

## **A Costa Rican experience**

By Jeff Stanhope

### **Costa Rica: An Overview**

#### **Geography**

Costa Rica is a very small country, only 51,100 Km<sup>2</sup> in size. To compare, the Yukon Territory is 482,443 Km<sup>2</sup>. That means you can fit nearly 10 Costa Rica's into Yukon's land area, or almost 20 times into BC! Costa Rica is only slightly larger than Vancouver Island's 31,000 Km<sup>2</sup>. However, if Costa Rica was "flattened" to get rid of its hills and mountains, it would be far larger — and it is the ruggedness of this terrain that makes it so difficult to provide adequate radio coverage.

#### **The People and the Economy**

The population of Costa Rica is approximately four million people; population growth has slowed somewhat in recent years to 1.4 per cent. Costa Rica seems well on its way to becoming a so-called "first world" country with a fairly strong economy, a generally well-educated public, and other factors, such as a long series of representative and stable governments with strong health and social-service institutions. The tourism industry is a large part of the economy, growing at 15 per cent a year with over one million visitors last year.

#### **The Environment**

If you have read the recent bestselling book *Collapse* by Jared Diamond, or listened to Ronald Wright in his 2004 Massey Lecture series, you would appreciate the possible negative implications of having such a small land base with population and development pressures. In *Collapse*, there are many examples of good long-term planning, such as in the Dominican Republic, and examples of short-term, or no planning, such as with Haiti.

The people of Costa Rica knew early on that they had little or no buffer (in terms of a large land area) to stave off habitat and natural-resource destruction from short-term political goals and special interests. They realized that, without land resources, there is not much else to bank on. In the long run, this self awareness led to Costa Rica instituting some very progressive long-term environmental policies, environmental education and, most importantly, actual enforcement. As a result, Costa Rica has created over 1.3M hectares of protected areas — about 25 per cent of the country's total area.

Thus, much of the old unsustainable ways of farming — the clearing of virgin forests followed by grazing cattle — are no longer encouraged or even tolerated. Of course, this was not very popular with those who are left without work in rural areas. However, with a good safety social net, and plenty of public education about the importance of the environment to future generations, it has become a successful strategy.

It is also important to note that the preservation of forests, marine parks, water resources and animals in Costa Rica is good not only for the people of Costa Rica, but also for the rest of us around the world. We will all come to depend more and more on worldwide animal and plant biodiversity with large areas of protected marine and forest environments.

There is a strong commitment by Costa Rica to make a difference — they just need better tools to get the job done. With support, partnerships, and best-practice sharing with other nations like Canada, they will get what they need to make a difference for all of us.

The telecom project I'm involved with is important, as it will support Costa Rica's efforts to sustain and professionally manage these ecosystems. While here in Canada we take it for granted that our forestry personnel, to cite one example, have the right tools to be effective and efficient caretakers of the forests, this is not the case in Costa Rica. This project will help the government adopt 21<sup>st</sup> century field management and administrative practices.

### **Overview of the Communications Project for Parks Staff in the Nicoya Peninsula**

The Nicoya Peninsula is in the northwest portion of Costa Rica and is the district administrative area for the *Area de Conservacion Tempisque* (or ACT), which is part of the Ministry of Environment and Energy or *Ministerio de Ambiental y Energia* (MINAE). MINAE has 11 such district areas throughout the country from the Caribbean to the Pacific Ocean. Together these comprise the *Sistema Nacional de Areas de Conservacion*, or SINAC.

ACT (which comprises all of the Nicoya Peninsula) is about three to four hours from San José and has about 20 protected areas, in small pockets. The regional head office for ACT is in the town of Nicoya. Situated along the Pacific coast and nestled within various valleys, ACT administers multiple protected areas and offices. Although these mountains and valleys are very beautiful, they do make it impossible to provide VHF radio communications without using multiple linked VHF radio relay stations (repeaters) at strategic hilltops.

Like any park or national protected area here in North America, each reserve is unique but all share the same enforcement themes for parks field staff — stop poaching of wild animals, and general habitat protection (including wild-land fire suppression in some dryer areas.)

