



# A Modeling Perspective on "Ground" Planes

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Most of what we have learned about ground planes beneath vertical antennas arose from LF and MF practice. There is another perspective from which we can approach the subject: modeling in programs like NEC and MININEC. Moreover, there is an alternative point of departure for investigations to the normal survey of landscape and subsoil properties. The alternative is free space. The combination of the two underlies the notes in this collection.

My aim is not to replace classic vertical antenna theory. Instead, it is to see what antenna modeling might add to the array of considerations we give to vertical monopole antennas and their ground planes. To that end, I have let the modeling lead where it may. At most, the notes may guide some of our expectations, but they are not likely to alter our explanations.

This is all background. There are no practical antennas in these notes, although there may be a practical idea or two. For one of the best arrays of practical applications combined with recent insights into vertical antenna pattern analysis and elevated radials, see ON4UN's *Low-Band DXing*. This book is still the current standard, as are the continuing investigations of Jack Belrose, VE2CV. But if I list every classic and worthy study, this index will be longer than the notes. ON4UN has an excellent bibliography.

Since there have been numerous recent developments in the understanding of elevated ground planes, the following references are suggested:

Arch Doty, K8CFU, John Frey, W3ESU, and Harry Mills, K4HU, "Efficient Ground Systems for Vertical Antennas," *QST* (February, 1983), 20-25

Al Chrisman, KB8I, "Elevated Vertical Antenna systems," *QST* (August, 1988), 35-42

Al Chrisman, KB8I, "Elevated Vertical Antennas for the Low Bands," *ARRL Antenna Compendium*, Vol. 5 (1966), 11-18

KB8I and professional colleagues have also published a numbers of studies on this subject in the *IEEE Transactions on Broadcasting*.

L. A. Moxon, G6XN, "Ground Planes, Radial Systems and Asymmetric Dipoles," *ARRL Antenna Compendium*, Vol. 3, (1992), 19-27

Dick Weber, K5IU, "Optimal Elevated Radial Vertical Antennas," *Communications Quarterly* (Spring, 1997), 9-27

Rudy Severns, N6LF, "The Lazy-H Vertical," *Communications Quarterly* (Spring, 1997), 31-40

Rick Littlefield, K1BQT, "Build a 20-Meter DX Pole," *Communications Quarterly* (Spring, 1997), 98-102

Note: By the conclusion of this series of notes, you should understand fully why the last three articles are essentially about the same antenna.



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