Flat sheet reflector antenna pdf

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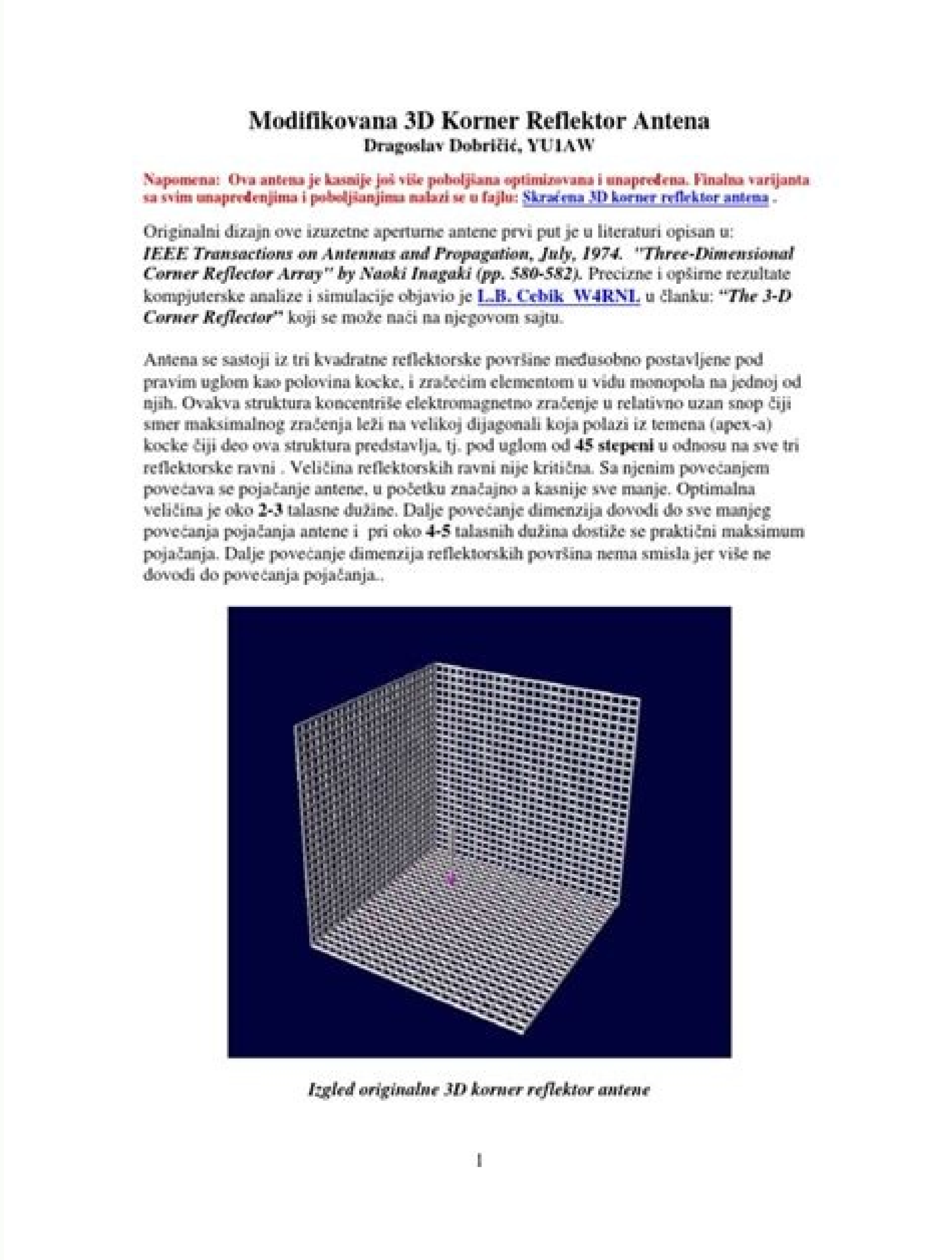

Modifikovana 3D Korner Reflektor Antena

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Napomena: Ova antena je kasnije još više poboljšana optimizovana i unapređena. Finalna varijanta sa svim unapređenjima i poboljšanjima nalazi se u fajlu: Skraćena 3D korner reflektor antena .

