The Kingdom of Tonga (A35) is located in South Pacific; if you look up the map it's a cloud of small dots a little bit to the south of Fiji (3D2). The nearest neighbours – E5, H4, 5W and other DXCC entities, not very often heard on low bands. The nearest biggest concentration of hams is within 8000km. According to The DX Magazine survey, A35 was #98 in the 2006 Most Wanted DXCC List.

My estimated 5-hour flight from VK2 to A35 has turned into a 12-hour journey, when the pilot has identified that "a filter needed replacement". The scenery on the way to A35 is pretty boring - it looks like the plain is flying over a perfectly deserted blue territory. When finally approaching Tongatapu island (IOTA OC-049), the view through my window was quite impressive – no any lights were seen below, just a blue bottom of the ocean lighted by the wing spotlight. "Welcome to Nuku'Alofa, twelve minutes after the midnight, the outside air temperature is 29 dgr C, and humidity is 98%" – these are my first news about A35. I bet the antenna set up will be a sweating exercise. When landed, I just followed the crowd across the open field, pulling some 50kgs of wires, fibre glass tubes and other stuff in my countless bags on my shoulders. Could not really see anything in the dark, just hear the welcoming shouts of the bunch of locals meeting their relatives and friends who just arrived.

My QTH was in the Northern part of Tongatapu island. Forget the Internet, TV, mobile phones, running tap water, good food on demand, and other sins of modern life – looks like a ham radio paradise where nothing and nobody can interfere your ham radio plans. The main furniture in my shack – mosquito net. With plenty of holes in it!

Fig. 1. Welcome to the hotel "Mosquito paradise"

After surviving the first night, Tuesday morning I walked to the nearest road to get a lift to the town to get my licence. A35MT that's what I get. An hour-long trip back to my village cost me 1.5 P'anga – that's about 0.75 AUD.

Fig. 2. At the old Prime Minister's Office building – getting so long awaited licence

Back in my QTH I have tried out the SIM card I've got in the town – no coverage at all! What a perfect place without any unnecessary magnetic pollution! I did manage to find some poor coverage spots near the main road, in the village, about a good kilometre away from my shack. SMS text function did not seem to work either!

Tuesday afternoon was time for big decision – where to set up antennas. Unfortunately, not much choice was here. A narrow sandy coastline strip was too narrow –the width during the high tide was only some 8m - not good unless your plans are 2 elevated radials going along the sandy strip.

Fig. 3. The sandy coastline strip is too narrow for laying the radials. A view to JA direction.

The choice was the bush then. I've got warned by the locals though – there were some tourists from OK1 land in the village; they went to the bush for some photos and got stung by Tongan wasps. Someone even had the head doubling in size as a result. Not good I though - my headphones would be too small.

Fig. 4. You may agree it looks a bit problematic to lay the radials here

Getting through the dense bush was nearly impossible – not even speaking of laying the radials. The main antenna I had to erect was something like the famous "Battle Creek Special" Inverted L vertical for 40m/80m/160m bands, with a vertical part about 20m high (for the vertical part I have used the 18m SpiderMast with Al extension tube at the base - thank you, DF4SA). I had a spare 12m telescopic fibreglass mast which I have used as a long needle to thread my radials through the bush. I finally gave up this sport when a few 20m radials took me a couple of hours to lay, and I still had a few kilograms of radials in my bucket. I have forgotten to mention the beauty of the bush – it takes only a few seconds for the body to be covered with a grey layer of mosquitoes. The Australian "AirGuard" sprayed every two seconds did not help the situation (I recall one spray used to be enough in VK2 land to "switch-off" all the bugs for the rest of the evening). A35 mosquitoes not only sting but some of them carry dangerous virus.

