A Yagi antenna, also known technically as a Yagi-Uda unidirectional array, or simply a Yagi, is a unidirectional antenna commonly used in communications at frequencies above 10 mhz. It was popularized in the '60s and '70s during the CB craze, at 27 mhz. This type of antenna is still very popular among Amateur Radio operators (HAMs) and very avid Citizens Band radio operators. It falls into a group of antenna structures known just as “beams”. (the other group is known as omnidirectional. Those antennas are normally vertical. It is currently used at some surface installations in satellite communications systems. A basic Yagi consists of two or three straight elements, each measuring approximately 1/2 electrical wavelength. The feed line can be balanced or unbalanced, though most often RG-58 or RG-8 was used. The Yagi is inherently a balanced antenna, but it can be fed with coaxial cable and a device called a balun at the point where the feed line joins the driven element. The driven element of a Yagi is the equivalent of a center-fed, half-wave dipole antenna. Parallel to the driven element, and approximately 0.2 to 0.5 wavelength on either side of it, are straight rods or wires called reflectors and directors. A reflector is placed behind the driven element and is slightly longer than 1/2 wavelength; a director is placed in front of the driven element and is slightly shorter than 1/2 wavelength. A typical Yagi has one reflector and one or more directors. The antenna propagates electromagnetic field energy in the direction running from the driven element toward the director(s), and is most sensitive to incoming electromagnetic field energy in this same direction. The Yagi antenna not only has a unidirectional radiation and response pattern, but it concentrates the radiation and response. The more directors a Yagi has, the greater the so-called forward gain or “beam”. As more directors are added to a Yagi, it becomes longer. Some Yagi antennas have as many as 10 or even 12 directors in addition to the driven element and one reflector. Long Yagis are rarely used below 50 mhz, because at these frequencies the structure becomes physically unwieldy. Wilson Electronics in Las Vegas, NV, popularized the structure with a beam antenna for CB called the Y-Quad. There have been numerous efforts to use this sort of antenna structure for wireless data but dish type reflectors seem to reject frequency noise much better.

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