Originalni dizajn ove izuzetne aperturne antene prvi put je u literaturi opisan u: ***IEEE Transactions on Antennas and Propagation, July, 1974. "Three-Dimensional Corner Reflector Array" by Naoki Inagaki (pp. 580-582).*** Precizne i opširne rezultate kompjuterske analize i simulacije objavio je **L.B. Cebik W4RNL** u članku: ***"The 3-D Corner Reflector"*** koji se može naći na njegovom sajtu.

Antena se sastoji iz tri kvadratne reflektorske površine međusobno postavljene pod pravim uglom kao polovina kocke, i zračećim elementom u vidu monopola na jednoj od njih. Ovakva struktura koncentriše elektromagnetno zračenje u relativno uzan snop čiji smer maksimalnog zračenja leži na velikoj dijagonali koja polazi iz temena (apex-a) kocke čiji deo ova struktura predstavlja, tj. pod uglom od **45 stepeni** u odnosu na sve tri reflektorske ravni . Veličina reflektorskih ravni nije kritična. Sa njenim povećanjem povećava se pojačanje antene, u početku značajno a kasnije sve manje. Optimalna veličina je oko **2-3** talasne dužine. Dalje povećanje dimenzija dovodi do sve manjeg povećanja pojačanja antene i pri oko **4-5** talasnih dužina dostiže se praktični maksimum pojačanja. Dalje povećanje dimenzija reflektorskih površina nema smisla jer više ne dovodi do povećanja pojačanja..

Izgled originalne 3D korner reflektor antene

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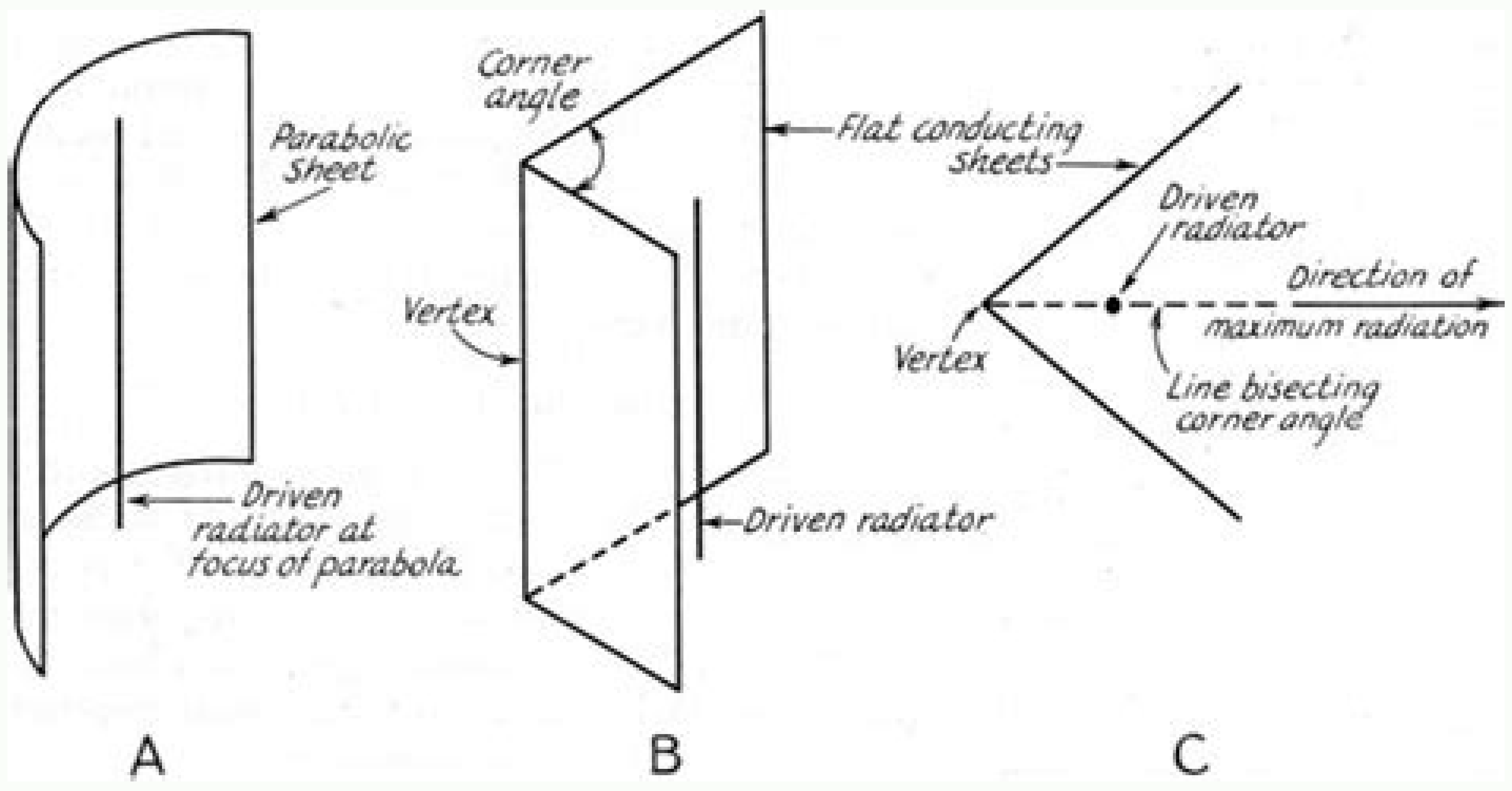

