



What Can We Expect from a 2-Element Beam?

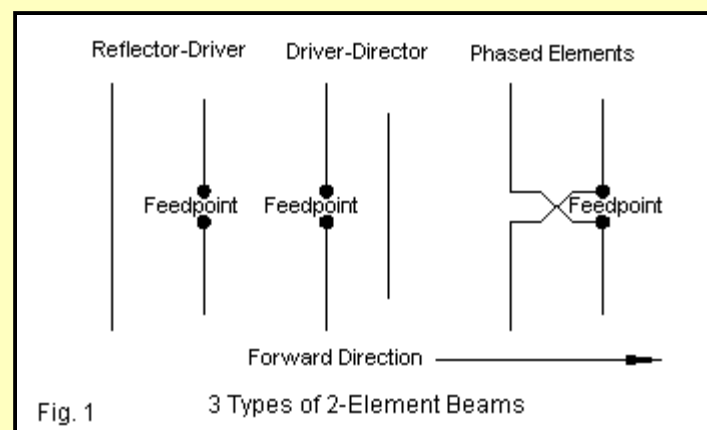


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I have heard lots of 2-element Yagi performance numbers bandied about over the years. Some are reasonable and well explained. Some are reasonable, but not well-explained. Some are unreasonable and demand explanation. The numbers are disparate enough to keep 2-element Yagi performance a mystery to the relative newcomer.

Having modeled and built a very large number of 2-element Yagis over the years, I thought a refresher might be in order, if only to clarify what count as reasonable expectations. The information is available in almost any solid reference, but perhaps a different type of presentation might be useful. If this is your first entry to these notes, I recommend that you read the parts in order.

The refresher is long and broken into a number of sections. The original version of this small series had no illustrations, but only tabular data. Since 9 years have passed since the original 1997 version of the notes, I have decided to rewrite and expand some of the coverage. In the process, I have re-modeled everything, since software has advanced considerably over the near-decade since I last examined this work in detail. Mostly, I have added some graphics to make the notes easier to digest. For example, **Fig. 1**.



The sketch shows the elements (but not the boom or the mast) of 3 types of 2-element beams, only 2 of which are Yagis. 2-element Yagi beams come in two varieties: reflector-driver arrays and driver-director arrays. Do not think of a beam like a flashlight. Consider the beam's forward direction, that is the direction in which signals are strongest (both transmitting and receiving). The reflector is simply any element to the rear of the driver, while a director is simply any element forward of the driver. For most purposes, but certainly not for all, the reflector-driver version is the more popular--and for some very good reasons that we shall note along the way. The driver-director version has some interesting properties that suit it to special purposes.

The third 2-element beam is not a Yagi. Rather, it uses a current phasing line between the elements. Only one of several possible versions appears here--the ZL-Special variety. However, one might redesign the array to have the feedpoint at the center, at the rear, or somewhere else along the phasing line. Since I have dealt extensively with phased arrays in another series of notes, we shall stick to 2-element Yagis in this series. (For information on horizontal phased arrays, see "[Some Notes on Two-Element Horizontal Phased Arrays](#)") In fact, most of the notes will apply to the reflector-driver type of 2-element Yagi because it is so versatile.

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Part 1: Method, Units of Measure, and the Dipole Standard of Reference

Part 2: The Full-Size 2-Element Yagi

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