

Report of the Expedition Leader

The 2013 Cordell Expedition to Clipperton Island



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SUMMARY

The 2013 Cordell Expedition to Clipperton Island was carried out successfully from 18 Feb to 18 March 2013. The team consisted of 24 radio operators, two filmmakers, two environmental scientists, and the author as Expedition Leader. The project was managed by the author (KK6EK), who organized the facilities and logistics, and by Chris Janssen (DL1MGB), who organized the radio operations. Ten HF stations plus one 6m/EME station were deployed and were active for 7 days, using the callsign TX5K. A total of 113,601 QSOs were logged on all legal bands 6-160m, using CW, SSB, RTTY and JT65 modes. A notable aspect was the use of DXA (version 2), that enabled DXers to obtain confirmation of their logged contacts on a public webpage within 1 minute of making the contact. In addition to the radio operations, a variety of environmental scientific projects were undertaken, with several notable new discoveries, including the first documentation of foraminifera. The project was carried out on schedule, under budget, with no damage to the environment or wildlife on the island.

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The Expedition

Origin

Late in 2011, I was invited to join an independently organized and funded expedition to Clipperton in March 2012. Called “The Clipperton Project,” its aim was to bring attention to fragile and symbolic ecosystems around the world, and to promote holistic approaches toward their protection and management. I accepted, but within a few months it became clear that in the context and with the limitations of the format of that project, I would be unable to carry out the kind of scientific work and amateur radio operations that would make the expedition worth the effort. With regret, I withdrew from that project, but immediately announced that I would organize a separate and comprehensive amateur radio expedition, including selected scientific projects. I scheduled it for March, 2013.

Planning

Much of the original planning for the radio operations (the “DXpedition”) was done with John Kennon (N7CQQ), who had organized and led three expeditions to Clipperton (1990, 2000, 2008). When John was unable to participate in the 2013 expedition, I substituted Chris Janssen (DL1MGB), who had experience from numerous DXpeditions and contests. It was agreed that Chris would take primary responsibility for organizing the radio equipment, team, and operations, and I would take primary responsibility for organizing the facilities, logistics, schedules, fundraising, and the scientific projects.

Team

The team was assembled by Chris and the author, primarily from personal contacts. A few of the radio operators approached us and offered to join. All radio operators had considerable experience, as shown by their resumes.

About half the team was Europeans, most members of one group, the Bavarian Contest Club. The other half was primarily Americans, spread across the country, practically all of whom did not know each other previously. This structure had the advantage of enabling simpler management of the whole team, but as we were to find out on the expedition, led to some major difficulties due to unresolved cultural differences.

As we were nearing completion of the preparations, we were approached by a team from the French TV program THALASSA, who wanted to document the expedition. They offer to pay their expenses and were added to the roster (see appendix).

In addition, the French government requested that two academic researchers from the University of Tahiti be landed on the island during our stay, and return with us to Cabo san Lucas. We were pleased to welcome them, although they did not provide any financial support.

Permits

Two permits were obtained: the landing permit, issued on 20 Dec. 2012 by Stephane Jarlegand, and the radio operations permit, issued 2 Oct. 2012 by Jean Chartier, both issued in the name of the High Commissioner for French Polynesia. Copies of these permits are provided in an appendix to this report.

Radio equipment

The radio equipment was assembled at the contest station DR1A at Goch, Germany, in December, 2012. It was packed in a container and shipped to San Diego. The inventory of the equipment is provided in an appendix to this report.

Chris wrote a detailed definition and description of the station configuration for Clipperton, which is available in a separate document.

Facilities

The first step was to secure an appropriate vessel. We made a trip to San Diego and examined several long-range fishing vessels from the fleet at H&M landing, eventually selecting the Shogun, based mostly on their experience in taking multiple previous expeditions to Clipperton.

The author, together with several colleagues (Rich Holoch KY6R, Walt Wilson N6XG, and the author's wife Kay) designed the facilities and arranged the logistics for the expedition. The facilities included the main tents, sleeping tents, air mattresses, tables and chairs, generators and electrical distribution systems, water and fuel containers, cooking facilities, eating utensils, emergency rations, tools, lights, shade netting, antenna masts, anchors, ropes and tie-downs, microwave and BBQ, garbage cans and bags, sanitation facilities, WiFi, and satellite telephones. Most of the items were selected and bought directly on the internet, mostly from Amazon using the "Prime" option (2-day delivery, no shipping).

One item that proved to be essential was the All-Terrain-Vehicle (ATV). I made an arrangement with a friend to rent his new Kawasaki Arctic Cat 450 for the month, with promise of no-damage return. As described below, the ATV was an extraordinarily valuable tool in the Clipperton environment.

Another facility I assembled was a fresh-water purifier (FWP). The lagoon is only mildly brackish, probably potable in emergencies. I assembled a 4-stage filter system, including a generator, pump, and hoses, to use for washing and emergencies. The system provided water for washing and showers, which significantly improved the morale of the team (See description below).

Departure

The facilities equipment were assembled at a warehouse in Richmond, California, and a week before the scheduled departure was loaded on a rented truck and driven by the author to San Diego. The container with the

radio equipment had already arrived from Germany. In 4 hours all the equipment from the truck and the container were loaded on the Shogun, much of it stowed below deck in the holds where they were stored.

Ten of the team members elected to board the vessel in San Diego. It departed in the early evening of 18 Feb 2013, and headed due south toward Cabo san Lucas.

The voyage

The voyage down the coast was uneventful, and we enjoyed good weather and calm seas, with one day exception.

Approaching Cabo san Lucas, we were ahead of schedule, but were unable to enter the port to pick up the rest of the team due to customs/immigration requirements. About 12 hours was therefore spent waiting for the early morning, whereupon the additional team members, mostly Europeans, came aboard.

The voyage south from Cabo to Clipperton was likewise uneventful. Many on the team slept or rested in their bunks, so practically no group meetings were held. The crew did some fishing, and the team operated radio using the callsign K6K/MM (maritime mobile). The QSL card for the MM operation is shown in an appendix.

Arrival

Dark. About 8:30 PM. February 26, 2013. The skipper of the Shogun announced that we had arrived at Clipperton. In theory, the island lay directly in front of us, but with the full moon diffused through a tenuous overcast, all we could see was the glowing spray from the violent surf pounding every foot of the periphery of this remote coral atoll. The team was quiet, introspective, anxious. We spent the night in the belief that tomorrow we would be sleeping on the island.

At dawn, the Shogun started moving counter-clockwise around the island, studying the surf and searching for a suitable landing. In the crystal-clear morning, the island lay stretched out before us, far bigger to our eyes than we had expected. The clumps of palm

trees seemed denser and greener than we expected. Now and then, the skipper sent a zodiac off to assess the surf, but invariably it returned with the news “Nope. Not here. Not now.”

We continued our circumnavigation, passing a small sailboat, sometimes recognizing some feature from pictures we had studied. Overtaking the sailboat again, we realized we were into our second trip around the island, and murmurs of anxiety started diffusing through the team. We watch the dolphins riding the bow and jumping in graceful arcs. The team remained quiet, but I could sense the anxiety.

Then around 2 PM, the skipper made a tactical decision and selected a very handsome grove of trees, announcing that they would take some boxes ashore. Quickly I selected the containers with emergency food, lights, radios, medical supplies, and a small generator. The zodiac was away and our spirits soared. But soon they returned with bad news: no more boxes or people—it was too rough. The European radio operators were not happy; their pre-defined goal of 150,000 QSOs had just been dashed. I thought of Apollo 13: “We just lost the moon.” But there was nothing we could do. Just wait until tomorrow.

Landing

With first light, the skipper judged the surf to be workable. We began to move equipment and people to the island. By 5 AM the first load of cargo was on the beach, and I began to offload the team members according to the sequence of work we had planned. With two zodiacs working in push-pull, we were able to take almost 10 loads in an hour. By 8 AM the major part of the equipment was on the island, and we were transferring tables and chairs, large generators, and antennas. By 11 AM we were scouring the corners of the boat for the lower priority items.