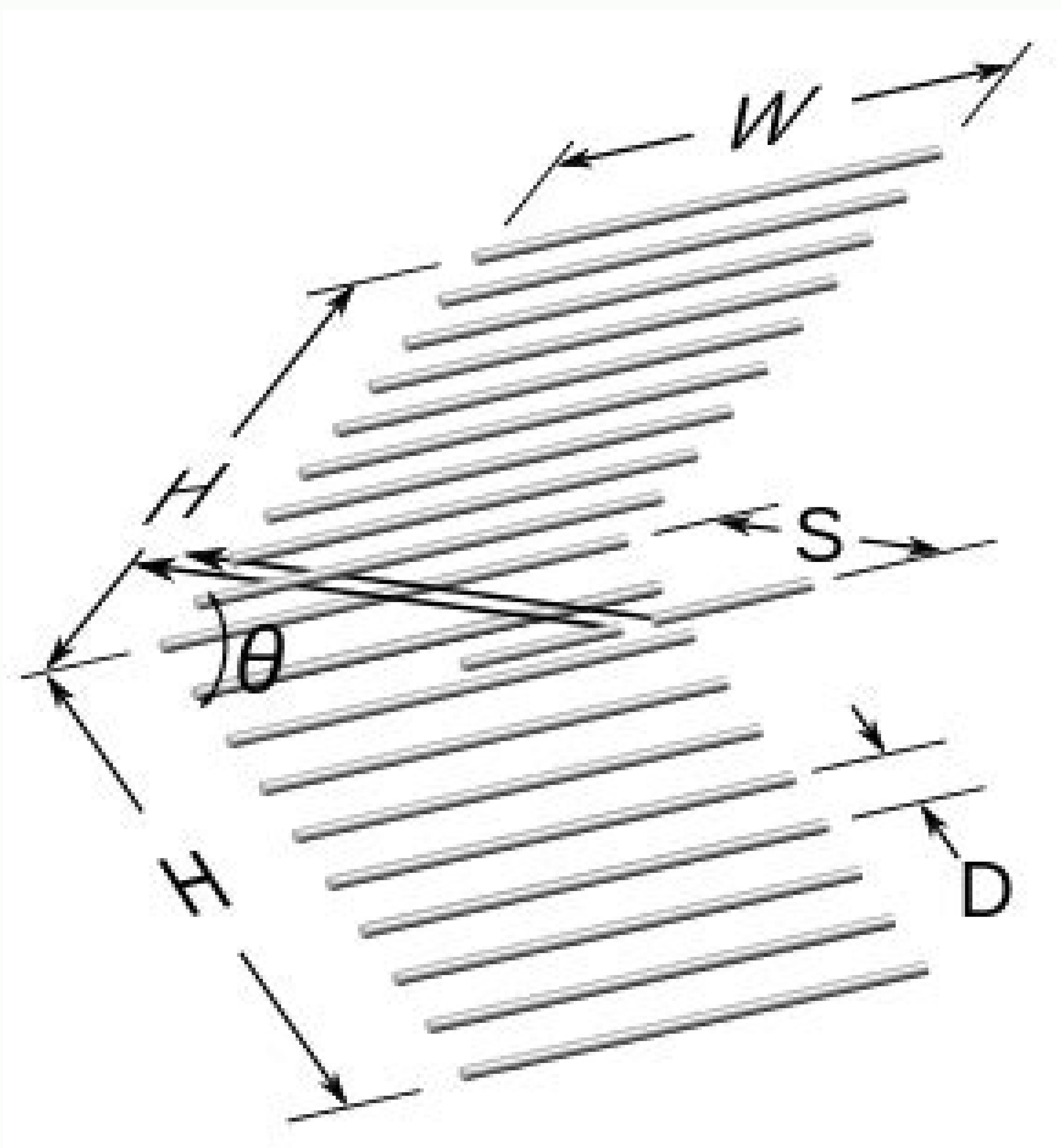

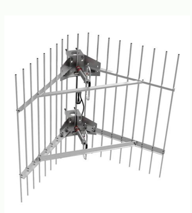

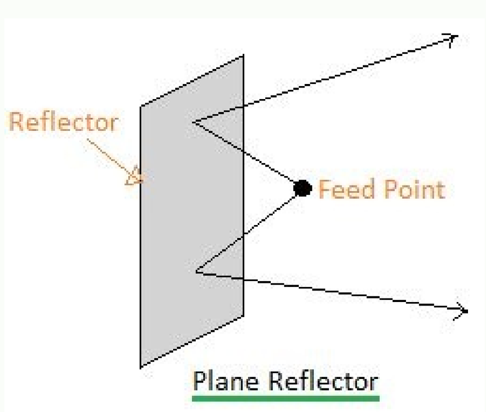

This page on Antenna reflector basics and types cover different reflector antennas viz. plane reflector, corner reflector and parabolic reflector. The equations of these reflector antennas are also mentioned. Plane Reflector Antenna The figure-1 depicts plane reflector antenna type. It consists of primary antenna and reflecting surface. With this arrangement, it is useful to radiate EM energy in the desired direction but not possible to collimate energy in forward direction. Following parameters depend on position of primary antenna and its polarization in the plane reflector antenna: • Radiation Pattern • Impedance • Gain • Directivity Corner Reflector Antenna The figure-2 depicts corner reflector antenna type. It consists of two or three mutually intersecting conducting flat surfaces. In this type, feed element can be either dipole or array of collinear dipoles. Dihedral form is most popular in this type of antenna reflector. Trihedral forms with mutually perpendicular surfaces are used for radar target application. The corner reflector antenna type is used to achieve collimation of EM energy in forward direction. It is used to suppress radiation in the backward and in the side directions. Parabolic Reflector Antenna The figure-3 depicts parabolic reflector antenna. This type of antenna has shape of paraboloid and hence it has properties of a parabola. The various feed antennas are used at focal point. Figure shows horn antenna at feed point. Let us understand operation of the parabolic reflector antenna. As shown waves generated by horn antenna are incident on reflector. The reflector reflects them back which forms plane wavefront. The radiation is concentrated along the parabola axis. The waves are cancelled in other directions due to path as well as phase differences. This way parabolic reflector antenna converts spherical wave into plane wave. Parabolic reflector is further categorized into following types based on reflector plate: • Parabolic cylinder reflector• Cut or truncated parabolic reflector • Pill box or cheese antenna reflector • Torus antenna reflector • Offset parabolic reflector antenna. Feeding for this type of reflector antenna is done using any of the following : • Half wave Dipole • Array of collinear dipoles • Yagi-Uda antenna • Horn antenna • Cassegrain feed Advantages: Small size and low cost. Disadvantages: The presence of side lobes here create EMI. The effect of EMI is more dominant in low noise receivers due to imperfections in the reflector. This is the disadvantages of this type of antenna. Antenna related links Antenna Tutorial. Table of Antenna types and gain equations. Manufacturers of RF antenna Set Top Box manufacturers Set Top Box basics TV Antenna Booster Satellite Dish Antenna Mobile Antenna Antenna Installation Antenna Calculators Antenna Gain calculator Antenna G/T Ratio calculator Parabolic Dish Antenna Antenna Near Field Horn Antenna RF and Wireless Terminologies This article has