Currently there is very little in the way of radio communications for ACT staff. Personnel using a radio here can only expect to have short-range conversations. MINAE own and operate three VHF repeaters on the mainland, but these provide only incidental, fringe coverage, and then only along the eastern side of the Nicoya Peninsula. Since ACT does not have its own network of repeaters, more than 90 per cent of its administrative area is without any radio system coverage.



## A Trip Diary

### Tuesday, January 10

I arrived in Costa Rica on January 10, 2006, loaded to the absolute max with radio equipment. Most of this equipment — such as a few regulators, some cables, and a solar panel — was donated by the BC Forest Service in Victoria, and some from the Yukon. However, this was all delayed by the Costa Rican customs soon after getting off the plane despite all sorts of official letters being sent to their own customs from MINAE beforehand. After customs was finished with me, I was met at the San José airport by another Canadian, Eric Allen, and together we comprised the volunteer “Team Canada” communications group. Eric helped out, as he is fluent in Spanish.

A MINAE official, Mauricio, who drove us to the Nicoya Peninsula, met us at the airport. The paved road to get from San José to the Nicoya Peninsula was actually quite good, in comparison to most roads in Costa Rica.

### **Monte Alto Reserve (and education centre)**

The first place we were housed in was typical of the many parks where you can, for a small fee of about US\$10/day, stay in parks-owned facilities, and also get fed the standard Guyo-Pinto, or rice and beans. Here at Monte Alto we had separate rooms but no hot water for the showers —

perfect for waking up quickly in the morning. Monte Alto is a beautiful setting, surrounded by large trees, and crisscrossed by many nature trails. There are also classrooms where children are educated on various aspects of the natural environment.

### **Wednesday, January 11**

After getting only a little sleep due to some very loud howler monkeys — who sounded like 500-pound animals just outside the door — we headed off to our first meeting. (These monkeys, by the way, are actually quite small, only three to five pounds, but they pack a good wallop.) The morning was spent in a planning session and, in the afternoon, we visited the first two possible radio sites. Our driver that day was Mario, who actually looked just like Super Mario of the video game fame.

### **Monte Alto Site**

The first proposed site we visited was on Monte Alto, very near to the parks preserve where we spent the night with the unpleasant howler monkeys. A repeater at this site would primarily provide a local communications drop for the Monte Alto parks staff. The site is comprised of a nice “Mirador” or lookout, but there is no hydropower or suitable building or tower to securely house a repeater.

However, we made one interesting discovery on this first day of the project: On the mirador, there was a sign saying that Canada had loaned Costa Rica some funds and that the re-payment had been forgiven. In order for Canada to write this off, the money had to be used for habitat protection and the land. The Monte Alto Reserve was purchased using these funds. We thought it a good sign for the start of the mission.



*The Mirador at Monte Alto. Note the sign that credits Canada’s contribution.*

On the way back, the park ranger gave me a piece of what used to be an ancient, native hand-carved bowl with legs. This was carved from rock, is apparently extremely valuable now, and was also prized by their owners hundreds of years ago. This bowl was used to mash nuts and other food stuff in meal preparation and was often buried with the loved ones who used them. I left this piece behind, on a tree at the site. In telling this story, the park ranger also related how the first people were treated by the Spanish who first arrived in 1502.

When the Spanish Conquistadors arrived, along with the Franciscan monks, concepts such as indigenous rights or land claims were unthinkable. No regard was given to the indigenous people and many aboriginal communities were destroyed by diseases, neglect and, in many cases, outright murder. In one such case, native people were taken out into the ocean by the Conquistadores and dumped overboard. Although one or two enclaves survived for a time, today there are no longer any native people of any great number in Costa Rica directly descended from the early first people, such as those who still exist in places like Panama.

## Cerro Azul

The next place we visited was Cerro Azul. Cerro Azul was the site of a former US radar installation built in the early 1990s to help track drug traffickers on the ocean, but it was abandoned after only some five years of operation. Looking at the site, it's quite clear it would have cost several tens of millions to construct.

This site is the highest on the Nicoya Peninsula at approximately 3,400 feet and has hydropower. It offers very good VHF drop converge as well as abundant UHF linking abilities to the rest of the ACT. If MINAE could gain access to this site, it would be the main "hub" location, with a repeating UHF hub and a local VHF drop. The only drawback is that in the rainy season the environment inside the former radar "golf-ball" dome is rather musty, leading to bad equipment corrosion problems.