In a rush of excitement, we could see that the team on the island already had two main tents erected. These were the greeting, eating,

meeting (GEM) tent and the communications (COM) tent. The team would live and work in these tents when not operating radios. One item we did not send was the ATV and the wagon. Frankly, I didn’t know how to do it, and I was relieved when the skipper delayed it until the next day.

That night we were thrilled to see flashlights floating back and forth on the island as the onshore team worked into the night constructing our camp. To our surprise, we also saw several other lights across the island, other boats at anchor. We had expected Clipperton to be a remote and lonely place, but this night it felt like a busy resort. The floodlights of the boat burned continuously through the night, and some of us went out periodically to marvel at the sea creatures attracted to the light.

The next morning, the moment I dreaded came suddenly: the skipper decided to load the ATV onto a zodiac and drive it to shore. As he zoomed away, I thought “Be still my soul.” On the beach, tiny but clearly visible, one of the crew members jerked his arms skyward in the “touchdown” gesture, and we applauded: the ATV was safely on the beach!

The camp

By the end of the morning every load of cargo and every other team member were on the island, so I took the last zodiac ride and stepped onto Clipperton Island. What I beheld was breathtaking: a village of eight tents surrounding a pristine fine white sand yard immediately in front of an extraordinarily handsome grove of palm trees. Two solitary trees, much taller than the grove, stood between our village and the beach, providing a prominent marker, like a flag on a golf course. At the entrance to the camp, the team had established a kind of corporation yard: the various shipping cases and gasoline jerry cans were arrayed in rows, providing a kind of open-air warehouse. Most of the team members were busy completing the two radio operation tents, designated site A (for SSB operation) and site B (for CW operation).

Even the sleeping tents had been erected and populated by cots, air mattresses, blankets, and pillows. I took the last bed, and posted my callsign on the doorway.

I should not have been so surprised, but the team did not follow the detailed plans for erecting the camp. For instance, we had meticulously designed the furniture layout and wiring diagrams for the GEM and COM tents, but the team simply moved quickly to install the facilities ASAP. No matter. A small amount of rearrangement, and I declared them operational.

The team agreed that the campsite, at the large palm grove on the east side of Clipperton, was the best of all sites on the island. Most of the island is open, bare, and extremely hot. Bougainville offered protection, but generated a depressing feeling due to its ruinous condition. Camping at Clipperton Rock might have been an acceptable alternative, but negotiating around the steep beaches and debris deposits would have been challenging.

The ATV

It was immediately obvious that the decision to bring the ATV was very wise. It turned out that perhaps half of the team already had experience driving an ATV, but it wasn't really so hard after all. The ATV and its wagon trailer moved back and forth between the main camp in the remote radio operating sites, carrying equipment, supplies, and sometimes people. The surface of the atoll near our camp was covered in a deep layer of very fine unconsolidated coral sand. Even walking in this material was difficult, and pulling a wheelbarrow (of which we had brought three) would have been exhausting. The four-wheel-drive ATV was able to move through the sand, although in the process the top layer, which had turned dark in the intense sunlight, was plowed under, leaving a bright white track. However, since there were no birds or burrows on the roadway, we were not causing any damage to the environment or the wildlife.

The radio stations

Through the rest of this day and the next, many members of the team spent many hours erecting many antennas. We brought exclusively vertical antennas, some connected into four-square arrays especially for 80m, 40m, and 30m. Altogether, the team put together 10 complete HF stations on the two main sites and one 6m/EME (Earth-Moon-Earth) station about 1 km away. Because the latter was essentially self-contained, and was not connected to our local Wi-Fi network, and because of the special needs of the 6m EME operation, he had very little interaction with the rest of the team and was not updated on DXA.

Visitors

While the radio team was erecting the antennas and installing the radios, I received several groups of visitors. The French Navy arrived in a large warship (the "Prairie"), and with a large contingent of very young cadets, brought ashore Prof. Christian Jost from the University of Tahiti and his associate Prof. Jean Morschel. Jost is probably the foremost expert on Clipperton Island. This was his first visit to the island in some years and he was eager to carry out counts of the trees, birds, crabs, and geographic surveys. They would return with us to Cabo San Lucas. Next came the commander of the Prairie, and we had extended sessions posing for the cameras, usually with Luis XE1L in the middle (as usual!). We were also visited by the young French couple from their sailboat, the one we had encountered in our circumnavigations. The wife generously climbed two of the palm trees behind our camp in order to hang up a banner showing our callsign: TX5K.

Going QRV

On the night of the second day, around nine o'clock most of the radio operators assembled in the GEM tent. Surprise! We were within about two hours of being able to go QRV. We had a very short discussion, and

then I made an executive decision: we would go on the air at 11:00 PM, in about two hours. I sent a note to our blogmeister Rich KY6R to expect us to go QRV soon.

DXA

Immediately, I queried Ed KE3D about the Wi-Fi network. The network was crucial, not only for the redundancy is provided, but because one special computer had been reserved exclusively for DXA, our real-time online log server. DXA would listen to all of the HF stations, capturing the individual QSO data, packetizing it, and uploading it every 60 seconds through the Inmarsat satellite link to a server on the US mainland. Anyone with a browser on any computer anywhere in the world opened to the URL www.dxa2.org would see a map of the world and other basic information about the DXpedition, including the total number of QSOs logged, the band modes on which TX5K was active at that moment, and the map of the world showing flags and call signs of the location of each station entered into the TX5K log within the last minute.

While not formally part of the stations and the radio operation, DXA was an essential part of the DXpedition, providing an important aid to DXers wanting to make a valid contact with Clipperton. Ed set about getting the Wi-Fi working. I was optimistic and excited.

Then, to my horror, in spite of our year-long preparations to implement DXA, and repeated assertions that it was perfect and ready to go, we discovered that there were multiple problems, both in hardware and in software. The radios went QRV on schedule, but DXA was not working. I was frantic, and bounced back and forth between the various people who had created various components of the system, some there on the island and some at home. It wasn't until late the next day, perhaps 18 hours after the radios started logging QSOs, that we succeeded in updating the data in DXA and getting it to correctly display the QSOs logged in each minute interval. From that time forward, the DXA

system worked flawlessly, and it received universal compliments and appreciation.

The shower

Once DXA was working, I carried out my secret operation, planned months before but not shared with the team. I loaded several cases from the corporation yard into the ATV/wagon and drove to the solitary palm tree at the edge of the lagoon, about 300 feet from our camp. There, undetected, I extracted and assembled the various components—a small generator, a 12 volt water pump, a three stage filter bank, two long hoses, and a nozzle on the end of a 6 foot pole stuck in the ground.

Wading into the lagoon, I was surprised to feel prickles over my skin, thinking it might be some sort of biting aquatic larva. Later, after some discussion with Prof. Jost, I understood that it was the sulfuric acid in the water, created by the large amount of hydrogen sulfide gas released by the rotting vegetation that grew in the stagnant water. I carefully placed the hose with its intake filter in a submerged bush, and returning to shore.

Expectantly, I started the generator, and waited anxiously for about two minutes. Then suddenly, with several burps, fresh cool water came squirting out of the nozzle, and I let out a triumphant whoop. The shower worked! I stripped down and spent easily 20 min. luxuriating in this fresh cool clean shower bath. Because of the intense heat on the island, especially in the morning, every member of the team was suffering, and I figured correctly that the shower would be very popular. Indeed, for the rest of the time we were there, a continuous parade of men went to and from the little tree. At the end of our operation, even the most vociferous complainer spontaneously dubbed it “the best thing on the island.”

Operating

As we progressed into the next few days, the DXA counter ticked off the rise in total QSOs logged. Now and then, we actually had all 10 HF stations working simultaneously.

The average rate at which TX5K logged QSOs was slightly over 14,000 per day. I spent my time monitoring DXA, filling its generator every few hours day and night. Next to me in the COM tent, Ed KE3D, set up a remote video camera and recorded some of the interesting behavior of the masked boobies that nest on the ground all around our camp. Ed even captured images of a rat, which was significant (see the scientific work below).

