



# MICROSTRIP ANTENNAS

# Microstrip Antennas Introduction

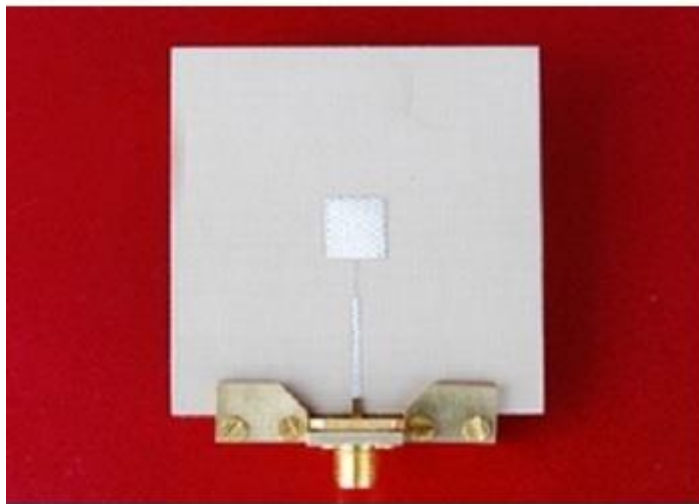


Also called “patch antennas”

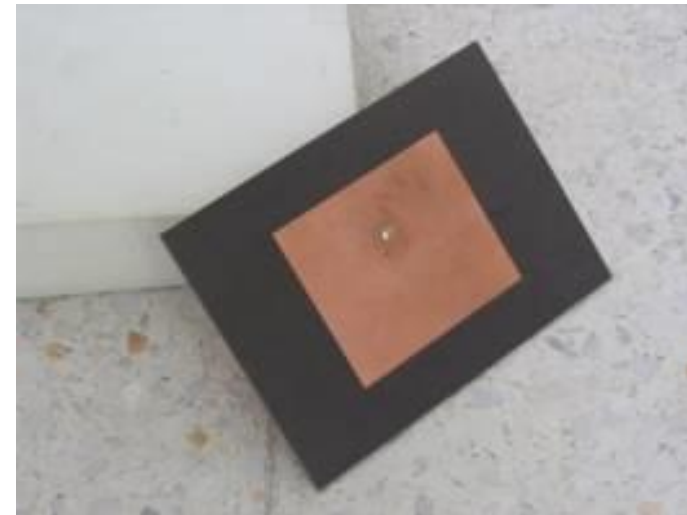


One of the most useful antennas at microwave frequencies ( $f > 1$  GHz).

- It usually consists of a metal “patch” on top of a grounded dielectric substrate.
- The patch may be in a variety of shapes, but rectangular and circular are the most common.



Microstrip line feed

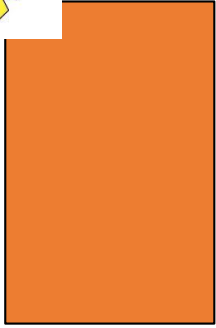


Coax feed

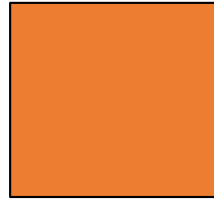
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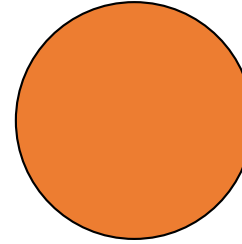
## Common Shapes



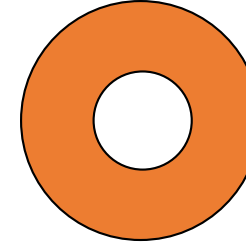
Rectangular



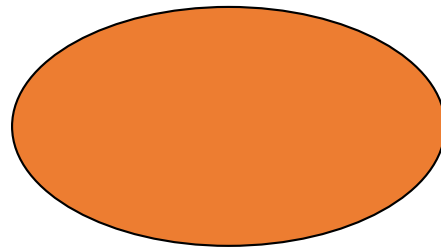
Square



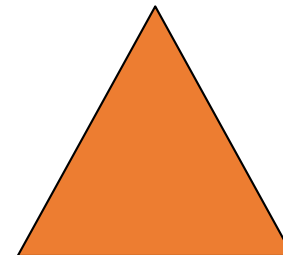
Circular



Annular ring



Elliptical



Triangular

# Microstrip Antennas Introduction



## History



- Invented by Bob Munson in 1972 (but earlier work by Dechamps goes back to 1953).
- Became popular starting in the 1970s.

G. Deschamps and W. Sichak, “Microstrip Microwave Antennas,” Proc. of Third Symp. on USAF Antenna Research and Development Program, October 18–22, 1953.

R. E. Munson, “Microstrip Phased Array Antennas,” *Proc. of Twenty-Second Symp. on USAF Antenna Research and Development Program*, October 1972.

R. E. Munson, “Conformal Microstrip Antennas and Microstrip Phased Arrays,” *IEEE Trans. Antennas Propagat.*, vol. AP-22, no. 1 (January 1974): 74–78.

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## Advantages of Microstrip Antennas



- Low profile (can even be “conformal,” i.e. flexible to conform to a surface).
- Easy to fabricate (use etching and photolithography).
- Easy to feed (coaxial cable, microstrip line, etc.).
- Easy to incorporate with other microstrip circuit elements and integrate into systems.
- Patterns are somewhat hemispherical, with a moderate directivity (about 6-8 dB is typical).
- Easy to use in an array to increase the directivity.

# Microstrip Antennas Introduction



## Applications



Applications include:

- Satellite communications
- Microwave communications
- Cell phone antennas
- GPS antennas