*The Cerro Azul abandoned radar site.*



*An abandoned Motorola MSR2000 VHF repeater and a Sinclair Q2330E duplexer — both reduced to "rust balls" and no longer serviceable after 10 years in the Azul environment.*

That night we returned to the facility at Monte Alto around eight pm. The access gate was locked so we walked the last 500 metres in pitch-black conditions. If we didn't already know the loud huffs that a Howler Monkey makes, it would have scared the pants off us. Their throats must have evolved to the point where they no longer get hoarse.

**Thursday, January 12**

## **Vista el Mar**

The next day we permanently vacated the Monte Alto premises, leaving the howlers to their devices, and drove into the town of Nicoya, to the ACT head office.

After visiting the office, we were off to visit another mountain as a possible repeater site. Along the way we stopped at a house where they were making an alcoholic beverage from a certain kind of palm tree. Basically, the palms are cut down, left on the ground, and notches cut into them. A sap comes forth to fill the notch, where it is left to ferment. This sap is later filtered and poured into used plastic two-litre pop bottles. I had a glass, in order to be polite (but also knowing the fermentation process would probably kill any nasty things). It was actually not half bad, although I declined further glasses.

The first possible site location we visited that day was an abandoned cement hut on Vista El Mar — ideal for the requirement at hand. It even had power available, although it was “currently” disconnected.

The other site along the Vista el Mar ridge is ICE’s (*Instituto Costarricense de Electricidad*). This company is the main power and telephone company in Costa Rica. The ICE property may be a good site choice since there is power and an antenna tower.



*Eric with a now “spare” 210C-4 from the abandoned MSR-2000 repeater.*



*The abandoned cement hut on Vista el Mar.*

Since MINAE is a government department, they may get the install and tenancy for free.

Here, we also found a grasshopper that was about five inches long. On the way back to our next living quarters, Barra Honda, we came across more of the dreaded howler moneys, plus some very large ant hills, about 4 feet high and 8 feet across, but with no ants in sight.

## Barra Honda Reserve

After this, we drove to Barra Honda, which proved to be our hacienda and base of operations for the rest of our visit to ACT.

As at the Monte Alto reserve, there was a friendly cook and a place to stay, and the local Howler Monkey gang seemed far off in the forest, possibly disturbing other monkeys' sleep. This time Eric and I shared a large room full of bunk beds. Of course, as at the first place, there was no TV in our rooms (who would want it?), but there were always plenty of synchronized ants to entertain us during the evening at no extra charge. It was obvious that they were well trained to put on a show for any guests, and insisted on getting paid only in spilt peanut butter or by chewing by the hundreds on the rubber gasket around the washroom tap.



*The Instituto Costarricense de Electricidad (ICE, pronounced "EE-SAY") tower #1 at Vista el Mar. There are two ICE towers located at this site.*

## Friday, January 13

### Cerro Sula

The following day we made the trip to Cerro Sula, near the south end of the Nicoya Peninsula. Here we met another MINAE field officer, Luis Mena, who also spoke English well, having gone to university in Texas.



*Eric, Luis, unknown employee who hitched a ride, and Mario after the trip to Cerro Sula.*

Some assume that all government departments around the world are well funded. At least this was my assumption of Costa Rica, but the first indication that this was not the case came after seeing the plethora of older, mixed-breed vehicles, some of which were donated to the government by other governments or from individuals. The vehicle we were in was no exception. It was an old, klunky, 1985 Mitsubishi truck. The engine had been rebuilt at least once, and we all had to get out and push it to get it restarted every time the engine was turned off.

The proposed Cerro Sula radio site was chosen not only to provide a local VHF drop, but also because it can link the rest of network to the Cabo

Blanco Absolute Reserve, on the southern tip of the Nicoya Peninsula. The Cabo Blanco Absolute Reserve was first created in 1963, and it is the oldest nature reserve in the country.

There is an island off this reserve with an old MINAE repeater already in place, although it was out of service when we were visiting Cerro Sula. It's a stand-alone (not linked) repeater that needs to be replaced and linked back to the rest of the ACT network via a slightly obstructed UHF path to Cerro Sula.