multiple issues. Please help improve it or discuss these issues on the talk page. (Learn how and when to remove these template messages) This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources: "Reflector" antenna – news · newspapers · books · scholar · JSTOR (April 2014) (Learn how and when to remove this template message) This article may be confusing or unclear to readers. Please help clarify the article. There might be a discussion about this on the talk page. (October 2008) (Learn how and when to remove this template message) (Learn how and when to remove this template message) Parabolic reflector as part of a Satellite dish An antenna reflector is a device that reflects electromagnetic waves. Antenna reflectors can exist as a standalone device for redirecting radio frequency (RF) energy, or can be integrated as part of an antenna assembly. Standalone reflectors Types of parabolic antennas Corner reflector part of a UHF television antenna The function of a standalone reflector is to redirect electro-magnetic (EM) energy, generally in the radio wavelength range of the electromagnetic spectrum. Common standalone reflector types are corner reflector, which reflects the incoming signal back to the direction from which it came, commonly used in radar. flat reflector, which reflects the signal such as a mirror and is often used as a passive repeater. Integrated reflectors When integrated into an antenna assembly, the reflector serves to modify the radiation pattern of the antenna, increasing gain in a given direction. Common integrated reflector types are parabolic reflector, which focuses a beam signal into one point or directs a radiating signal into a beam.[1] a passive element slightly longer than and located behind a radiating dipole element that absorbs and re-radiates the signal in a directional way as in a Yagi antenna array. a flat reflector such as used in a Short backfire antenna or Sector antenna. a corner reflector used in UHF television antennas. a cylindrical reflector as used in Cantenna. Design criteria Parameters that can directly influence the performance of an antenna with integrated reflector: Dimensions of the reflector (Big ugly dish versus small dish) Spillover (part of the feed antenna radiation misses the reflector) Aperture blockage (also known as feed blockage: part of the feed energy is reflected back into the feed antenna and does not contribute to the main beam) Illumination taper (feed illumination reduced at the edges of the reflector) Reflector surface deviation Defocusing Cross polarization Feed losses Antenna feed mismatch Non-uniform amplitude/phase distributions The antenna efficiency is measured in terms of its effectiveness ratio. Any gain-degrading factors which raise side lobes have a two-fold effect, in that they contribute to system noise temperature in addition to reducing gain. Aperture blockage and deviation of reflector surface (from the designed "ideal") are two important cases. Aperture blockage is normally due to shadowing by feed, subreflector and/or support members. Deviations in reflector