I then decided to erect elevated resonating radials – a smaller number than originally foreseen ground radials. There is a belief that with a smaller number of elevated and resonating radials a similar effect may be achieved as with a bigger number of ground radials (you may be interested to read countless discussions on this topic in the Topband reflector). Having tried such setup in a number of occasions operating as VK2CCC and VK2ATZ, I have decided to go with elevated radials, mainly because in my situation it looked as if it would be easier to erect a smaller number of elevated radials – starting at the mast end at about 2.5m height they would bridge the dense bushes and slightly sloping towards the insulator end would be attached at about 2-1.5m above the ground. While it is quite easy to hook elevated radials in your backyard with a pint of cold beer in one hand, here I needed a third hand to clear my face from mosquitoes. I had to cut a "channel" for every radial to keep it clear from the vegetation. Some of the longer radials (160m and 80m) could not go through the bushes where I wanted and I had to hook additional insulators to change the direction of the radial (insulators were made from a piece of black plastic I found around).

Fig. 5. “Adjusted” direction of the 160m radial

When erecting the vertical part of the mast, I have somehow managed to injure my back and could not do any work afterwards. Nor walk. Ironically, there was no Plan B and I crawled back to the shack without any clear plans or likelihood to get well by the end of the expedition. After laying for an hour or so in the shack and having no improvement whatsoever, just feeling continuous pain in the back, I have started developing alternative plans. Decided to cut a simple vertical dipole for 17m band which seemed to be opened at that time, and to erect the dipole on the 12m fibreglass mast right next to the shack. Any bigger movement would cause extreme pain in the back and I bet for Tongan mosquitoes it was funny to look at me fiddling around the shack in small steps for another few hours, trying to tune the vertical dipole and fix it in a temporary-permanent position.

Finally the antenna was there and I was laying in the shack and running a pile up on 17m band.

Wednesday’s morning wasn’t very promising – despite an excellent mood after yesterday’s evening and morning pile-ups, my back was still aching. Cold shower in the sea, a breakfast (always the same - toasted bread and baked eggs), and I was feeling much better. Struggled back to the antenna site in the bush. Decided to limit the number of radials to be erected to 12 radials on 40m, 4 radials on 80m, and 2 radials on 160m band.

Fig. 6. A closer look at the feedpoint

The antenna I have chosen to set up was a variation of the famous 'Battle Creek Special' – it was a two-trap vertical for 3 bands (see Fig.10). On 40m band it works as a ¼

wavelength vertical with the 40m trap ‘cutting-off’ the remaining part of the antenna. On 80m band 40m trap works as ‘extension’ coil placed somewhere near the middle of the vertical part, with 80m trap ‘cutting-off’ the remaining (horizontal) part of antenna.

Fig.7. 80m band trap - 8.7w RG58 cable on 90mm diameter plumbing tube

On 160m band 40m and 80m traps work as ‘extending’ coils. Since the vertical part of the antenna on 160m band was pretty short, with only two elevated radials I did not expect it to be a good performer. Should it be called a Dummy Load Vertical instead?

Fig.8. 40m band trap – 10.3w of RG58 cable on 43mm plumbing tube

This antenna was initially tested and tuned in my VK2 QTH, but it was installed above a completely different type of ground – there was no soft soil in my VK2 QTH, just granite stones. When assembled in A35 the antenna resonated miles away from the original VK2 resonance. It seems that tuning the elevated radials has taken ages. If not the Vector Network Analyser (technology much much and much more convenient than the conventional MJF, Palstar and other “single point” analysers, although with precision far from the traditional bridge circuit) connected through the USB cable to the laptop where I could see complete picture with SWR, Z, phase and other curves in desired frequency segments, I would have died from mosquitoes. See Fig.9, the SWR curve of the tuned antenna. The bandwidth of such antenna was rather narrow if compared with a conventional single band vertical. I guess the ground system was pretty inefficient on 160m.