Supplies

On most days, the Shogun arrived in the morning with supplies: food, water, and gasoline. The food was superb—steaks, hamburgers, pork chops, lasagna, macaroni and green salad, and desserts of various kinds. When hamburgers arrived, with all the trimmings, we opened up the gas-fired barbecue and the team was treated to freshly grilled, hot, juicy burgers. Unfortunately, I had not made it sufficiently clear to the team that expeditions involve a certain amount of overhead, such as setting up for the meals, heating the food, and washing up afterwards. As a result, there was more than a little bad feeling between some team members who thought that their only responsibility was to work pileups and others who didn't feel they were there to be servants.

Exploring

Most of the team members took the time to hike the entire circumference of Clipperton, some 7 miles, and they returned with many interesting observations and valuable photographs. In particular, they documented the 2008 site of the TX5C DXpedition, which was recognizable because some items had to be abandoned when their departure was limited by the high surf. Another interesting site was the stacks of artillery shells, left on the ground in the open, birds blithely roosting among the potential bombs. Some people have reported hearing these explosives detonating, and we gave them as wide a berth as possible, consistent with getting good photographs. Elsewhere, team members documented the

remains of a forklift, a bulldozer, and a jeep. Interestingly, the rubber tires on the jeep were intact and seemingly in good condition, while the rest of the vehicle, made of steel, was almost completely rusted away.

Clipperton Rock

Clipperton rock is truly an other-worldly artifact. The erosional remnant from the original volcano that enabled the growth of the coral atoll, it is a prolate spheroid not quite 100 feet high and 200 feet long, shot through with major cracks and tunnels, and even a few natural flying buttresses. By crawling on your stomach and climbing a cliff with the aid of a rope, it is possible to reach the summit. There you can behold a most spectacular view of the entire island, ticking off the individual locations that were by now becoming familiar. Significant numbers of the nearly 100,000 gannets (boobies) on Clipperton roost and nest on the Rock, and inside the areas that are protected from direct sunlight sustain growth of calcium carbonate nodules covered with emerald green algae. I found a brown booby wedged in a crevice near death, but in spite of extricating it and bringing it to water, it soon died.

Bougainville

Like numerous other teammates, I made a special trip to the large grove of palm trees on the opposite side of the island called Bougainville. The site had been occupied numerous times in the past, including by major military and scientific expeditions, as well as shipwreck survivors and other visitors. Bougainville had been my primary destination, based on the fact that it has many trees which would provide shelter from the wind and sun. One morning I commandeered the ATV and drove to Bougainville by way of Clipperton Rock.

Mounting the ATV, I drove across very steep deposits of sand and broken flotsam, emerging onto the long flat hard surface that led to Bougainville. Even as I approached, I had the feeling that the area was less attractive

than I had imagined, and this was confirmed when I arrived. True, there were a large number of palm trees, but there were also thousands of dried and dead coconuts on the ground in a depressingly gray cover that made walking difficult and unpleasant. Bougainville had the feeling of ruins, of a disaster area, and in a sense it was. I was surprised and disappointed at the extensive equipment and facilities that had been simply abandoned: concrete buildings, plastic water tanks, electric motors, steel drums now almost entirely rusted away, household furniture, and thousands of small items that might once have been tools.

Beyond the main grove was a clearing almost entirely covered with green plants, suggestive of a playing field, and while this provided some relief from the ghostly palm forest, the image of children playing ball and adults having a picnic lunch was not a very believable illusion. Just a little further away, the large French flag announced that this island belonged to the Republic of France. While seemingly redundant, such formalities are a central part of international politics: most nations claim an exclusive economic zone extending 200 miles out into the oceans around their borders. For this tiny atoll, in a strategic location in the Eastern Pacific, it gives France autonomy over more than 100,000 square miles of ocean containing some of the richest tuna stocks in the world. Clipperton is in such a strategic position that several countries, including Mexico and the United States, have historically competed to claim ownership, and various expeditions have gone there to observe nuclear bomb tests and satellite launches.

Beyond Bougainville is the long, wide, flat, and hard northwestern side of the atoll that had been bulldozed for a landing strip, and beyond that the sights of various radio DXpeditions including TX5C could be found. Nearby were the hundreds of abandoned artillery shells, stacked neatly on the ground and clearly not-to-be-touched.

Scientific work

Team member LouPhi Loncke, the other Explorer's Club member besides myself, and I made about 15 collections of sediment in a search for the microscopic one-celled animals called foraminifera. These samples were transferred to Dr. Mary McGann of the U.S. Geological Survey, who examined some of them immediately and identified two genera: *Bolivina* and *Sorities*.

With the help of several teammates, LouPhi and I searched for, and documented, several masked boobies exhibiting the "Angel's wing" deformity that renders these birds flightless. LouPhi shot an astonishing video of two brown boobies in mortal combat, possibly an indication of how some adult birds come to have a broken wing.

We brought with us two kites, and used them to loft cameras that provided a large number of high-quality and informative aerial photographs of our campsite and other parts of the island. We also attached a large net in an attempt to capture flying airborne insects, but none was collected.

Prof. Jost counted birds and palm trees, sometimes with the aid of another kite-borne camera. He also installed survey markers and documented the crab population.

We also noted cockroaches and rats near the campsite. There were a few crabs, perhaps a dozen that came in the night, but nowhere near the large numbers reported by previous visitor to Clipperton. One of the most startling sights was the extensive growth of the vine-like plant since the 2008 TX5C expedition. It is apparently growing rapidly due to the reduction of the crab population by the rats. We believe that within 5-10 years it will cover the entire island, which also has been the case in the past.

The crabs themselves were not aggressive, and actually seemed tame, except naturally they fled when crowded. We wanted to estimate how many crabs were at our campsite, but it was nearly impossible to distinguish one crab from another. So to

identify individual crabs, we marked some of them on the carapace, using an erasable marker, typically using radio callsigns or names to distinguish the individuals. Interestingly, we never saw the marked crabs a second time, indicating that the individuals we observed were part of a much larger population that randomly came into the camp, rather than a few individuals who came repeatedly.

The two French TV filmmakers, Ramon Gutierrez and Jean Bazille, spent most of their time with two particular radio operators. While it was disappointing that they concentrated on such a narrow focus, it was satisfying that the project was documented. The 30-minute film was completed in late May and will be broadcast in France on September 13.

Thinking about leaving

As the days progressed, the radio operators kept up an extraordinarily energetic regimen, and the total number of QSOs rose above 90,000. About four days ahead of schedule, some members of the team already were discussing the strategy and procedures for shutdown and leaving. I was a bit surprised, since I assumed they wanted to extend the operating time to the maximum. In fact, some members apparently were making extremely tight schedule arrangements for our return to Cabo San Lucas and were nervous about our departure. From experience, I knew that such plans are very dangerous, and I advised the team to be careful about making such tight plans, just in case the weather turned bad.

Weather predictions

As usual, I consulted with the skipper on the boat, who was in direct contact with the home office in San Diego and had all the available information about the current weather and predictions for the next few days. His input was that we would probably experience increased winds for two more days and then the winds would subside. However, it is the state of the surf, not the wind, that

would determine whether we could get off the island, and the surf was determined by major weather patterns hundreds of miles away. And although it was my role and responsibility to keep everyone informed with the best information available, when I brought this information to the team, I was not popular.

100,000 QSOs

On March 8, a little over a week after we began, the DXA counter displayed exactly 100,000 QSOs. Quite a few people around the world anticipated this moment and took pictures of the screen, suitable for framing.

Shutdown

Two days before the scheduled shutdown, we stopped the CW operation and dismantled the Site B tent. With the increasing awareness that we would be leaving in two or three days, some team members who had not yet ventured out of the camp took the opportunity to make the 7-mile circuit around the island.

The next day we discussed when to stop operations altogether and dismantle the site A tent. I thought we might have another day to operate, since the surf was decreasing nicely. But apparently the team preferred to not risk being late to leave, so packing began in earnest. I marveled at the efficiency and speed with which they dismantled the camp and moved the bundles and containers to the beach. Already the crew from the Shogun was running shuttles, and the whole operation reminded me of a colony of leaf-cutter ants dismantling a bush and carrying it down a trail where the pieces would disappear into the nest.

In an amazing replay of a week before, the team simply lifted the ATV into a zodiac and the skipper drove it through the rising surf safely back to the boat. Soon, team members themselves were being transported back to the boat, and the number of people and amount of gear waiting on the beach diminished nearly to zero. The boat crew did the final sweep, gathering the last crates and personal bags.

