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A Critical Study Of Mcrostrip Antenna

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Most of our knowledge concerning the biological effects of radio-frequency (RF) radiation from wireless communication vices came out of investigations conducted using experimental animals, such as rats, mice, etc. When it comes to the impact of RF radiation on human health and safety, epidemiology can play a pivotal role, because it is a study of the distribution of disease and its determinants in human populations.

In aircraft and spacecraft and spacecraft applications, where size, weight, cost, performance of installation, and aerodynamic profile are constraints low profile antenna may be required. To meet these specifications microstrip antennas can be used. These antennas can be flush-mounted to mental or other existing surfaces, and they only reason only require space for the feed line which is usually placed behind the ground plane. Major operational disadvantages of microstrip antennas are their inefficiency and their very narrow frequency bandwidth which is typically only a fraction of a percent or at most a few percent.

Microstrip antennas consist of a very thin ($t << N$) metallic strip (patch) placed a small fraction of a wavelength ($h << 2$) above a ground plane. The strip (Patch) and the ground plane are separated by a dielectric sheet. The radiating elements and the feed lines are usually photo etched on the dielectric substrate. The radiating patch may be square, rectangular, circular, elliptical, or any other configuration. Square, Rectangular, and circular are the most common because of ease of analysis and fabrication. The feed line is often also a conducting strip, usually of smaller width.

Coaxial-line feeds where the inner conductor of the coax is *attached to radiating patch, are also widely used. Linear and* circular polarizations can be achieved with microstrip antennas. Arrays of microstrip element, with single or multiple feeds, may also be used to obtain greater directives.

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Because the thickness of the microstrip is usually vary small the waves generated within the dielectric substrate (between the patch and ground plane) undergo considerable reflection when they arrive at the edge of the strip. Therefore only a small fraction of the incident energy is radiated; thus the antenna is considered to be very inefficient and it behaves more like a cavity instead of a radiator.

A microstrip antenna is essentially a printed circuit board with all of the power dividers, matching networks, phasing circuits and radiators. Photo etched on one side of the board. The other side of the board is a metal ground plane and thus the antenna can be directly applied to a metallic surface on an aircraft or missile. A microstrip antenna in its simplest from consists of a thin metallic radiating patch on one side of a dielectric substrate ($\square_r \leq 10$), which has a ground place on the other side. The patch conductors can assume virtually any shape, but conventional shapes are generally used to simplify analysis and performance prediction. Ideally, the dielectric constant $\square_r$ of the substrate should be low ($\square_r$ H" 2.5), so as to enhance the fringe fields which account for the radiation feeding is often by means of a coaxial probe or a microstrip transmission line. The concept of utilizing the radiation characteristics of microstrip resonators was proposed several years ago. Since then, research into the use microstrip antennas for a diverse range of applications has proliferated, with microstrip antennas now becoming established as a separate topic in its own right within the broad field of microwave antennas. The popularity of the microstrip antenna approach stems from the fact that the structure is "Planer" in configuration and enjoys all the advantages of printed circuit technology.

However, microstrip antennas also have some antennas also have some disadvantages compared to conventional microwave antennas including

1. Narrow band width.
2. Loss, hence somewhat lower gain.
3. Most microstrip antennas radiate into an half plane.
4. Practically limitations on the maximum gain (20 dB).
5. Poor end fire radiation performance.
6. Poor isolation between the feed and the radiating elements.
7. Possibility of excitation of surface wave.
8. Lower power handling capability.

However, there are ways of substantially diminishing the effect of some of these disadvantages. For example, surface wave excitation

may be suppressed or eliminated by exercising case during design and fabrication.

For many practical designs, the advantages of microstrip antennas for outweigh their disadvantages. Even though the field of microstrip antennas now (1980) may be considered to be still in its infancy, there are many different successful application with continuing research and development and increased usage of microstrip antennas it is expected that they will ultimately replace conventional antennas for most applications. Some notable system applications for which microstrip antennas have been developed include: satellite communication, Doppler and other radars, Radio altimeter, command and control. Missile telemetry, weapon fuzing, manpack equipment, Environmental instrumentation and remote sensing, feed elements in complex antennas, satellite navigation receiver, Biomedical radiator, This list is by no means exhaustive. As awareness of the possibilities of microstrip antennas increases, the number of applications will continue to grow.

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