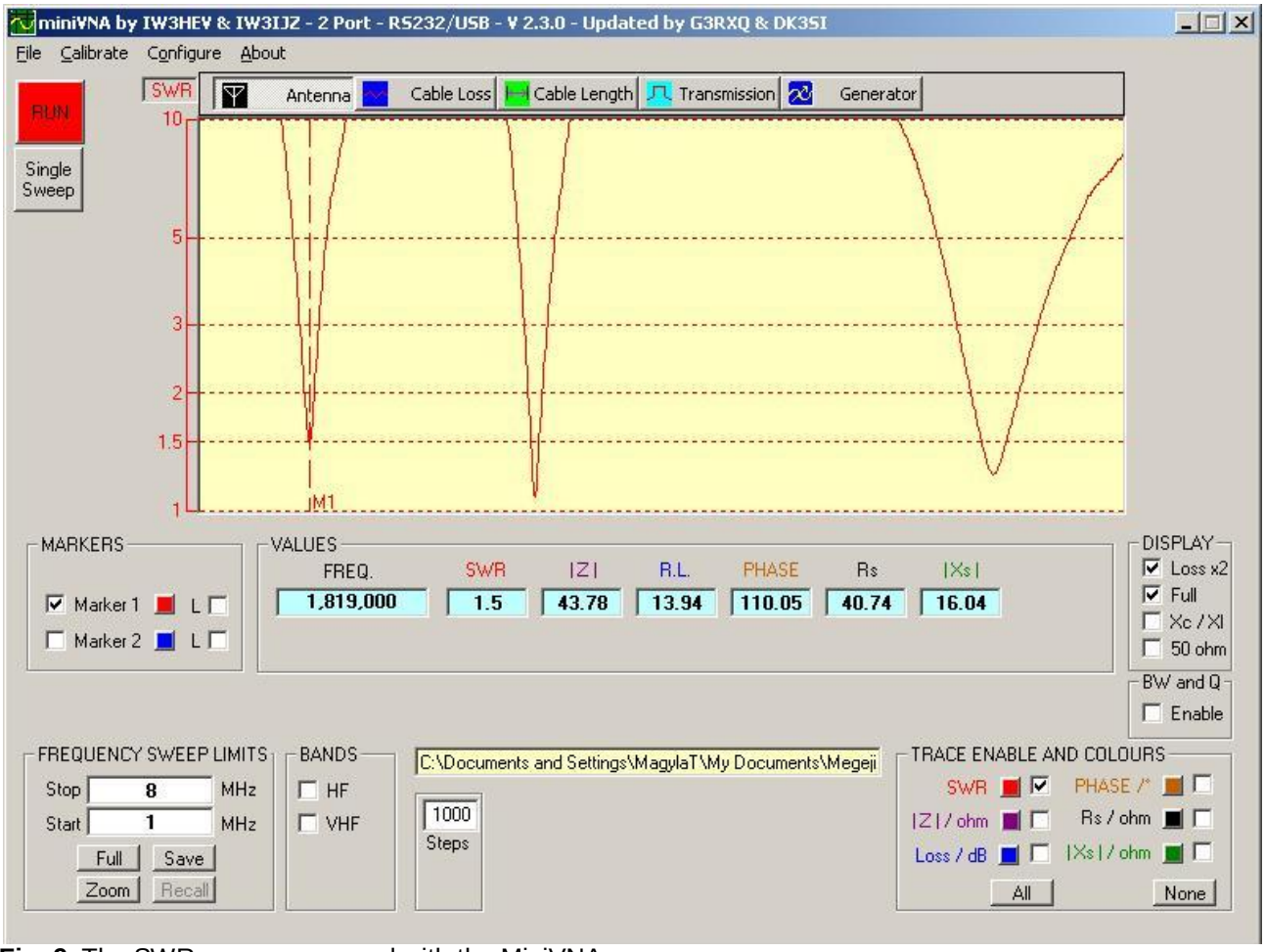

Fig. 9. The SWR curve, measured with the MiniVNA

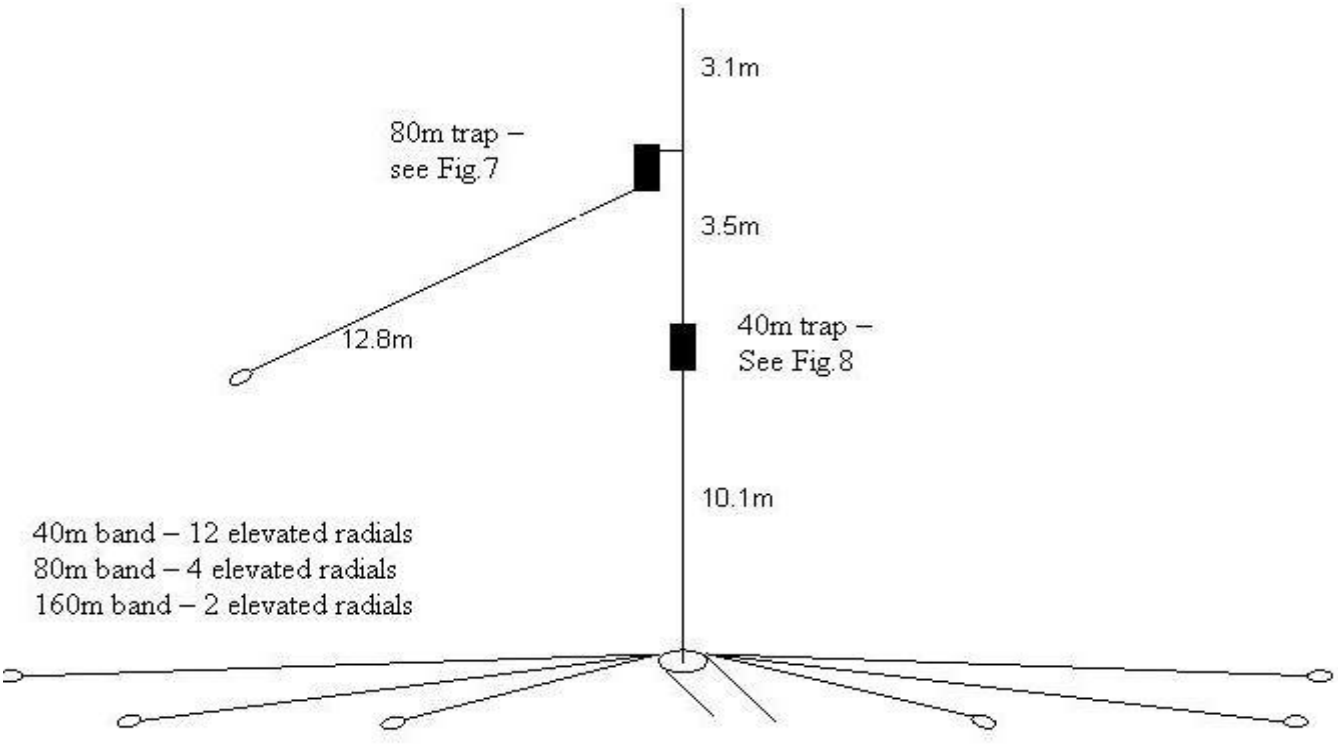

Fig.10. The main antenna at A35MT

Having started at 07 AM and finished about an hour prior to the sunset, I was back in the shack, doing the final connections. Switched the 40m band on - and – surprise surprise - could not hear anything on the CW segment as the band was buried in S9+++ impulse type QRN. I recall someone complaining in the newsgroups about the Chinese radar…

80m band was a pleasant surprise. The local time was still a good hour to the sunset, and I could hear European signals coming unusually loud for that time of the day – some of them had 579, 589 signals (well, ok, the Big Guns only); at the same time I could hear a few JA and W/K stations coming at 559 or so. I recall back in LY land in 1990-s I used to work Long Path on 80m and W/K Big Guns would be coming only at 559 LP at best on LY3BP dipole hooked high up on a local wine factory chimney.

