. **But around that time, Proxim began offering the Orinoco units, which Simpson says are more intelligent and fail-safe—** a crucial consideration, because the availability of the network (and the medical data flowing over it) directly affects Baptist's patient care.

"Even when the [wired] network went down, the wireless segment has never gone down," Simpson says. "It's one of the most stable systems we've ever had."

Wireless networking has rapidly become a commodity. 'The prices have just plummeted, so there's not a huge profit margin—and there's no significant differentiation between the players.'

that conforms to Wi-Fi, the industry's term encompassing the 802.11a, b and g wireless-networking standards.

Some organizations have overcome hesitation to embrace Proxim's offerings. At the Berklee College of Music, for example, director of networking and telecommunications Roy Galang says the school has deployed just half of its planned 200 access points because of early concerns about complexity that soon proved unfounded. **"We didn't know how easy this would be,"** Galang says of Berklee's Proxim implementation.

The Baptist Health System of East Tennessee started using Proxim Inc.'s RangeLAN2 wireless products six years ago and is in the process of switching over to Orinoco access points.

Rick Simpson, the hospital group's senior system specialist, says he briefly looked at upgrading to Proxim's now-discontinued Harmony line of access points, but those units, he says, were "dumb": They couldn't be individually programmed or maintained. They

Proxim's next major technology hurdle is Maestro, a project being developed in conjunction with Motorola and Avaya. Due to be rolled out this year, Maestro is supposed to deliver uninterrupted outdoor-to-indoor cellular phone service over a secure, proprietary network.

But all of Proxim's product developments have been in the wireless space. **And market watchers say the company is at a strategic disadvantage to major competitors because it doesn't sell wireline networking systems such as Ethernet switches.**

According to Gartner analyst Ken Dulane, many enterprise customers want their wireless setup to be an extension of their core wired network instead of assembled parts. "That gives a big leg up to the incumbent vendors," Dulane says, "and Proxim doesn't have a business in that area."

It also doesn't have the profits of larger, healthier competitors like Cisco, which recently posted year-end net income of $1.1 billion. —JOSHUA WEINBERGER

THE TECHNOLOGY

WIRELESS NETWORKS IN THE WORK- place typically have a maximum range of only about 300 feet. So what can a technology department do to extend its network's reach, short of new wire?

Proxim's answer to this riddle is to let its Orinoco access points act as "repeaters" that catch and resend wireless transmissions in a point-to-point fashion, like a cutoff man relaying an outfielder's throw to home plate. That allows a wireless local-area network to extend into areas without Ethernet wiring, such as an open parking lot.

The key is to avoid signal congestion, so the Orinoco access points have a dual-slot configuration, which allows them to simultaneously send and receive signals. Like the "In" and "Out" doors of a busy restaurant kitchen, the two slots function independently: A departing packet of data isn't hogging the only point of entry as another packet comes whizzing by. Instead of needing to wait, the arriving data comes in through the second slot.

A different approach—promoted by Cisco, Intel and others—is a "mesh" wireless network architecture in which multiple nodes act as routers, relaying data to their nearest neighbor. Proxim, however, points out that this multipoint design is apt to function less efficiently than its own point-to-point repeaters. That's because in a mesh, many nodes are contending for the same spectrum, and that interference degrades overall performance.

—JOSHUA WEINBERGER AND TODD SPANGLER

REFERENCE CHECKS

BERKLEE COLLEGE OF MUSIC
Roy Galang
Dir., Networking and Telecommunications
(617) 747-2048
Project: Along with five Tsunami QuickBridges, the Boston school has plans for as many as 200 Orinoco access points (APs) for faculty and student use.

VERIZON COMMUNICATIONS
Michael C. Bolduc
Dir., Products and Services
(972) 465-5500
Project: Telecom company's broadband unit had nearly 500 Orinoco 2500s installed in New York payphones for public Internet access at the end of 2003.

BAPTIST HEALTH SYSTEM OF EAST TENNESSEE
Rick Simpson
Senior System Specialist
(865) 632-5873
Project: Knoxville-based regional hospital group has 250 Proxim APs, from six-year-old RangeLAN2 units to new Orinocos.

HIGH PERFORMANCE WIRELESS RESEARCH AND EDUCATION NETWORK
Hans-Werner Braun
Principal Investigator
(760) 788-6687
Project: University of California facility has deployed about 20 Tsunami bridges to connect rural areas of San Diego County.

VAIL RESORTS
Vicki Silvera
VP, Information Technology
(970) 845-2590
Project: Luxury-ski-resort operator used Proxim for a handheld wireless system several years ago, but has since switched over to equipment from Symbol Technologies.

UNITED NATIONS DEPT. OF PEACE-KEEPING OPERATIONS
Jason Mayordomo
Chief of I.T.
mayordomo@un.org
Project: Has deployed Proxim units in war-ravaged countries, such as Sierra Leone, where wireline systems would be impractical or impossible.

