

# VHF Reflectors in Plane View

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Barry VK3BJM explores the ups and downs of chasing planes and fulfils two passions



Barry VK3BJM, morning 21/4/02, Waukaringa PF97RR

**I have a number of passions in life, and high on the list are camping and amateur radio – particularly the VHF, UHF and SHF bands. It’s true that I often combine the two. Whilst out on previous excursions, I’ve become interested in how much Aircraft Enhanced Propagation (AEP) can offer the portable VHF/UHF operator. This may be due to a “law” which states quite clearly that during a planned portable operation, Tropospheric Enhancement shall vanish completely.**

So, Necessity being the Mother of Invention, I started asking questions of those who knew about AEP, and collecting maps and flight information. My goal was to assemble a map of southeast Australia, onto which I could transfer promising flight paths. From this, I could plan trips to out-of-the-way places, from which to work back into Melbourne, or anywhere else that had established VHF/UHF stations.

Contacts using AEP occur regularly over 700km paths. It has been suggested that a particularly favourable (read large and high!) aircraft may provide propagation out to 900km – absolute tops. I am interested in this area between 700 and 900 km. I purchased some aeronautical charts (Scale 1:1,000,000) and, using tape, assembled them into a single map. The northwest corner of the map is at

Lat. 28 S, Long. 138 E; and covers all of mainland Australia south to Adelaide, and east to the Gold Coast.

## **Go Northwest, Young Man!**

I like travelling into South Australia – the Flinders Ranges is favourite area of mine – and the first flight paths I marked out were the international paths from Melbourne to Asia. One in particular caught my eye. It is an outbound route from Melbourne, called H164. If you were to draw a straight line from Melbourne Airport to Leigh Creek South, SA, then you would just about have this route plotted. Leigh Creek is about 900km from Melbourne.

I have a friend, Dave, who lives not far from this route, in Maldon, VIC. He suggested that, from visual observation, it was a busy route. I needed little more encouragement! Dave also enjoys

going bush, and required little encouragement, either.

We agreed to travel up to a spot just north of Ouyen for the first night. The next day, in order to try something a bit different, we would continue on through Mildura before heading west across towards Lake Victoria, then north through the Danggali Conservation Park to Yunta. We would then whiz up the Barrier Highway towards Manna Hill – which happens to be under the H164 route. Day 3 would see us go back towards Yunta, then northwest to the old Waukaringa Goldfield. Day 4 would be a long drive back to Maldon, going via Broken Hill.

## **Our portable station:**

As we were going to attempt contacts over a sizeable distance, I chose to take a sizeable antenna array. On 2m, this consisted of a pair of 10-

element, DL6WU-design yagi. These would be "stacked", with a three-metre spacing, hopefully to give us in the order of 14dBd gain. There was also a 15-element, DL6WU-design yagi for 70cm, to go on the six-metre mast. These would all be connected to an Icom IC-706 MkIIG, with power amplifiers providing 160 watts on 2m, and 100w on 70cm. I planned to use a "RAJE Electronics" PIC-based CW keyer, to save my larynx.

There was also an Icom IC-729, to provide HF liaison on 40 or 80m, connected to a wire vertical supported by a "Squid-pole" – a 7-metre, telescoping, fibreglass tube.

### Day 1:

Mathematically, the number of possible delays in leaving on schedule is the square of the number of trip participants. We left Maldon at 0630z Thursday afternoon (18/5/2002), a few hours behind schedule. Arriving at Wedderburn gave us an opportunity to meet Des VK3CY, for the first time, and for Des to see the horizontally polarised mobile antenna that I use for 2m – known as a "Big Wheel" or "Cloverleaf". This was an opportunity too good to miss for all concerned. We moved on a bit after 0700z.