A clean campsite

At that point I took the opportunity to walk back to our campsite, now completely bare, and systematically inspected and photographed the entire area. I was extremely impressed with what the team had done: they had cleaned it completely. I found not one single scrap of paper, piece of wire, fragment of food, or any other evidence of our stay there, save the fact that the soft white sand was unusually clean, at least compared to the neighboring areas. In a relatively short time, the wind would return our campsite to its previous state, including deposits of plastic debris that float in from the ocean.

Departure

Around noon, the Shogun left Clipperton, about 12 hours earlier than originally scheduled, bound for Cabo san Lucas. The trip back was surprisingly quiet. Only a fraction of the team showed up for meals, and there was relatively little general socializing. The team was physically tired from the exertion, and socially tired from the sometimes stressful personal interactions. Much of the team spent much of their time napping. The gentle rocking of the boat was conducive to relaxing, remembering, and writing. The Shogun ran due north on the calmest seas the crew had ever seen. I took the credit for bringing the good luck.

The return voyage

One evening Prof. Jost treated us to an extremely interesting presentation about the past and future of Clipperton, particularly pointing out the importance of active management of the island to protect its natural resources and the French Exclusive Economic Zone.

After four days of sailing, we were in Cabo, and the majority of the team (mostly the Europeans) left the boat, presumably in time to make their scheduled flights. The remaining nine of us continued another four days to the home port in San Diego, where we were

greeted by wives, sweethearts, and a wonderful sign that said “Welcome Home Shogun.”

The death of Luis XE1L

It was decided to unload the boat the next morning, so we walked across the street to our hotel carrying our suitcases. Luis XE1L rolled his suitcases across the street on a hotel cart and down the hallway to his room, chatting with his two roommates. Then without so much as a word or a wince, he suddenly collapsed on the floor.

Instantly, his teammates realized something was seriously wrong, and while one started CPR, the other dialed 911. In minutes, the fire department was there and began resuscitation. But after a half-hour, it was obvious that Luis was gone, and they transported him to the UC medical center about 5 miles away.

Not everyone on the team knew what had happened, but for those who did, the shock was profound. Unfortunately, dx-world.net published the rumor before its official confirmation, which created considerable confusion in the radio community. The publication forced me to make a press release half a day before I reached Luis’ family, an unforgivable breach of journalistic and ham radio ethics.

In spite of our feelings about Luis, the next morning the boat had to be unloaded and the gear packed to be returned to Germany and northern California. By midday, with assistance from people who just showed up to help, it was done. The radio equipment was returned to Germany in the container, and the facilities equipment was returned to Richmond in a rented truck. As my wife and I drove the truck north out of San Diego, we finally succeeded in connecting with Luis’ family, and I had the unenviable task of explaining to his wife on the telephone what had happened.

Post-expedition

For some, the expedition isn't over, even after returning home. For me, there were the tasks of unloading and processing the equipment, returning borrowed items to their sources, catching up with correspondence, fielding urgent questions from DXers who were concerned about their QSOs, updating the web pages, catching up the financial records, and writing reports and articles for our sponsors. The logs were uploaded to ClubLog immediately after the end of the DXpedition, and most of DXers requested their QSO cards using OQRS. The cards will be distributed in late June, 2013, some three months after the operation.

In the first two weeks after my return, I wrote a full-length book about DXA, including more than 150 pages about K7C and TX5K, and had copies available at the DX convention in Visalia (late April) and Dayton (late May). I sent 30 copies ahead to the convention in Friedrichshafen, Germany, and 15 copies to Japan. Information about obtaining a copy of the book is provided at the end of this report. An e-book version is in preparation, and will be accessible through the expedition website www.tx5k.org.

In early May, I received and accepted an invitation from Zorro JH1AJT to make a presentation at the radio convention in Tokyo in August.

The future

We are certain that no damage was done to the island, and that future projects, even projects with considerable facilities and equipment, can safely visit Clipperton Island. In fact, we believe that such visits contribute to the monitoring and therefore the management of the island, and are therefore a desired activity.

Clipperton Island is far from fragile. Rather, it is tough and resilient, and could easily be host to many well-planned well-motivated visits. The proposals for establishing a permanent population in the island, articulated by Prof. Jost, have merit, even if it would mean a major shift in the ecosystem (e.g., opening a passage and allowing the lagoon to mix with the ocean). After all, Clipperton is far from a "natural" state and probably cannot ever return to the conditions it had before the arrival of man.

This author, in fact, would enthusiastically embrace an opportunity to return to Clipperton, to carry on with projects that document the rapid changes experienced by the island, and to explore the most sensible path for its future. Without reservation, I can state that the 2013 expedition was a positive event for the participants, for some 25,000 radio operators worldwide, and for environmental scientists, program managers, and the public interested in Clipperton.

Pictures



The track of the vessel for the expedition



Part of the team sailed from San Diego



Location of the landing/campsite



Landing the ATV



The site selected for the TX5K campsite



The campsite at the beginning of setup



The TX5K campsite. Sleeping quarters at left



The GEM tent (left) and COM tent (right)



One of the operating tents



Part of the antenna inventory for TX5K



One of the operating sites



Mealtime in the GEM tent



The shower



The kite used for aerial photos and insect collection



Aerial photo of the TX5K campsite



Aerial photo looking north over the TX5K campsite



The cases with supplies and gasoline jerry cans



The ATV was essential for transporting supplies



A typical pair of masked boobies



Clipperton Rock about 1 km from TX5K



One of the red crabs, marked for identification



The author with Prof. Jost in front of the camp



Flying the flags of the countries and sponsors



The Explorers Club flag

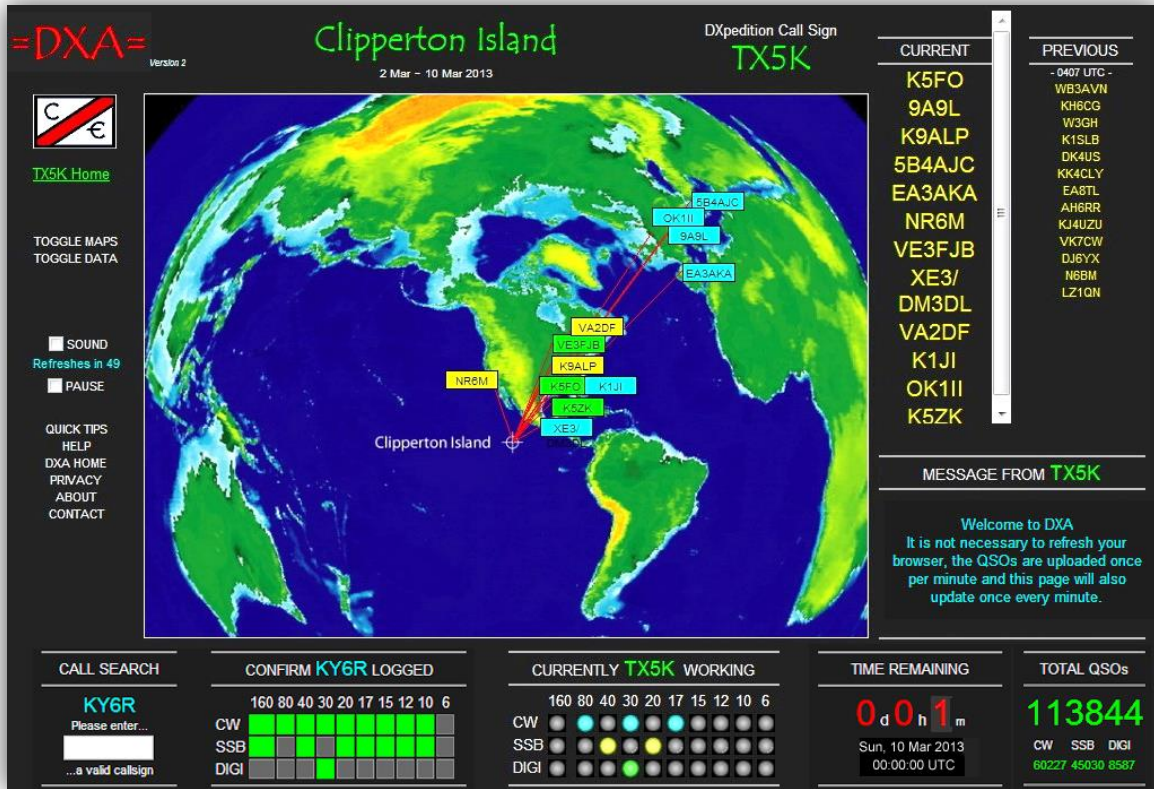


The TX5K campsite, situated in front of a palm grove, on an open flat sand deposit, with the lagoon in back



The TX5K campsite as left by the team. No debris was left and no damage was done to the environment

DXA Screen



The DXA screen presents information to assist a DXer in making a valid contact with the DXpedition. It is automatically updated from the radio log on the island once per minute. The parts that are updated include the flags and leaders on the map, the two lists in the upper right, the CURRENTLY WORKING table, and the TOTAL QSOs table. If a callsign is entered in the SEARCH box at left, and a new band/mode QSO is made in the 1-minute interval, the CONFIRM LOGGED table is updated also updated.

