Correction!

I have read "Signals Reflected via Aircraft" in "AR" for May.

There is an error which needs correctling because it changes the phase of the particular point by a full 180°.

In the Appendix (1), third sentence reads:-

"This *appears* when the reflected signal assumes massive predominance, (etc, etc...)"

This should read:-

"This *disappears* when the reflected signal assumes massive predominance, (etc, etc...)"

Otherwise it all seems fine. Thank you.

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More on Aircraft Enhancement

In your May issue, Gordon McDonald, VK2ZAB, accuses me of adding to the body of myths, furphys, half-truths and plain nonsense existing in amateur radio lore. He finds no fault with the argument I presented in the March issue which prompts him to make the accusation, but attempts to debunk it by exception, using a mixture of overt scorn and bad mathematics.

The mathematics presented by Mr McDonald may appear plausible to the non critical reader, but in practice, they are simplistic to the extent of producing results which are seriously in error.

In presenting his maths, Mr McDonald both assumes that the Earth is flat, and ignores the 900 feet difference in elevation between the aircraft and "prism". However, the Earth is round, and the aircraft and "prism" follow circular trajectories with respect to the baseline of Mr McDonald's diagram. The aircraft elevation may be assume to start at 12km, whilst over the VK1BG QTH, but if so, it peaks at about 15.7km over the centre point of Mr McDonald's baseline.

If we assume, for the moment, that there are interfering signal paths, as Mr McDonald proposes, and correct his maths as suggested above, then we find that the difference in path length generated by the first 22 km of aircraft movement is about 6.38 metres, not 12.48 metres, as Mr McDonald calculates.

Wave cancellation takes place only once per wavelength, not twice as asserted by Mr McDonald.

Thus, the perceived beat frequency in the above situation would be about 1 in 10 secs. on 432 MHz (not 1 in 2.5), and 1 in 30 secs. on 144 MHz. This can hardly be called "flutter" - and on 2 metres, the band both VK2ZAB and VK1BG make the most use of, it would be called slow QSB and would be regarded as normal! At the limit of range at which VK1BG can "see" the aircraft (some 68 km beyond the centre) the beat on 2 metres still only works out to be about one in 5 seconds.

There are other problems with Mr McDonald's argument.

First, for significant interference to be noticed between two signals from the same source, but arriving over two paths, they must have approximately the same amplitude. Some years ago, during a social visit, Mr McDonald was good enough to calibrate my "S" meter for me. As a result of that exercise, we established that there was a discrepancy of almost 14 dB between his calculated signal strength from VK3UM and VK1BG on 2 metres, and that actually occurring, (he has not since been able to explain why the signal is so much stronger than he would have predicted). With a difference of such magnitude between allegedly interfering signals, it is most unlikely that interference would be noticed at all.

Second, Mr McDonald's "flutter" argument seems to be based on CW signals, not SSB as is normally used for aircraft enhancement work. The circuit between VK3UM and VK1BG is long, compared to a wavelength at 21 metres - in fact, there are in excess of 210,000 wavelengths involved at 144.2 MHz. If a signal at precisely 144.2 MHz happened to arrive via 2 paths in exact antiphase at the Rx, then signals about 345 Hz above and below this frequency would be in phase, and reinforce. Thus, in the passband of a normal SSB receiver there would be several adding, and several subtracting frequencies all at the same time.

To the ear, on a normal SSB signal, the effect of a slowly changing two path system over such a long circuit would be a slow change in audio quality, and the non-critical listener would probably not notice it.

Finally, the hot aircraft wake crosses the "line of sight" path from the aircraft body towards the horizon directly to the rear. Attenuation of VHF signals due to refractive scattering on this signal path would result, further reducing the potential for noticeable interference between aircraft path, and prism path signals. In other words, the wake tends to shield the aircraft itself from RF. Therefore, under the special circumstances described in my article, the wake acts to inhibit Mr McDonald's reflections from happening at all.

Like Mr McDonald, I have better things to do, and would rather not engage in further fruitless dialogue with him on this subject. As I have said to him privately, I am grateful to him for his early assistance in refining the theory presented in the March issue.

He has been consistently and resolutely opposed to the notion of a hot gas supported mode of propagation, and has, therefore, acted as an excellent critic by being very quick to point out any flaws in my reasoning. But his counter arguments now boil down to the contention that I am trying to present something new, and that, because he has not seen the phenomenon previously reported, it cannot exist. In fact, there is nothing new in what I propose - it's just a linkage of ideas gleaned from some pretty old text books.

For the record, the word "forthright" in my article, to which Mr McDonald seems to take exception was not mine. At that place in the text my draft used the word "bruising"; from the tone of his article in the May issue, you will understand that my choice of "bruising" was no accident!

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