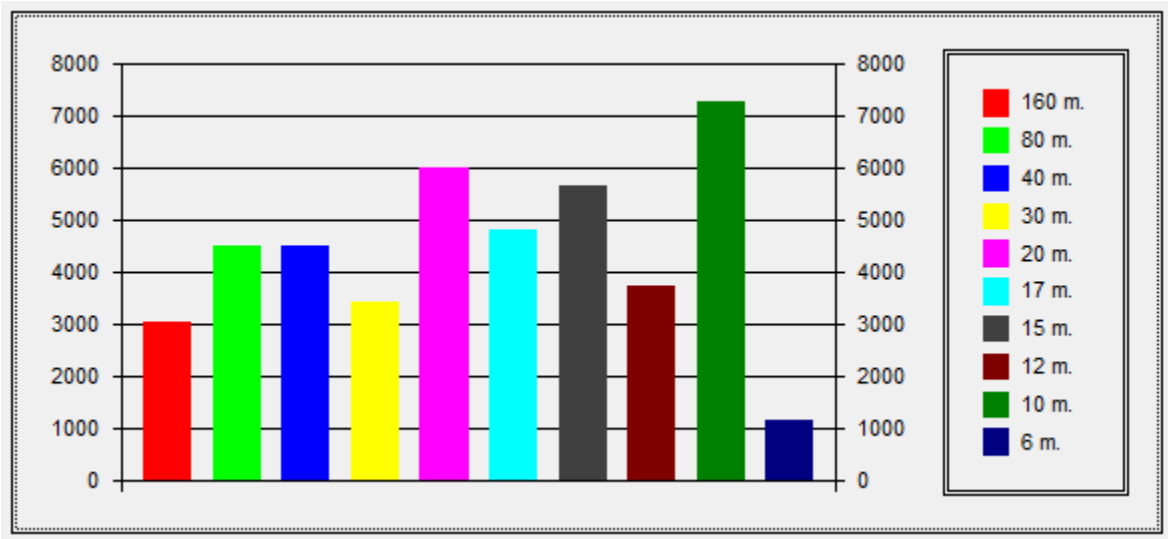
Nov 28, 2012, Natal

Summary and Conclusions

The PT0S operation was active from the Archipelago St. Peter and St. Paul between Nov 10, 2203 UTC until Nov 23, 1017 UTC. The table below shows our results.



PT0S QSO Count per Band

The PT0S DXpedition was long in the making. At the time when we started considering it, sometimes around the middle of 2011, the position of the Brazilian Navy, which controls the SPSP, was that there was no room for radio expeditions and their activities were incompatible with the mission of the scientific research station and the Navy. In other words, No DXpeditions!

Atilano, PY5EG, after a lengthy effort was able to convince the Navy that we could conduct a zero impact operation. Very reluctantly, the Navy agreed to give us (and Amateur Radio) a try. Consequently we had a lot of restrictions and a lot of uncertainty. Indeed, uncertainty was with us both before and during the entire operation, right up to the very end. Uncertainty about where and how we could operate, sleep, eat, etc. As it turned out, both the scientists and the Navy people were incredibly helpful and accommodating. Still, the uncertainty remained and it continued influencing our decisions during the entire operation.

We arrived on morning of Nov 10 and set to work on Station 1 and its 160 - 10 meter antenna. The station was ready by 2200 UTC. As usual, we started on 160 meters. Noise was S9+10 dB but we were hoping that there would be some TB

stations that could put a S9+10dB signal into the middle of the Atlantic. There sure were! That night we made around 300 QSO-s on 160. Obviously, we were working the big guns. Next day we built Station 2 (with its 80 to 10 meter antenna). The 6 m antenna was next, along with an intense hunt for noise sources. By day three we had three stations and got rid of most of the noise. We also had a good RX antenna with a remote pre-selector-amplifier covering 160 to 10 meters. We were up and running but we were getting very little sleepy. There was no place for us to sleep during the day, and during the night we were often running all three stations. By the end of day 3 we were walking like zombies.

Then uncertainty struck: the scientists were leaving in a few days' time and an all-Navy construction crew was coming in. We received advance warning that some in the Navy did not want us to be there during their stay. We finally sorted that out (lots of back channel phone calls). The arriving Navy crew were great and had no problem with us. Furthermore, we now could have the entire lab (hurray! -- all 3 x 4 meters of it). Navy guys, however, would not tolerate our gear or anything else outside the lab. We had to move the larger part of our gear (about 500 lbs) out of sight and pull everything else back into the lab, including the third station, which we had temporarily set up on the open verandah. We were also informed that we may have to stop operations if the Navy guys found that we were in their way. We made a decision to work all the bands as hard as we could, giving out PT0S to as many as possible, just in case we were shut down early.