Having had an example of haute cuisine, Sea Lake style - a warning shout of "Don't mind the noise", as the box of frozen meat patties were dropped on the concrete floor to break them up, being an example of the banter that should earn the chef his own TV cooking show - we motored on until we arrived at Hattah at 1045z. It was too dark to find the track out to the Hattah trig point, which seemed to be the only spot acknowledged as a hill on our map. We decided to set-up camp, just outside the boundary of the National Park. I found that I had a problem with the mast, which required attention in daylight. That meant we could only erect one 2m yagi. We worked VK3CY on the "Big Wheel", and Des relayed the mast situation to others whilst we put the yagi up. We then worked VK3XPD, VK3KEG, VK3FMD, VK3II, VK3BDL, VK5DK, VK3ZQB, and VK3XDQ.

The location proved very interesting for observing aircraft. Dave spotted the first whilst we set up the yagi. A contrail lit by moonlight against a clear sky is a surprisingly beautiful thing. We saw three planes from Sydney bound for Adelaide, one outbound from Melbourne on the path to Leigh Creek, and two Melbourne-bound from Adelaide. We experimented with the last two we saw, using the Adelaide and Mt Gambier beacons. The beacons were both only 4x1 via troppo.

The first experiment involved a Sydney>Adelaide flight. The flight path was almost, but not quite parallel with our beam heading to Adelaide. We peaked the beam on VK5VF (320km away), and noted the signal as the plane strayed into the pattern of the yagi. These figures are only approximate, but at about 20 degrees from the beam heading, fast flutter appeared. The flutter reduced to a slow beat as the plane neared the horizon, and then stopped leaving a signal nearer to 5x1.

The second was with an Adelaide>Melbourne flight. This time the flight path was perpendicular to our beam heading to VK5RSE (347km to the south). Again fast flutter appeared as the plane cut the beam heading - at the peak, the RS got to 5x6. The pass was obviously shorter, due to the angle between flight path and beam heading.

Being able to see the plane, thanks to the navigation lights, as it caused these effects seemed pretty nifty.

### Day2:

We were up not long after the sun rose, and commenced proceedings with a freshly brewed plunger coffee. Little luxuries are so important! I put out a call on 2m, and worked VK3GOM, VK3AEF, VK3CY, VK3II, VK3AXH, VK3FIQ, and VK3KQB. All RS reports were up on the previous night. I called Gordon, VK2ZAB, on the mobile phone, and ran a CW keyer from 2305z to 2340z with the yagi pointed to Sydney. I believe nothing was heard. We were packed up and on the road a bit after 0001z.

We had a late breakfast and refuelled the vehicle at Mildura. Then we left the comfort of the GSM

network (HA!) and headed west to Lake Victoria, then north through the Danggali Conservation Park. The last mobile contacts we had on 2m were with VK3AEF and VK3CY, from near the Darling River Ana Branch at QF05vw. The unsealed road is fair, and the drive through this region was enjoyable, but we will probably use the bitumen more next time. We arrived at Yunta at 0630z, and headed for Manna Hill. As luck would have it, we were unable to locate a suitable spot in the area I really wanted. The Sun was starting to set, so we decided on a ridge adjacent to a Telstra installation 15 km back towards Yunta, called Mt Edwards, PF97vm.

Of course, the Telstra installation had a paging (or similar) device on 148.810MHz. It was blarping every 30 seconds and causing a degree of de-sense to the 2m receiver, despite being half a kilometre from our position. Coinciding with our arrival, a Boeing 747 passed overhead, heading NW. It was the last plane we saw that night.

We made the modification to the mast, and erected the 2m yagi array, and the single 70cm yagi - in the dark! We checked and heard beacons from Adelaide, Mt Gambier, and Mildura – but none were terribly strong. I cooked up the pasta and the Bolognese sauce, and we ate with gusto. Unfortunately, I forgot to open the bottle of Cabernet Merlot that I'd carefully packed to go with the meal.