80m definitely was the band of the choice that night, and the pile up has started. I made some 200 QSOs during the first two hours on 80m. Not too bad with 100w radio and a dummy vertical. Have tried to answer all QSY requests for 160m band. About 02 AM was my first QSO with Europe (well, European Russia – RZ4HZ). RZ4HZ gave me 589/599 report on 80m, but could hardly hear me on 160m at all – I got only 539 report. Thanks!

The purpose of my “expedition” was to give more opportunities for others to work A35 on the low bands, and not to run long pile-ups on 20m etc “easy” bands, despite the good propagation on 30m, 20m, and later on 15m. Sunset and sunrise moments were used to call CQ on 160m, and the rest of the time I used to stay on 80m, answering all the possible QSY to 160m requests. The noise floor on 80/160 was almost non-existent. The static crashes that would block everything for a second or two in my previous 3D2MT expedition, were non-existent in Tonga at all. I was not impressed with antenna performance on 160m, despite knowing that plenty of expeditions used only 2 elevated radials in a similar setup. Modest ground system, the traps, relatively short vertical part, distance from the salt water, a block of dense vegetation and a polar route to most of European countries should have made the impact. I had a series of SKEDs arranged on 1821.4kHz with my fellow LY2IJ, however during my sunrise I would only hear a marine beacon on 1822kHz.

The next day I have decided to hook a dipole for 160m if time allowing, to compare with the main antenna.

Fig. 11. My setup in the shack

However, the weather did not look very promising the next day (heavy clouds). I have tried to tune into the local broadcasting station on the MW band for the weather advice – the MW band was surprisingly deserted in this end of the World with the only station heard at about 1022kHz – Radio Tonga. “Heavy showers, and thunderstorm, wind up to 40km/h” …To avoid any QRN from the static and thunderstorms, I have decided to set up two remotely switched short Beverages – one to JA/EU, the other one to W/K direction, and then to see if I have time for the dipole. As previously experienced at 3D2MT, short Beverages did not have good directivity, but offered a much better signal-to-QRN rate. I have expected to cover Europe and JA with the same short Beverage, despite a slightly different azimuth. Trying to keep the coax as short as possible (remaining coax to be used for a dipole on 160m/80m) I have selected a place in the bush, next to the shack. While trying to clean the vegetation around a palm tree selected to support the remote end of the Beverage switch box, I have been attacked by a Tongan wasp (perhaps the same that attacked tourists from OK1 land). Trying to escape the wasp I run as fast as I could (the pain of the bite has dominated over the pain in my back) and lost all the tools, some wires, and my glasses in the bush.. An onion and a few drops of vinegar – the only medicine which local people had. Luckily, my head did not double in size, and the local people helped to find the glasses.

Back on track, alternative place found for the beverages. Beverages were finished right on time – the storm has just started, and it was time anyway for my evening session at the radio. During the next night I have spent most of my time on 80m band, piling up QSOs and experimenting with beverages. Beverages were installed some 40m away from the salt sea and while experimenting I did not notice good directivity. Surprisingly enough, there was no thunderstorm QRN, nor any static crashes and after some experiments I have connected the main TX antenna directly to the radio.

Fig. 12. Remote end of the Beverage control box

Fig. 13. The inside of the shack-end Beverage control box. Includes TX/RX antenna switching relay

Night time operation on 160m band was not very successful with a dummy vertical, so I have decided to work SOSB on 80m band in the CQ WW DX CW contest. Friday morning got up early and erected a low dipole for 80m.

Despite of the heavy rain, Friday lunch time went to the town to have some 'decent' food, and to enjoy GSM coverage. Called home and then Paul A35RK hoping for a 'two eye QSO' – unfortunately Paul got stuck in another island and was considering taking down all the antennas due to the risk of loosing all during the hurricane.

Enjoyed more pileups Friday night on 80m and 40m, when the band was still free from the radar QRM.

