

Experiments in aircraft enhanced propagation - 1

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In November 2003, I wrote an article about my trip to Waukaringa SA, for the purpose of investigating Aircraft Enhanced Propagation (AEP) on 144MHz and 432MHz back to Melbourne. In conjunction with this, I have spent the last three years investigating AEP in far west NSW. This investigation stemmed from a trip in April 2001, to a place called Mt Manara.

In the Beginning

Mt Manara is in the Manara Hills, 60km northwest along the Cobb Highway from Ivanhoe. The purpose of the trip had been to activate the Maidenhead Locator (or “grid square”) QF17xm on 2m and 70cm, and I had expected to exploit tropospheric ducting or meteor scatter to do this. This trip fell under the definition of “Flying by the seat of your pants”. I had no idea where exactly I’d be operating from, or how the land would lie – I just knew there’d be a range of hills out there. I was lucky – I found the landowner whose property the hills were in, and he gave me permission to camp at the survey marker. The surrounding plain had an average height above sea level of 90m – the hills rose steeply from the plain, and the survey marker was at 175m ASL. It was a fabulous view!

Unfortunately, conditions to VK3 were not so fabulous, and only allowed a single CW contact, on 2m, into Melbourne. But on Sunday 22nd of April, I

was persuaded (via HF liaison) to turn the Yagi towards Sydney. I was immediately told that my CW keyer was being heard by Gordon, VK2ZAB, and to “go to voice”. Contact was made on 2m and 70cm, both with amazingly good reports (up to 56 and 54 respectively). The distance to Gordon was 680km. Later that morning I also completed on 2m with Alan, VK2DXE.

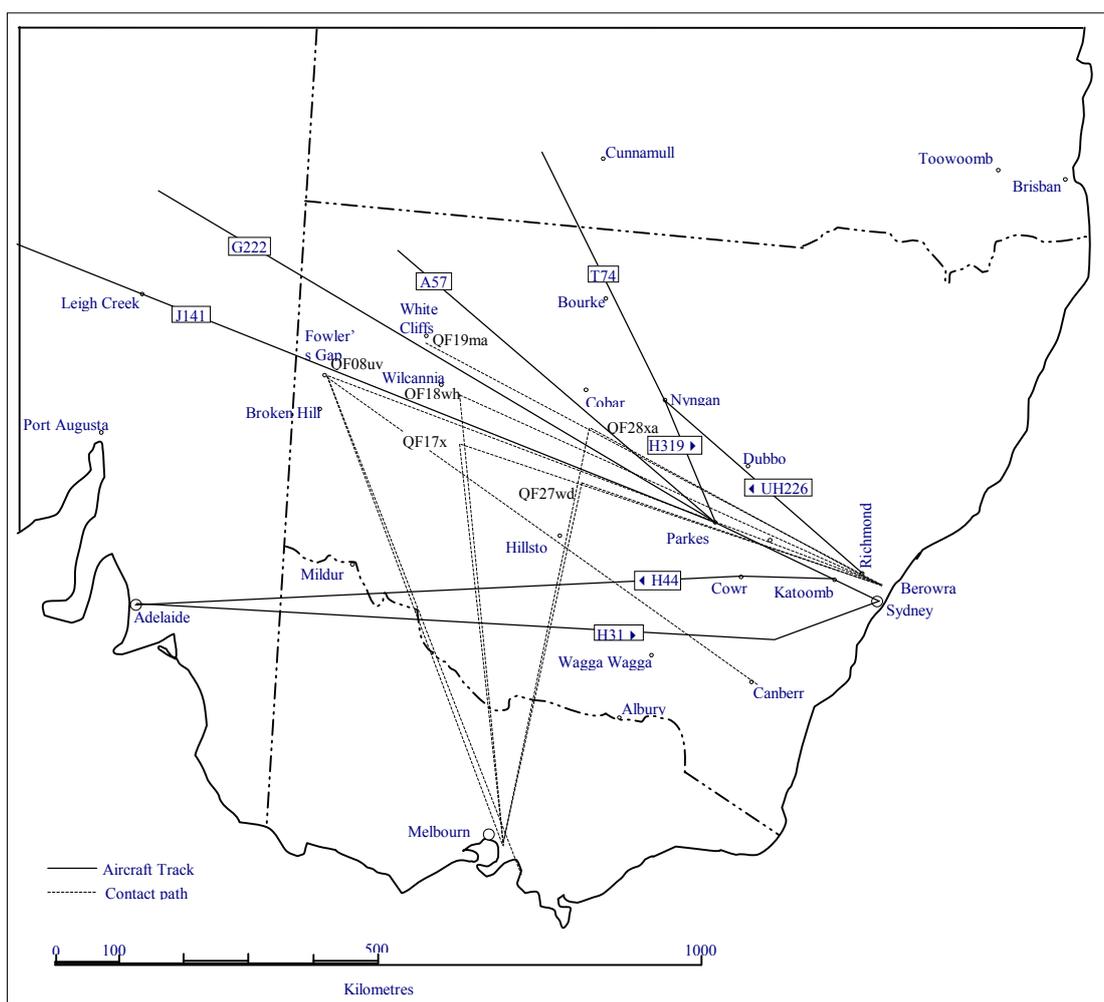
Alan was instrumental in both setting up the contacts (he was passing messages on HF) and highlighting aircraft enhancement as being the mode of propagation. At