The drive back was about the same: a bone-jarring trip on dusty roads, constantly dodging large potholes. In one way, the bad roads are great for the environment as they help prevent future development, to some extent. On the way back, Luis talked about how they are constantly fighting general environmental degradation and pollution pressures from proposed, new and existing tourist developments. It's really a fine balance between bringing new investments and jobs, which are of course important, against the long-term costs to the environment, and Costa Rica's mostly pristine environment is the reason many tourists come in the first place.



*The Cerro Sula site with Mario, Luis, and Eric.*

### **Saturday, January 14**

This day was spent exploring the Barra Honda Reserve. There are many deep lime-stone caves as well as some nice trails to explore. We hiked around with a local guide until Eric and I split up. I preferred to get some extra rest back at the barracks and Eric took his climbing ropes to explore further along with the guide. On my way back to the rooms, I stopped for a while to watch some monkeys (*not* the howler variety). The juveniles were quite interested in getting close to me to have a better look at their distant uncle, but an older monkey, who seemed to think he was in charge, basically just showed his fangs at me and made rude gestures. After a while, not wanting to get the dreaded "Monkey Bite Disease," I continued on my trek back to our quarters.

Later that evening during a nature trail walk, just as it was getting dark, I came across a large swath of Army Ants on the march. I was actually stepping on them by accident until I realized I had better start jumping. Marching Army Ants are amazing to watch, as millions of them go on their rampage through the undergrowth looking for any type of live or dead protein. Along with insects, their food may include baby birds and other small animals that don't or can't move fast enough. The locals actually welcome them into their home as a free cleaning service — in as little as two hours absolutely everything remotely edible is cleaned out, including any pests such as termites, scorpions, other ants, and even rats. Basically, if you wake up in the middle of the night with the floor crawling, you just wait well away from the house until the ants have done their "cleaning service."



**Sunday, January 15**

### **Ostional Turtle Reserve**

This day was spent visiting the famed turtle egg-laying beach at Ostional on the Pacific coast, and was the only time I was able to use my bathing suit (for about 20 minutes) during the entire trip.

At the *Ostional Reserve* there is a research facility jointly staffed by MINAE and university students from around the world. The students spend two to three weeks studying the turtles and their habitat, as well as helping patrol the beach against egg poachers. This is one of only a few key beaches along the west coast of Central America used by sea turtles for laying their eggs. The sea turtles can swim as far as India before returning years later. Like many of the reserves, *Ostional* is of international importance, as the protected turtles don't go anywhere else to lay their eggs.

On their patrols, the students use donated, limited-range UHF radios. The UHF base station does not currently work, and the mobile VHF installation in the facility's truck does not work either. The communications upgrade considered for *Ostional*, therefore, is to replace the UHF radios with VHF, and install VHF-linked repeater at Punta Giones that would serve the area.

### **Monday, January 16; San José**

At five am on Monday morning, Mario drove us back into San José. The first place we visited was the equivalent to our own Industry Canada spectrum office, the *Nacional Control de Radio*. In fact, it was more like a throwback to the mid 1970s with the good old Department of Communications!

Costa Rica is a strange blend of old institutions and new technologies. Well, here was an old institution, at least on the surface. Upstairs, above their authorization section, was what we would call their Spectrum Control section, and their "SOC".



*Eric poses in front of the main entrance to the office and student residence at Ostional.*



*Spectrum Monitoring Consoles.*

In the middle of this large room, we saw three consoles with various spectrum monitors and receivers. Staff would sit in front of the consoles for hours at a time — in essence “human monitoring machines” — looking for misbehaving radio waves. Along the sides of the room were what could best be described as “EL-1s in training”, as they looked young and wide eyed with their own very tiny desks.



*Alexis, Eric, and Mario at the Nacional Control de Radio oficina in San José.*

At the NCR office we met with Alexis, who was the head person in charge of the spectrum control function. We had to talk to him for two reasons: first, we needed him to sign some papers allowing the radio equipment to be released from Customs, and, second, discuss the MINAE project in general.

It was here that we discovered the horrible truth: spectrum availability is a big problem. While narrow-banding was on the horizon in terms of helping to alleviate the scarcity of radio channels, it would be very difficult to find the open channels needed by MINAE, both in VHF and UHF.