The CURRENTLY WORKING table (bottom center) shows which band/modes the DXpedition used in the last minute.

Toggle and links in the left-hand column provide display options and information pages. The TIME REMAINING display at lower right is a countdown clock to the projected shutdown time. The MESSAGE box enables the administrator to display a message to the public, to the pilots, or to the other administrators.

The screenshot shown above was made after the last QSO was logged by TX5K, i.e., after all radio operations were shut down. The total number of QSOs was later revised to 113,601.

The system necessary to make this work includes: (1) The operating radios with logging computer interface; (2) A WiFi network to enable networking all the logging computers; (3) A dedicated computer to collect the log data from the WiFi network and software ("Console") to packetize the data and present it to the satellite link; (4) An Inmarsat satellite link operating in BGAN mode; (5) Software ("Collector") on a server to receive the packets and parse them to distribute the data; (6) The DXA HTML web page (above) to read the data and send it to a requesting client.

DXA version 2 was used on the Clipperton 2013 DXpedition; DXA version 3 is in the design stage.

Permits



HAUT-COMMISSARIAT DE LA REPUBLIQUE EN POLYNESIE FRANÇAISE

Cabinet
N°HC 3666/CAB/SSIRI

Papeete, le 20 DEC. 2012

Monsieur,

Par courrier en date du 21 septembre 2012, vous avez sollicité l'autorisation de faire escale sur l'île de Clipperton du 26 février au 11 mars 2013.

Après étude par les services de l'Etat compétents de votre dossier qui ne présente pas d'expertise scientifique à proprement parler, je formule néanmoins un avis favorable pour que vous puissiez vous rendre sur Clipperton, dont je vous rappelle néanmoins le danger inhérent au débarquement et l'extrême difficulté pour y déployer des moyens de secours en cas d'accident.

Je vous rappelle également que la navigation dans la zone doit faire l'objet d'une information auprès de la station MRCC de Papeete (mrccpapeete@mail.pf).

Par ailleurs, en vertu du code de l'environnement et de son article L411-1, j'attire également votre attention, compte tenu de l'intérêt scientifique et de la nécessité de préservation du patrimoine naturel de Clipperton, sur l'interdiction générale de capture ou d'enlèvement d'espèces animales non domestiques ou végétales, qu'elles soient vivantes ou mortes.

Je vous informe également que mes services ont pris un arrêté, n°1350 du 7 septembre 2011, relatif à la protection du biotope de Clipperton nécessaire à la reproduction, à l'alimentation, au repos et à la survie des espèces (notamment concernant les colonies de fous masqués et de fous bruns).

L'ensemble des déchets et les restes d'activités devront être collectés par vos soins et évacués de l'atoll à la fin de votre escale et les lieux remis en leur état d'origine.

Vous trouverez enfin, annexé à ce courrier, un rapport d'observations que je vous demande de bien vouloir remplir puis à retourner à mes services. Ces données permettront notamment aux organismes de recherche en Polynésie française de compléter utilement leurs connaissances sur Clipperton.

Je vous prie d'agréer, Monsieur, l'expression de ma considération distinguée.

Pour le Haut-Commissaire
et par délégation,
le Directeur de Cabinet

Stéphane JARLEGAND

M. Robert Schmieler
Expédition CORDELL
4295 Walnut Blvd
Walnut Creek, CA 94596 USA



HAUT COMMISSARIAT DE LA REPUBLIQUE
EN POLYNESIE FRANCAISE
BP 115 - Papeete (Tahiti)

ANTENNE DE POLYNESIE FRANCAISE
-O-O-O-
Tél. : (689) 50 60 62 - Fax (689) 50 60 63
Dossier suivi par Madame ARITAI Léonne
Ref. : N°016/2012

**LICENCE TEMPORAIRE D'EXPLOITATION
D'UNE STATION RADIOELECTRIQUE D'AMATEUR**

Le Haut Commissaire de la République en Polynésie française autorise :
Monsieur SCHMIEDER Robert Nationalité : *américaine*
à établir et à utiliser dans les conditions prévues par l'arrêté 1573 OPT du 29 mai 1984

1 station(s) radioélectrique(s) d'amateur décrite(s) ci-dessous :

STATION(S) FIXE(S)		STATION(S) MOBILE(S)	
Nombre	4	Nombre	
Marque	Icom - Elecraft - FlexRadio - Acom	Marque	
Référence	IC 756 Pro - K3 - 6700 - 1000 (amp)	Référence	
N° de série		N° de Série	
Emplacement	Ile de Clipperton	Emplacement	
		Navire	

CLASSE 1 CEPT : Toutes bandes radioamateurs

Le titulaire de la présente licence s'engage à respecter la réglementation d'ordre intérieur ou internationale intervenue ou à intervenir en matière de stations radioélectriques d'amateur et à informer l'Antenne de la Polynésie française du Haut Commissariat de la République de toute modification apportée dans les caractéristiques, la composition ou l'emplacement de ses stations.

En outre, il devra se conformer aux conditions particulières d'exploitations indiquées ci-après :

Cet indicatif spécial temporaire est accordé pour une utilisation limitée à quinze jours sur une période de six mois (art. 4 de l'arrêté du 30/01/09).

INDICATIF ATTRIBUE : **TX5K**

Date de validité : 1^{er} février 2013

Date d'expiration : 1^{er} mai 2013

A Papeete, le 2-10-2012
Signature de l'intéressé :

Pour le Haut commissaire
et par délégation
le chef de l'Antenne de la
Polynésie française

Jean CHARTIER ANTE



Schedule

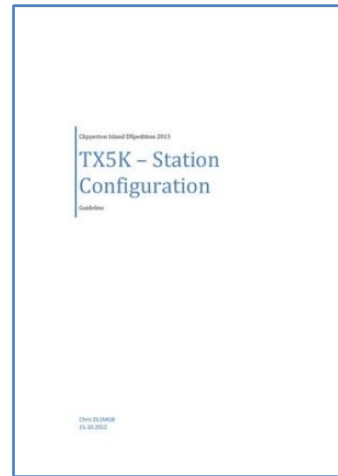
Day #	Date	Wed	Time	Location
0		Mon	1800	Lv SD
1	February	19	Tues	UW
2	February	20	Wed	UW
3	February	21	Thu	UW
4	February	22	Fri	UW
5	February	23	Sat	800 UW/Cabo/UW
6	February	24	Sun	UW
7	February	25	Mon	UW
8	February	26	Tue	2200 UW/Arr Clipperton
9	February	27	Wed	Landing/Setup
10	February	28	Thu	Setup/QRV
11	March	1	Fri	QRV
12	March	2	Sat	QRV
13	March	3	Sun	QRV
14	March	4	Mon	QRV
15	March	5	Tue	QRV
16	March	6	Wed	QRV
17	March	7	Thu	QRV
18	March	8	Fri	QRV
19	March	9	Sat	QRV
20	March	10	Sun	QRV/Teardown
21	March	11	Mon	Teardown/Loading/UW
22	March	12	Tue	UW
23	March	13	Wed	UW
24	March	14	Thu	UW
25	March	15	Fri	800 UW/Cabo/UW
26	March	16	Sat	UW
27	March	17	Sun	UW
28	March	18	Mon	1800 UW/Arr SD