There were a few stations on the liaison frequency on 80m, and we discussed the pros and cons of 2m Vs 70cm propagation. It was suggested that we run the keyer on 70cm towards Melbourne for a number of hours, and we did. Sadly, Chas VK3BRZ heard nothing at Lara, though Charlie VK3FMD, in Malvern East, reported having heard one burst including the "K" at the end of a transmission. Eventually we gave up. Steve VK5RU/VK5ZBK then called us on 80m, from St Agnes (about 15km NE of Adelaide). A contact on 2m followed, and while signals were not huge, it was a comfortable QSO.

### **Day 3:**

On Saturday morning we ran the keyer again on 2m until 2300z, but without success. We packed up, and headed to Yunta. There we had a late breakfast, and a shower at the Yunta Roadhouse. Just before midday, we headed out the road to Waukaringa.

Waukaringa is located 39km to the NNW of Yunta (PF97rr), and is a goldfield ghost town. We spent about three hours exploring the area, and half an hour cutting rusty wire from around the transmission shaft. I found a large quantity of angular iron pyrites during this exercise – mostly imbedded in my back and shoulders...

There is a ridge overlooking the field, and it was on this ridge that we decided to set-up camp. At about 0530z, we were told to move from 7070kHz, as the frequency would be in use for 24 hours as part of a WICEN exercise. We shifted to 7080 – and wondered how many stations would not be able to find us.

During the set-up, the squid pole suffered a mechanical failure on being raised - the wall collapsed on the lowest section. We overcame this by running a 1.8m length of galvanised pipe (that I just happened to have lying about the car) up the centre of the squid pole. We decided to only put up a single 2m yagi, and the 70cm yagi - wimps, yes. While it was still light, I cooked the pork curry, and we ate as the sun set.

We ran the keyer on 2m towards Melbourne. At 1107z, Jim VK3AEF at Nhill reported the keyer was audible. I went to voice, and a contact was completed - 5x1 each way over the 500km path. Much whooping ensued.

Charlie VK3FMD arrived on 80m a little later, with a little info on QANTAS flights leaving Melbourne. We could see planes on the flight-path regularly this time - we counted six for the night. Charlie advised there was a flight to Kuala Lumpur leaving at 1245z (2245EST). We were guessing that it would reach the mid-point about 45 minutes later. Sadly, Charlie heard nothing during a 15-minute window either side of 1330z, though 5 meteor pings were noted. During this time, I noted a station calling me. At 1347z, I swung the yagi towards Adelaide,

and again worked Steve VK5ZBK. Signals were much stronger this night (5x6), with less QSB.

Incidentally, the next plane we saw went past at 1451z - if it was "our" plane (the Kuala Lumpur flight), then perhaps the midpoint is 1 hour into the flight... We wondered – did we give up too soon?

### **Day 4:**

Again, nothing was heard on Sunday morning. We were packed up and mobile at 0020z. We then drove for a bit over 11 hours, reaching Maldon at 1245z on Sunday night. We broke the trip by a few stops, including one at the Thackaringa Microwave Repeater station where I was able to access the GSM network (Broken Hill cell) for the first time since leaving Mildura. I confess I find it astounding that there is no GSM (or CDMA) network along the Barrier Highway between Hallett and Broken Hill, considering the number of microwave repeater sites and vehicle traffic along the highway.

### **The wash-up:**

Both Dave and I had a great time. Working Jim from Waukaringa, and Steve from both locations, meant the trip was worthwhile. We didn't succeed in working into Melbourne, but I haven't given up hope. I need to do more research on the scheduling of flights, and time taken to reach midpoints. And there may still be improvements I can make to the portable station, to increase our chances of success. Erecting stacked 2m yagi arrays is a job best handled by 2 people. Fortunately, I don't think I will have any trouble getting Dave to go on another trip like this. But whether the distance between the bottom yagi and the ground is sufficient to allow the array to work as well as it should, and therefore make the whole assembly worthwhile, is open to debate.

The only downer to the trip was the loss of my 14-year old Akubra hat, somewhere around Waukaringa, we think. So if anyone should be near Waukaringa and happen upon it, or spot a wedge-tailed eagle with the brim pulled low over the beak, please let me know.