surfaces cause non-uniform aperture distributions, resulting in reduced gains. The standard symmetrical, parabolic, Cassegrain reflector system is very popular in practice because it allows minimum feeder length to the terminal equipment. The major disadvantage of this configuration is blockage by the hyperbolic sub-reflector and its supporting struts (usually 3–4 are used). The blockage becomes very significant when the size of the parabolic reflector is small compared to the diameter of the sub-reflector. To avoid blockage from the sub-reflector asymmetric designs such as the open Cassegrain can be employed. Note however that the asymmetry can have deleterious effects on some aspects of the antenna's performance - for example, inferior side-lobe levels, beam squint, poor cross-polar response, etc. To avoid spillover from the effects of over-illumination of the main reflector surface and diffraction, a microwave absorber is sometimes employed. This lossy material helps prevent excessive side-lobe levels radiating from edge effects and over-illumination. Note that in the case of a front-fed Cassegrain the feed horn and feeder (usually waveguide) need to be covered with an edge absorber in addition to the circumference of the main paraboloid. Measurements Measurements are made on reflector antennas to establish important performance indicators such as the gain and sidelobe levels. For this purpose the measurements must be made at a distance at which the beam is fully formed. A distance of four Rayleigh distances is commonly adopted as the minimum distance at which measurements can be made, unless specialized techniques are used (see Antenna measurement). See also Lens antenna Radio astronomy References ^ J. J. Condon and S. M. Ransom. "Reflector Antennas". Essential Radio Astronomy. National Radio Astronomy Observatory.{{cite web}}: CS1 maint: uses authors parameter (link) Retrieved from " Not to be confused with Corner reflector. Corner reflector UHF TV antenna from 1954 with bowtie dipole driven element A corner reflector antenna is a type of directional antenna used at VHF and UHF frequencies.[1][2] It was invented by John D. Kraus in 1938.[3][4] It consists of a dipole driven element mounted in front of two flat rectangular reflecting screens joined at an angle, usually 90°.[1] Corner reflector antennas have moderate gain of 10–15 dB,[2] high front-to-back ratio of 20–30 dB, and wide bandwidth. Corner reflector antennas are widely used for UHF television receiving antennas, point-to-point communication links and data links for wireless WANs, and amateur radio antennas on the 144, 420, and 1296 MHz bands.[2] They radiate linearly polarized radio waves and can be mounted for either horizontal or vertical polarization. The corner reflector antenna should not be confused with a corner reflector, a passive device used to reflect radio waves back toward the source. Physical design Construction of typical corner reflector antenna. The flat reflecting surfaces can be metal sheets, but are more often made of wire screen or rod elements parallel to the driven element, to reduce weight and wind loads on the antenna.