Due to the local time difference from GMT (Tongan time= GMT+13 hrs), the contest here started at 01:00 PM on Saturday. Just before the sunset I heard a few strong European signals (was it LZ9W and others) and a bunch of JAs and W/Ks. The first hour after the sunset was not successful – JAs and W/Ks were too busy running the pileups of locals, Europeans disappeared early, and there was literary nobody to work, no VKs and ZLs heard at all during the first hour after the sunset. After an hour things have started to improve – the next two or so hours my pace was 1 QSO per minute. After a couple of hours the pace has dropped significantly that I have start worrying whether I was still running 100w. The #98 in the most wanted DXCC list (as per 2006 survey) did not help at all. For comparison, the pace was even lower than running QRP on the 160m band last year working as J41A from Europe… All the JAs disappeared from the band early, and W/Ks that I could hear were already in my log. Surprisingly W3LPL and other Big Guns could not hear me. Must be the direction of their RX antennas. I recall a QRP QSO with W3LPL on 80m band when living in England and working as M/LY1F. I was using a short-circuited 20m band dipole against a 40cm ground rod (no radials…) When 80m got boring, I went to 160m and 40m bands to make some QSOs for „Check Log". No radar QRN on the 40m band, and plenty of stations – what a miss – I should have chosen to work SOSB on 40m band instead!!!

Local sunrise on 80m – W, JA, OC, Europe – BIG GUNS and SMALL PISTOLS were coming loud at the same time. Or was I listening on 20m band by a mistake? My friend Algis, LY7M, on 80m was coming with a solid 589 signal. I have tried to call him, but in vain. LY7M was running a good pile-up, and after having spent too much time I finally gave up – unfortunately my log was too short and I needed more QSOs. . I have tried to experiment switching between a vertical and dipole on receive and transmit – at about SR

time dipole seemed to be the same good as vertical, otherwise vertical would produce better signals. Another BIG signal on 80m was E51A. When I failed to get through the pile-up with my vertical, I switched to a low dipole – the increase was easily noticeable, perhaps some 2S in received signal. First call, and E51A was in my log. Beverages were used only on rare occasions when I would need to cancel loud JA to copy weak European signals.
A good hour after the SR, I took off the headphones and walked away to find some food for the breakfast.

Due to my travel arrangement, with my flight back to VK2 was booked for Monday morning, 10:35 Tongan Time. To be on time for the flight, I would have to finish on Monday morning very early (due to the GMT and A35 time difference, the contest would still be on) and would have to disassemble and pack all the antennas and the gear. After the breakfast (two eggs, bread, and a cup of cold tea – the same seven days in a row) I have decided to disassemble both Beverages, 17m band dipole, 80m dipole, and 40m and 160m band radials from the vertical so that for the next morning I would only need to spend my time in disassembling the vertical with 4 pcs of elevated radials.

The next night was extremely upsetting – I made some 40 more QSOs on 80m, and a pile of contacts on other bands for “Check Log”. Sorry guys for not being able to QSY to 160m band when you were asking for (VE7SV and others..) – without 160m band radials, the vertical did not resonate on 160m. It seems that antenna on 80m band without 40m and 160m band tuned radials performed much worse. No JAs were found on 80m band by midnight, all the W/K that I could hear, were already in my log. Finally fatigue has taken over me and I have fallen asleep. No alarm clock was needed – mosquitoes waked me up an hour before the SR. A good run into European Russia, surprisingly strong RA4 signals and no need for beverage or other dedicated RX antennas. A52R from Buthan called himself –was a pleasant surprise in my log.
That’s about it – Monday morning the contest was still on, but I was wrapping myself in whatever nearly dry closes I had so that to protect the skin and went to challenge Tongan wasps in the bush.

CU & 73 de LY1F
P.S. some more photos are available in my photo gallery here.

Fig. 14. I wish this field was available for lease – to set up the next A35 expedition antenna farm…