Key: Lv=Leave SD=San Diego
 Arr=Arrive UW=Underway
 Cabo=Cabo San Lucas
 QRV=Radio operations
 Local (CI) Time = UTC-8hrs

Radio Equipment

Stations

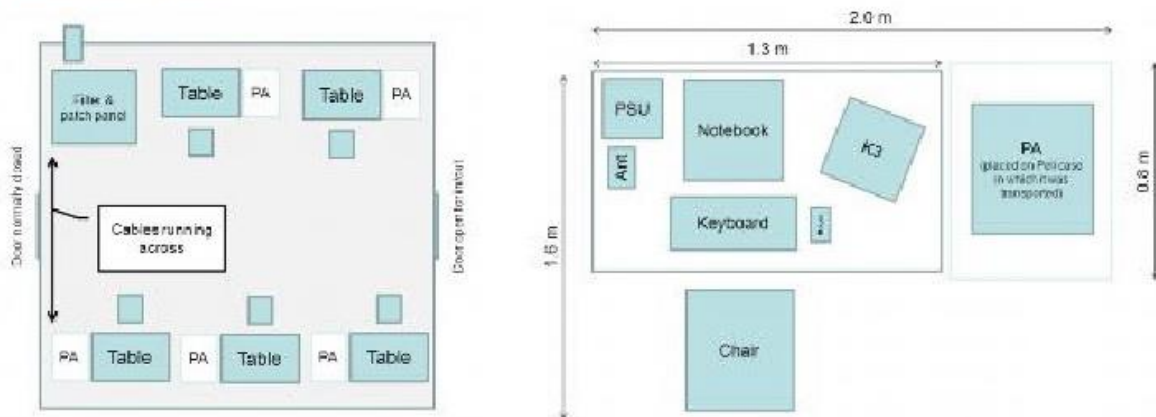
The configuration of the stations is described in the document by Chris DL1MGB. Here we provide only a brief excerpt from that document. The full document is available as a download form the tx5k website (see Bibliography).



The standard hardware configuration consists of 10 similar sets:

- Notebook with Win-Test software and connection to WLAN
- Keyboard and mouse
- Transceiver Elecraft K3 with Heil headset ProSet4 and low power bandpass filters (optional)
- Microham MKII interface
- Power amplifier ACOM 1000 or OM Power 2500
- High power 403A bandpass filters
- Antenna switching unit (VDAs and 4Squares)
- 13.8 V DC power supply
- UPS 1 kVA (optional) for continuous operation during generator refilling or maintenance

Station layout



Antennas

Except on 160m and 80m we had two antennas for each band.

CAMP A (SSB and RTTY)

40m 4-square
30m 4-square
20m 4 element vertical dipole array
17m 4 element vertical dipole array
15m 4 element vertical dipole array
12m 4 element vertical dipole array
10m 4 element vertical dipole array

CAMP B (CW)

160m 27m high vertical (Titanex V160E)
80m 4-square
40m 4-square
30m 4 element vertical dipole array
20m 4 element vertical dipole array
17m 4 element vertical dipole array
15m 4 element vertical dipole array
12m 4 element vertical dipole array
10m 4 element vertical dipole array
Beverage antenna 30°/210° for receiving on low bands

Each camp had an antenna patch panel where coax and control lines of each antenna were available for each stations of the respective camp.

Statistics of the Radio Operations

The radio operating statistics

[Source: ClubLog] The total operating time was 7 days, 19 hours, 32 minutes. The number of unique calls was 24,480. The average logging rate was 610 QSOs/hour. The cost per QSO (taken to be the total cost of the DXpedition divided by the number of logged QSOs) was \$1.70.

QSOs by Date

Date	Total QSOs	Uniques	Uniques %
09-03-2013	5432	1032	19.0
08-03-2013	15974	2593	16.2
07-03-2013	16461	2793	17.0
06-03-2013	14486	2599	17.9
05-03-2013	19789	3596	18.2
04-03-2013	20429	4554	22.3
03-03-2013	16056	4342	27.0
02-03-2013	4974	2971	59.7
Totals	113601	24480	21.5

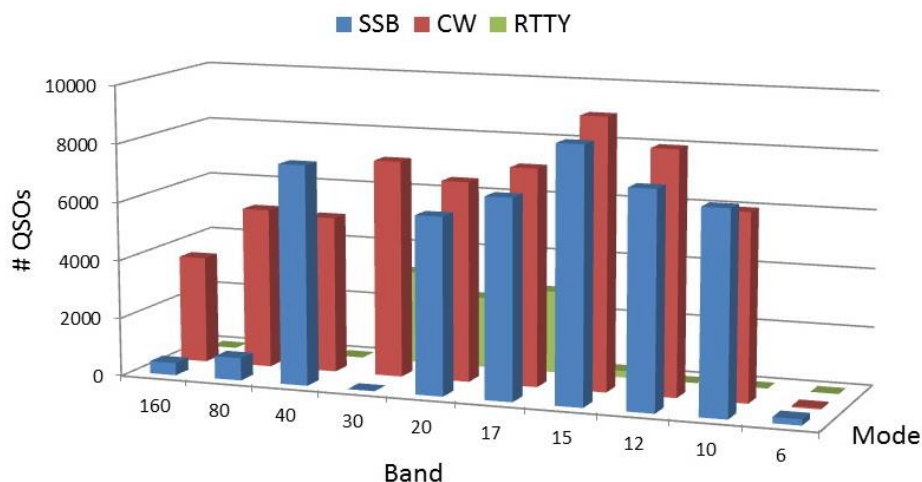
QSOs by Continent

Continent	Total QSOs	%
Africa	814	0.7
Antarctica	2	0.0
Asia	16311	14.4
Europe	34990	30.8
North America	56914	50.1
Oceania	1621	1.4
South America	2949	2.6
Totals	113601	100.0

QSOs by Band\Mode

Band\Mode	PH	CW	RTTY	JT65	Total
160	423	3662	0	0	4085
80	771	5485	0	0	6256
40	7508	5347	9	0	12864
30	0	7412	3171	0	10583
20	6048	6843	2429	0	15320
17	6812	7428	2815	0	17055
15	8686	9280	226	0	18192
12	7366	8317	0	0	15683
10	6873	6375	0	0	13248
6	208	53	0	54	315
Totals	44695	60202	8650	54	113601

The last table is plotted in the diagram below.



QSOs by Continent\Mode

Cont\Mode	PH	CW	JT65	RTTY	Total
AF	405	326	0	83	814
AN	0	2	0	0	2
AS	5593	9533	0	1185	16311
EU	10694	20841	28	3427	34990
NA	25387	27812	19	3696	56914
OC	816	701	4	100	1621
SA	1800	987	3	159	2949
Totals	44695	60202	54	8650	113601

QSOs by Continent\Band

Cont\Band	160	80	40	30	20	17	15	12	10	6	Total
AF	5	15	53	47	150	130	118	128	168	0	814
AN	0	0	0	0	1	1	0	0	0	0	2
AS	326	1070	2686	1811	1875	2155	2399	2299	1690	0	16311
EU	994	1835	4198	4451	4365	5178	5918	4922	3101	28	34990
NA	2709	3230	5586	4048	8190	8944	9044	7729	7403	31	56914
OC	29	70	191	146	322	237	234	183	205	4	1621
SA	22	36	150	80	417	410	479	422	681	252	2949
Totals	4085	6256	12864	10583	15320	17055	18192	15683	13248	315	113601

DXCC entities by Band\Mode

Band\Mode	PH	CW	RTTY	JT65	Total
160	10	79	0	0	80
80	33	90	0	0	93
40	115	101	4	0	125
30	0	112	89	0	117
20	118	116	88	0	136
17	117	120	79	0	136
15	118	126	32	0	136
12	119	129	0	0	138
10	112	113	0	0	128
6	12	9	0	23	33
Totals	154	150	109	23	166