the time he lived near Sydney Airport, and was able to tell me when an aircraft departed – we then timed starting our calls about 25 minutes later.

Finding AEP supporting communication from the far side of NSW was a big and very pleasant surprise – it turned the trip from a near disaster to a major success.

Research Time

Back home, and with the assistance of several VK’s, I started researching what was supporting these contacts. From Airservices Australia I



obtained "En Route Charts" (ERC's); charts that show details for all flight paths over Australia. I also bought World Aeronautical Charts – 1:1,000,000 scale topographic maps of Australia.

I assembled eight of these maps into a single map covering the southeast corner of Australia (south of the NSW/QLD border, and east of a line running north through Coober Pedy) and marked the high-level flight paths onto this map. When I marked on the beam heading of the contact with VK2ZAB, I could see where it intersected the flight paths.

The important paths were those that carried international flights between Sydney and SE Asia – important because they are big aircraft (like Boeing 747-400's) and they are at high altitudes (around 41,000 feet). These paths head out over Katoomba to Parkes, where they diverge and form four different paths.

The first is called J141, and it leaves Parkes on a heading of 274°, continuing to the waypoint at Leigh Creek SA. For information's sake, at Leigh Creek J141 swings to the south west to continue on to Perth via the Kalgoorlie waypoint. This path carries domestic air traffic – but at high altitude.

The second is called G222, and is a two-way international path that leaves Parkes on a heading of 282°, traveling almost in a straight line over the Ayers Rock waypoint onto Broome, where it swings onto a heading of 296° en route for Jakarta. The inbound traffic is kept separate from the outbound traffic using specific altitudes for each; the outbound (from Sydney) traffic is higher than the inbound traffic.

Next is the path A576, which heads from Parkes at 291° to Alice Springs, then over Derby to Bali. On this two-way track, the inbound (to Sydney) traffic is higher than the outbound traffic.

Lastly there is the T74 track, known as such between Nyngan and Tindal Airbase in the Northern Territory. It splits into two separate tracks at Nyngan – one (H319) to Parkes and then on to other points; the Tindal-bound path UH226 is direct from Richmond Airbase to Nyngan. Obviously for military traffic, so flight schedules are not likely to be available! However, the

traffic is very high – between Richmond and Nyngan the minimum safe altitude is 55,000 feet.

For working back into VK3, the domestic flight paths between Adelaide and Sydney were suitably located near the radio path midpoint, albeit nearly at right angles – which meant propagation would be brief.

Now that I had the propagation-supporting flight paths marked on the map, I could then select other operating spots ensuring that the beam headings intersected these flight paths in a favorable way – around the midpoint between my spot and the station to be contacted.

Trip Number 2 – November 2002

In mid-November 2002, I returned to the area for more. I had more time available, and I traveled in a large loop – up the Cobb Highway to Wilcannia, east along the Barrier Highway to Cobar, then south down the Kidman Way. I stopped overnight at four locations: (1) Mt Manara, (2) a spot in the MacCullochs Range (50km east of Wilcannia) – QF18wh, (3) near Killala Station (50km south of Cobar) – QF28xa, and finally (4) Mount Hope – QF27wd.

Sixteen contacts were made into Sydney, and with numerous stations, on both 2m and 70cm. While near Wilcannia and Cobar, I was close enough to the aircraft flight paths to see the aircraft passing – in fact they would wake me at 6am each morning. The aircraft were seen both coming from and heading towards Sydney. From Killala Station, it was just possible to watch the aircraft change course slightly as they reached the waypoint at Parkes.

Nineteen contacts from these four locations were also made back to Melbourne and Geelong, from AEP provided by the Sydney-Adelaide flight paths.

The Wilcannia – Sydney contacts were achieved at a distance of 712km, while those back to Melbourne were at a distance of 697km.

By now I had satisfied to myself that contacts from the west of NSW could be made reliably and regularly. Now I wanted to see how much further west contact could be made from. Next month I'll tell you

how the subsequent two Dxpeditons went in exploring this.