[2] The spacing of the rods D should not be more than 0.06 (6%) of the wavelength. The angle θ between the sides is most commonly 90°.[1] The gain increases as the angle narrows, but the increase below 90° is minimal, and requires longer reflector screens be used. However, angles down to 45° have been used.[2] The spacing (S) of the driven element in front of the point where the reflectors meet is approximately 0.5 λ but is not very critical; for 90° antennas the gain doesn't vary more than 1.5 dB for S between 0.25 λ and 0.75 λ.[1][2] The radiation resistance of the dipole increases with this spacing, so the spacing can be adjusted to match the driven element to the feed line.[2] Bowtie driven elements are often used for wide bandwidth applications like television antennas.[1] The antenna can be regarded as a form with a gain intermediate between a plane reflective array antenna and a parabolic antenna. Corner reflector antennas are particularly suitable in applications where a broadband directional antenna around one to 1+1⁄2 wavelengths in size is needed.[5] A parabolic dish this size has no advantage in gain over the corner reflector, so its simplicity of design and construction make it attractive. Variations Several different variations of the antenna are used The single driven element can be replaced by a Yagi array. UHF Yagi television antennas very often use a corner reflector. These antennas actually function more like two separate antennas: the corner reflector and driven element serves to provide broad bandwidth gain at the lower end of the UHF band, while the Yagi array is cut to give extra gain at the high end of the band. Monopole versions for use at lower frequencies have been built by placing vertical reflecting screens behind a vertical monopole antenna. 450 MHz homemade corner reflectorModern UHF TV antenna consisting of 3 Yagi arrays in front of a common corner reflectorLarge 37-meter-high (120 ft) two-bay corner reflector antenna for military troposcatter communication link, Massachusetts, 1955Dual stacked corner reflector UHF TV antenna. Stacking 2 antennas increases horizontal gain 3 dB.[citation needed]Vertical monopole corner reflector for HF transmission References ^ a b c d e Stutzman, Warren L.; Thiele, Gary A. (2012). Antenna Theory and Design. John Wiley and Sons. pp. 192–194. ISBN 978-0-470-57664-9. ^ a b c d e f g Straw, R. Dean (2000). The ARRL Antenna Book (19 ed.). American Radio Relay League. pp. 18.9–18.11. ISBN 0-87259-817-9. ^ Kraus, John D., US patent 2270314, Corner reflector antenna, filed January 31, 1940; granted January 20, 1942. ^ Kraus, John D. (1988). Antennas (PDF) (2 ed.). Tata-McGraw Hill. pp. 549–560. ISBN 0-07-035422-7. ^ Kraus 1940, p. 18. Further reading Kraus, John D. (November 1940). "The square-corner reflector beam antenna for ultra high frequencies" (PDF). QST. USA: American Radio Relay League. p. 18. Retrieved June 2, 2015. Technical article about the antenna by the inventor.

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