The DXA statistics

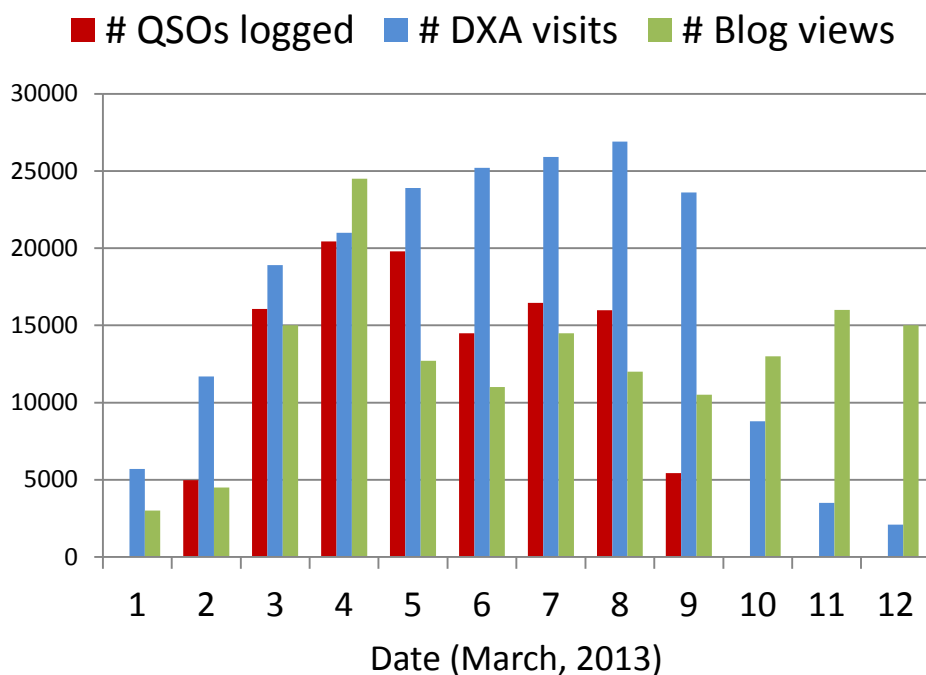
The number of visits (i.e., unique visitors) to the DXA web page was above 20,000 for six days. The total number of DXA2 hits on TX5K was about 36,467,836. It seems safe to say that for a major DXpedition, DXA will be accessed by about 25,000 different ham radio operators, who on the average will watch it about 9 hours. Interestingly, the number of unique callsigns in the radio log and in the DXA visit log are essentially the same, about 25,000.

The Blog statistics

Rich KY6R set up and maintained the TX5K blog. It received 194,647 views, with a maximum of 24,134 on March 9, the day of shutdown. Because TX5K shut down a day ahead of schedule, it is reasonable to assume that many DXers went to the blog for the news. The blog received 546 comments. Rich's last posting was the announcement of the passing of Luis XE1L.

The statistics compared

The following graph shows the daily totals of QSOs logged, DXA visits, and Blog views. It shows that although the radio activity decreased slightly during TX5K, the DXA activity increased and was appreciable even after shutdown, and the blog activity extended well past shutdown.



It is very interesting that the # QSOs and the # Blog views track rather closely; typically they are less than 20% different, in spite of rising and falling. In contrast, the # DXA visits is typically about twice the # Blog views until the DXpedition went QRT. This suggests that each DXer who made a QSO checked DXA twice and the Blog once during that day. Of course, after the DXpedition went QRT on March 9, they stopped checking DXA but kept looking at the Blog, at the rate of 10,000-15,000 each day.

Finances

The financial records for the project were kept primarily by the author and secondarily by Chris Janssen in Germany. To a first approximation, the team shares collected from the European team members were forwarded to the U.S., and are included in the listing below. The balance of money collected in Germany was used for shipping the radio equipment to/from Germany/San Diego, and for miscellaneous expenses in Europe. This report includes only those finances managed by the author in the U.S., but it likely includes the bulk of the revenue and expenditures for the project.

Balance sheet

INCOME			%
Team shares	Contributions by the team members (\$6500/person)	\$159,465.65	72.9
Donations direct	Foundations, clubs, individuals	\$23,463.06	10.7
Donations PayPal	QSL orders plus additional online donations	\$32,764.94	15.0
Fees	Fees and returns of bank account charges	-\$93.50	0.0
Souvenir sales	Books, mugs	\$1,751.00	0.8
Designated	Temporary monies for designated recipients	\$1,500.00	0.7
		\$218,851.15	100.0
EXPENDITURES			%
ATV	Rental and service of the ATV	\$1,682.79	0.8
Boat	Charter contract and misc. expenses	\$147,950.00	68.7
Communications	Satellite phones, domain, memory cards	\$1,846.67	0.9
Designated	Temporary monies for designated recipients	\$1,494.60	0.7
Equipment	Printer, water pumps, pumps, gas cans, batteries, water filters, duct fan, lights, hardware, drum pumps, Spider-beam poles, folding carts, fans, stove, etc.	\$5,583.79	2.6
Facilities	Tents, air conditioner, microwave, cots, air mattresses, bread maker, BBQ, mugs, tables, shade netting, anchors, tarps, pillows, plates, bowls, folding chairs, etc.	\$25,086.67	11.6
Fees	Bank fees	\$187.53	0.1
Food	Bread mixes, emergency food, snacks	\$559.09	0.3
Fuel	Gasoline, diesel	\$3,324.77	1.5
Generators	2 Honda 3kW	\$1,798.00	0.8
Gifts	Banners, hats, tee-shirts	\$1,406.10	0.7
Hardware	Hoses, power strips, lines, tools, batteries, etc.	\$1,928.73	0.9
Postage	QSL cards, stamps, books	\$3,337.47	1.5
Printing	Handbook, book, QSL cards, etc.	\$4,647.13	2.2
Refund	VE3CK	\$6,000.00	2.8
Scientific	Kite, netting, black lights	\$665.28	0.3
Services	Dockside, warehouse, pest control, hospitality room, etc.	\$1,432.31	0.7
Supplies	Tarps, office supplies, paper products, cleaning, sanitary	\$3,176.68	1.5
Transportation	Truck rental, shipping, misc.	\$3,321.39	1.5
		\$215,429.00	100.0
ACCOUNT BALANCE		\$3422.15	
		As of 6/7/13	

All the items in the table above are documented in the bank records, and the current (7 June 2013) balance of the expedition checking account is exactly the amount computed from the difference between income and expenditures. Thus, we feel confident that all the transactions of the expedition have been included accurately in the table.

It might be noted that in Feb, 2013, we projected the total budget as \$235,000. The lower numbers obtained on the actual expedition are due mainly to lower vessel expenses and overhead, accounting to a reduction of about \$18,500.

Projection

As of the date of this writing (8 June 2013) the finances are not yet closed. Several processes will extend significantly into the next year, in particular the QSL income and expenses, sales and shipping of souvenirs (books, mugs), and resale of some of the equipment. It should be noted that significant portions of the equipment may not be saleable, such as two Honda generators that were ruined on the Shogun due to flooding of the storage hold, the water filter system, anchors, tarps, etc. We believe we can sell the tents, air conditioner, microwave, cots, BBQ, tables, and folding chairs, but at much reduced price compared with their purchase.

The following table makes a rough estimate of the final net assets of the expedition.

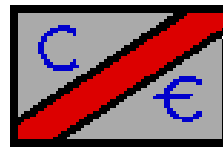
ACCOUNT BALANCE	As of 6/7/13	\$3,422.15
REMAINING INCOME		
Equipment sale	Estimate	\$5,000.00
Souvenir sales	Estimate	\$300.00
		\$5,300.00
REMAINING EXPENSES		
Debt to RWS	Misc. personal expenditures	\$1300.13
Shipping gear	Estimate	\$150.00
Postage	Estimate	\$300.00
		\$1750.13
PROJECTED NET ASSETS	Estimate	\$6972.02

However, this table must not be taken as a statement of actual conditions at the conclusion of the expedition. It has been the policy that residual assets be divided among the participants, and this will come into effect one year after the conclusion of the expedition (March 18, 2014), at which time the assets will be disposed according to the wishes of the participants.