However, MINAE is using (only) three repeater pairs. This, coupled with the fact that, occasionally, some new frequencies become available, means that there is still hope to either re-use these, or find some new ones. Another factor is the way they were allocating frequencies in the past: when a new assignment was made, it was made for the whole country because of the small geographical area involved. However, they are now looking to split these into zones where two or more different users from different parts of the country would share the same frequency.

Alexis said the best thing to do was to send a list of desired VHF and UHF frequencies and he would see what he could do.

## **Tuesday, January 17**

This day, we decided to take the first full day off since our arrival. Eric and I shopped around San José looking at cars and trucks. One thing about Costa Rica is that there is a greater variety of cars and trucks than we are used to seeing here in Canada. The vehicles are generally smaller and from different parts of the world, such as the *Great Wall* line from China, or the *Mahindra* products from Bombay, India.



Another striking difference we found was that more models are offered in diesel. In fact, those

*A typical micro-pick-up that can be bought for about US\$8K.*

models that are available in both Canada and Costa Rica —such as the Nissan Xterra or various small KIA passenger cars like the Spectra — they are offered as a diesel alternative in Costa Rica. There were hardly any large gas-guzzling North American cars and trucks on the roads.

For those interested in the cost of fuel in Costa Rica, we found that diesel was 330 Colones per litre and gasoline was about 400 Colones per litre. Right now, US\$1.00 is about 500 Colones.

After looking at cars, we gathered some supplies for Eric at an equivalent of Home Depot — such as an 180 lb, 300 foot length of ½ inch cable for Eric’s business. We lugged this and other supplies via taxi to the regional bus station where Eric took his leave, returning to Providencia where his business — and winter home — is located.

### **Wednesday, January 18**

Of course, rather than going to the beach, I opted instead to go to the Dentist for a root canal. Who wouldn’t, after going all that way? I had already been referred to an endodontist in Victoria on my way down for a chronic problem they could never figure out in Whitehorse after years of trying. The cost was going to be around \$1,400 of which only about \$500 would come back from the insurer. I had already heard that medical tourism in Costa Rica was a thriving business, and for good reasons — it is still relatively inexpensive, they are well trained, and they generally use the latest equipment.

This was certainly true of where I went. The young specialist who worked on me was from Costa Rica, but was trained in Houston, Texas. In the end, the total cost was a ¼ of what I would have paid back home.

With a frozen mouth, I proceeded back to Hotel Don Carlos to complete the written report and then to the big wrap-up meeting at the Ministry of Foreign Affairs, International Cooperation Section. Here we had representatives from MINAE, the Ministry of Foreign Affairs, and the embassy staff person in Ottawa who helped with the project but who also just happened to be in Costa Rica on vacation. In total we had seven government people there plus myself.



*The “wrap-up” meeting breaks out into individual animated discussions.*

They first thing they asked was “did I know Spanish?” Of course, I did not, but luckily most of them knew some English. Despite my partially frozen mouth, by drawing a map on the white board I was able to get across the progress we had in determining the technical requirements for each site, the project’s spectrum requirements, the lead time and documentation required for customs, and the

requirements for training. Other aspects of the project were also covered, such as the expected average site cost of around US\$2,500 and the logistics around shipping a container down from Canada.

What happened next was somewhat amazing. After I had finished my report, bedlam broke out with everyone talking at once. Perhaps this is normal procedure in Central American culture, and it more or less continued for the rest of the meeting. With the help of the lady from the Costa Rican embassy in Ottawa, I was able to get the odd bit of information back as to what they were saying. They discussed budgets, personnel, equipment, and were happy to know that I was planning on coming back next year for "Phase Two".

Early the next morning I flew back to Seattle, where my nephew picked me up. We stayed overnight at a friend's place, and then the next morning at around four am, we left for Vancouver and eventually for the Yukon.

### **Next Steps in a Nut Shell**

Once we establish the frequencies, various gears can be configured and piled up in a heap and ready for shipment to Vancouver, also possibly joining with equipment from Victoria. From Vancouver it can be containerized and sent off to Costa Rica, hopefully by the summer, or early fall giving it time to clear customs. The next trip down will likely be in December 2006 or January 2007 for about three weeks, just before the Canada Winter Games start in Whitehorse.