As it turned out, the Navy guys were very accommodating and helpful, and gradually we were able to expand our living space and even share meals and other stuff with them. On the downside, they were incredibly noisy: they had an unshielded 6 kVA generator without a muffler running all day about 10 meters outside our "shack" and at night they had loud music and other noise until late. More QRM for the 160 operator. And still no sleeping during the day.

Then the weather struck. Strong winds drove large waves, which, combined with the new-moon spring tides, crashed over the rocks flooding our No. 2 antenna, the strong current physically ripping out the feed-line coax and breaking the N connector of the antenna coupler. We rebuilt that and were back on 80 meters by late afternoon. The next one to go was the control cable of the main antenna coupler. Heavy wave action caused its jacked to rip over the sharp rocks. We replaced and rerouted the cable, which got us back on the air. A point to make here is that we could only work on this antenna safely at low tide. At high tide, there were huge waves washing over the rocks surrounding the antenna base. It was dangerous and very wet.

All this time we continued operating. In our efforts to maximize the QSO count we did let some of the pile-ups get out of hand. They were huge and difficult to control. PT0S was in a unique location: being in the middle of the Atlantic, just a little bit north of the Equator, we had most bands (including 160 meters) open for

substantial amounts of time to both EU and NA, and at times, to even Asia (JA). Combined with the high interest, this made for some large and ferocious pile-ups. Indeed, because of some of the negative feed-back (some of it deserved, some not) we stopped working 12 m SSB, realizing that the band was just too narrow for the pile-ups we were generating.

There was no shortage of poor behavior on most bands, SSB generally worse than CW. Apart form the jammers, we had "constant callers", stations that kept calling even during QSO-s or when the operator has asked for a completely different partial call. Very annoying and often they slow down the entire pile-up. We had a policy that once a station was picked up with a partial call, we would stick with that caller, whatever it took to complete the QSO (within reason). The constant callers were often a major obstacle in this regard. What is more ridiculous, is that the entire process was clearly visible on the SDR/CW-skimmer, which showed all the callers, the persistent ones and the ones who just made a mistake by calling out of turn. Perhaps publishing screen shots could act as a deterrent, as the skimmer shows all the call-signs involved.

In a pile-up the operator has two conflicting options: he can try to keep the pile-up tight but his QSO rate will be greatly reduced. Or, he can work a wider pile-up where the QRM is less intense and enjoy a higher QSO rate, and be able to work weaker stations. The ideal is somewhere in the middle, but that is easier said than done.

From day one we were uploading logs. According to the "plan" we were supposed to have access the high-speed Internet facility of the scientific station. Unfortunately for us, it was not working during the entire time we were on the rocks. Instead, we our Iridium sat-phone that we brought as a back-up. Because of its low speed (2.4 kbps) the phone was totally unsuitable for uploading logs. All logs had to cut into 10 kbyte pieces, compressed and sent piecemeal. Tamas, HA5PT, pieced the log fragments together for the log search and the LoTW submission. To get the clearest shot at the satellites, we took the sat-phone and computer to the top of Belmont (about a 300 foot climb) two or three times a day. We probably spent two to three hours on log uploads per day!

Equipment:

Station 1:

The antenna, which covered 160 to 10 meters, was a two part antenna: one part, for the low bands, was an Inverted L with a 16 meters long vertical section and a 12 meter long horizontal section. The second part, for the bands above 30 meters, consisted of three wires forming skinny tri-angle about 2 meters wide at the top and about 6 meters tall. The antenna was fed via a dual output home brew automatic antenna coupler mounted to the lower segment of the antenna pole. The antenna was located on top of a rocky outcropping that jutted into the

sea, about 8 meters (25 feet) above the water at low tide. At high tide waves were crashing on and around the base of the antenna. A large number of radials (40+) of various lengths were draped over the rocks, most of them ending in the surrounding salt-water. The rocks beneath the antenna had numerous cracks and crevices leading down to the water. There were also pools of salt-water all over the rocks. (See pictures.) The antenna had a clear shot over open water from the East to the West and was somewhat obscured to the west-south-west by the peak of Belmont.

The radio was a K3, driving a dual SG-500 amplifier for an output of 1 kW.