▶▶ Hopping aboard the pickup that will take him to the airport, Mayordomo asks the driver, "Can you fly?" So the ride back reaches speeds of 130 k.p.h., which is more than 80 m.p.h. and way too fast for this rural road.

The driver is Liberian, and Mayordomo asks him a little bit about exiled president Charles Taylor. "Do you want him back?" Mayordomo asks.

"No!" shouts the driver.

Mayordomo reaches the airport just in time to race across the runway and board the plane by running up the cargo ramp, climbing over suitcases and squeezing around a veil of netting to get to the passenger compartment.

Nov. 3, The restaurant at the Hotel Bintumani, Sierra Leone

All week long, colleagues and public affairs personnel have been warning Mayordomo about things he shouldn't talk about with a reporter. But for the most part, he has been content to show his operation warts and all.

"I haven't tried to filter," Mayordomo says. "You've seen the firefighting, the tap dancing." One measure of success is the volume of complaints pouring into his office. "If it's escalating, then I'm losing control," he says.

In the big picture, he thinks he is making progress. Where U.N. procurement rules used to prohibit direct contact with vendors, as DPKO I.T. chief he has been able to establish long-term contracts with key vendors like Cisco and Hewlett-Packard that allow for more open communication. "How can they understand the way we operate, the way we do business, if we don't sit down with them face-to-face?" he asks.

But as UNAMSIL's technology leader, he is still struggling with the basics, like getting better performance from his help desk. The issue is personal for him because many mission officials have gotten in the habit of calling him directly instead. Just this morning, he was on the phone with someone who called to complain about a network slowdown.

"Do you have the 24-hour pager number for the duty technician? You're laughing, but this has been published since I got here," he told the caller. "Do you want the number or not? When you call me, I in turn call the help desk, so you're just prolonging the circle."

Ultimately, the communications and information-technology organization needs to learn to function more like a business, he says. "If someone is not performing, get rid of them. If the equipment is not working, pull it out." There ought to be service-level agreements so the "customers"—the military and civilian constituencies within DPKO—have some guarantees about the reliability of the network and of the technical support behind it.

DPKO needs to move away from improvising so much and to start planning better, particularly in terms of providing the technical manpower to support the rapid deployment of a mission, not just the equipment. He sees the pattern playing out again in Liberia, where the absence of a self-sufficient technical staff meant that he had to send in one of his people to fix a relatively simple configuration issue with the mission's financial software.

But, as difficult as it may be to set up shop in regions of the world torn apart by war, coups or other violence, it is even harder to settle into such a locale and reliably deliver and maintain network services throughout the life of a peacekeeping mission.

"We're able to start up quickly, but we're not able to sustain it," he says. "New deployments of missions are always chaotic, but that doesn't mean we should just accept it. It's not the first time we're doing this. We've been doing this for years." ◀
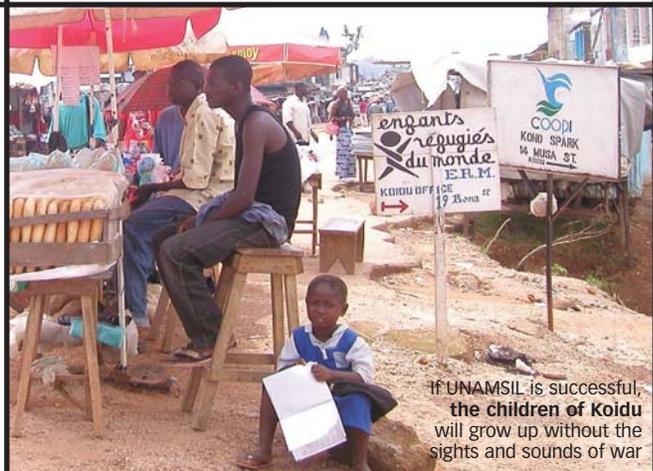
If UNAMSIL is successful, **the children of Koidu** will grow up without the sights and sounds of war

HOW RELIEF AGENCIES HOOK UP FROM THE FIELD

CARE and Catholic Relief Services find ways around local network impediments

BY DAVID F. CARR

Catholic Relief Services, CARE and other relief agencies working in remote parts of the world depend on communication and information systems to do their charitable work. The agencies need to coordinate personnel, reorder supplies, and report problems and progress back to their home offices. But often, simply securing a phone line in a developing nation presents a major challenge.

Not only do local telecommunications services tend to be scarce and unreliable, but local governments can thwart alternative solutions, such as satellite-based services, with tight access controls and onerous licensing fees—even for organizations trying to aid their people.

Yet both Catholic Relief Services and CARE have found ways to work around regional obstacles. Through the use of locally based communications providers or technologies such as voice over Internet Protocol that bypass the local, regulated communications grid, the agencies are setting up the networks they need to help deliver food and medicine to the war-torn and famine-plagued corners of the globe. For a look at how they do it, go to WWW.BASELINEMAG.COM/JAN04.