Logos



CORDELL EXPEDITIONS



CORDELL EXPEDITIONS

Souvenirs

Tee shirts in the following designs were provided for each member of the team on Clipperton. We regret that we have no additional tee-shirts for sale.



A souvenir mug is available for \$10 from the author.

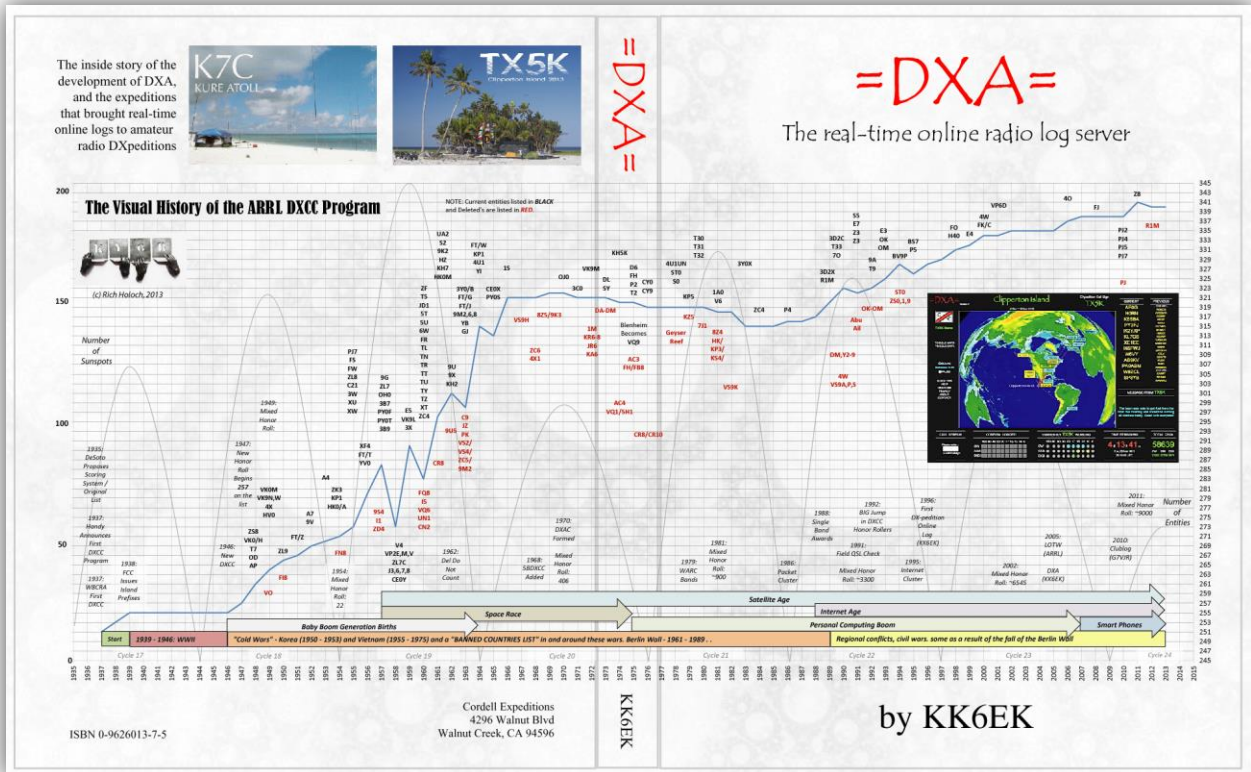


QSL Cards



The Book

A book describing the TX5K expedition is: *DXA: The Real-time Online Radio Log Server*. The book includes the inside stories of K7C (Kure Atoll 2005) and TX5K (Clipperton 2013) DXpeditions. The cover, depicting the visual history of the ARRL DXCC program, was developed by Rich Holoch KY6R.



282 pp., 16 pp. full color, perfect binding, 7.5"x10"
\$20+postage: \$3 U.S., \$16 foreign

To order:

Go to www.tx5k.org and use PayPal, or send payment direct to:

KK6EK, Dr. Robert W. Schmierer
4295 Walnut Blvd.
Walnut Creek, CA 94596 USA

The Team

The Clipperton Island Expedition TX5K was carried out under the title of Cordell Expeditions, a nonprofit research group founded by the author in 1978. Expedition Leader was Dr. Robert Schmieder (co-organizer for logistics). Co-organizer for radio operations was Chris Janssen DL1MGB.

The onsite TX5K radio team consisted of the following: Jef Claes DD2CW, Markus van Bergerem DJ7EO, Mathias Mueller DJ2HD, Gerhard Richter DJ5IW, Chris Janssen DL1MGB), Dietmar Casper DL3DXX, Andreas Paulinck DL5CW, Tom Koglin DL5LYM, Heye Harms DJ9RR, Ed Cox KE3D, Rick Royston KF4ZZ, Robert Schmieder KK6EK, Walt Wilson N6XG, Carlos Nascimento NP4IW, Yann Weber F1NGP, Giovanni Bini I5JHW, Kenneth Hemstedt OZ1IKY, Robert Lusnia SP5XVY, Igor Lazarev US0VA, Roman Granovych US5WDX, Lance Collister W7GJ, Michael Shapiro WA6O, Dave Farnsworth WJ2O, and Luis Chartarifsky XE1L

The onsite scientific/documentary team consisted of Louis-Philippe Loncke (“LouPhi”), Prof. Christian Jost, Prof. Jean Morschel, Ramon Guterrez, Christophe Bazille, and Robert Schmieder. Scientific collaborators were Dr. Mary McGann (U.S. Geological Survey), Dr. Paul Silva (Univ. Calif. Berkeley), Alain Duchauchoy F6BFH (History), and Dr. Robert Pitman (National Marine Fisheries Service).

The vessel (Shogun) owner was Ted Dunn. Crew during the voyage included Aaron Barnhill (skipper), Bruce Smith, Cole Byron, Charlie Morita, Joseph Jamous, Brett Willkinson, Byron Winn, and Josh Penny.

Event webmaster was Rich Holoch KY6R, who also maintained the blog. Technical support was provided by the other developers of DXA: Pete Bourget W6OP and Dean Davis N7XG. Technical support was provided by Alan Maenchen AD6E, Dean Straw N6BV, and Felipe Ceglia PY1NB. Pilot stations included Gary Jaeger DF2RG (Chief), Bill Horner VK4FW, Marcus Dornach DL9RCF, Craig Manning XE2HWJ, Col McGowan MM0NDX, Andre Pretorius V51B, Cesar C. Rodrigues PY2YP, Stan Schwartz KH66CG, Rex Turvin NR6M, Deepak Pathak VU2CDP, Andy Moiseev UA0BA, and Yasuyuki Inuoe JR1AIB.

QSL Managers were Bob Schenck N2OO (direct mail) and Dean Davis N7XG (OQRS).

Honorary Team and Dedication

The Clipperton Expedition is dedicated to the memory of Conrad Limbaugh. Honorary Expedition Leader was Dan Gotshall, for decades a prominent marine scientist and expeditioner. The TX5K DXpedition is dedicated to the memory of Chod Harris VP2ML, a champion of DXpeditions and editor of DX Magazine. Honorary DXpedition Leader was “Zorro” Miyazawa JH1AJT, for many years a major benefactor of DXpeditions and an active DXer and DXpeditioner.

Sponsors

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Equipment support was provided by Heil Sound, OM Power, Spiderbeam, microHAM, Alpha Amplifiers, Elecraft, Outfitter Satellite Phones, and San Francisco Kites.

Documents

A variety of documents are available on the expedition website:

Document	Format
Project description (v3.8)	PDF (5.9MB)
Landing permit	JPEG (28 kB)
TX5K radio permit	JPEG (30 kB)
Participant's Handbook	PDF (7.3 MB)
Policies and Participant Agreement	PDF (258 kB)
TX5K Station Configuration	PDF (562 kB)
PowerPoint presentation April 2013	PDF (22.2 MB)
Final Report: The 2013 Cordell Expedition to Clipperton Island (this document)	PDF (3.2 MB)

These documents can be downloaded from the following URLs:

www.tx5k.org/ (click DOCUMENTS)

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The website for TX5K is www.tx5k.org.

The website for DXA2 is www.dxa2.org.

The website for Cordell Expeditions is www.cordell.org.