Station 1 also had an extensive RX setup intended for the low bands. There were two RX antennas. One , facing north, was a 4 m x 4 m flag, erected on the very steep north facing slope of the peak, about 2 meters above the rocks and 20 meters above the water. A second flag of similar size was erected on top of the peak, next to the light house. This flag was facing south, which was LP to JA. The two RX antennas were connected to a custom built remote pre-selector and amplifier. The pre-selector had 9 sharp band-pass filters, selectable from the operating position. The pre-amp had a gain of 25 dB and a very low noise figure. (See Gary, KD9SV for info.) The pre-selector was connected, via 100 meters of RG-6 coax, to a receiver front-end, which contained RX antenna switching, remote controls for the pre-selector, a second low noise pre-amplifier (10 dB gain) and an output splitter to feed the K3 RX input and an QS1R SDR. The SDR was running CW Skimmer. We ended up using this RX set-up on all bands. The LP flag was especially useful on 40 meters when working Japan in the morning. 0n 160 most of the time we had both pre-amps on for a total of 35 dB of gain. (Did not use the K3's internal pre-amp.)

Station 2:

Station 2 had a similar antenna to the Station 1, except instead of an Inverted L, the low band section was an 18 m tall vertical. Just like the Station 1 antenna, it had two sections and was driven by an automatic antenna coupler. The antenna was located is a shallow crater south of the scientific station. The location was a compromise: the original plan had it mounted on the dock (above the salt-water) but the Navy needed clear access to that space. The floor or the crater was covered with a few inches of salt-water, which sometimes rose to a couple of feet during high tide and high wave activity, that provided an excellent ground. This antenna was an excellent performer on all bands, and outstanding on 80 meters. It was perhaps our best performing TX antenna. The point to make here is that with a vertical, a good ground is more valuable than a higher location with a clear shot to the horizon. (See pictures.)

The radio was another K3, driving a single SG-500 amplifier for 500 watts output.

Station 3:

Station three had a bare-foot K3 with two antennas: a five element 6 m Yagi and a 10 m vertical. The 10 m vertical had four semi-elevated radials and was standing about .5 meter above ground level on the side of some jagged rocks (not that we had anything like ground level on the rocks). Both antennas worked well, as shown by the QSO count on 6 and 10 meters. (For a short time we used our 4th K3 on Station 3 as a monitoring radio for 6 m. Unfortunately, later we needed the spare radio and we lost that capability.)

A larger Navy crew was scheduled to arrive on Nov 23. We made arrangements with the boat, and we were hoping to continue operating through the weekend and the CQWW CW contest, but we were uncertain about the Navy letting us do so. Some Navy personnel indicated that it would be OK, while others suggested that the large crew will need all the room there was. It was all up to the brass. We assumed the worst and kept operating at full steam, making the most of our possibly limited time. By then we sometimes had four stations on the air. We have built a 10 m vertical on which we ran 10 m SSB while waiting for 6 m openings. At times we operated two 10 m stations at the same time: one CW and one SSB.

From the outset we had a number of priorities. First, we wanted to re-establish Amateur Radio as a welcome activity on SPSP. Second, we wanted a high QSO count. We also had a low band focus and wanted to work as much 160 m as possible, as well as 80 and 40 meters. In addition to all that, we wanted make sure Asia, specifically the JA-s, were given a good chance to work us. Unlike the Pacific DXpeditions -- where the JA-s have a ring-side seat -- the situation was now reversed; the JA-s would have a long and difficult path on most bands, with narrow time windows and the need to work through EU or NA "walls". During some of the windows we were requesting JA-only, which most people respected. Thanks for that! Although we listened hard for JA-s every morning and evening, on both SP and LP, we did not manage even one JA contact on 160. On 80 we made 174 JA QSO-s, most of it at our SR via LP. The figures below show the QSO distribution by continent.

CONTIN.	QSO
AF (Africa)	729
AS (Asia)	3200
EU (Europe)	20386
NA (North America)	16207
OC (Oceania)	397
SA (South America)	3034
Total: 6	43953

At the end we had 44,000 QSO-s, which were made during 12.5 days of operations. The end came on the morning of Nov 23, when the large Navy crew landed around 0900Z. The brass came ashore a bit later and at 1020 we were

told then that they will need the space we were using. We immediately made the decision to go QRT, break down the station and antennas, clean up and leave. It was all in rush, as the boat had to leave before 2 PM if we wanted to arrive in Natal in daylight. (You don't want to be around the docks in Natal at night!)

Among other considerations, we did not want to be pushy and over-stay our welcome. By felt by then that we did have a good relationship with the Brazilian Navy, which we did not want to spoil. We wanted to part with them on the best of terms, leaving the door open to future DXpeditions.

George, AA7JV