What makes conformal smart microstrip antennas useful for missile fuze systems

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A guidance integrated active fuze detects proximity of the missile to the target; rejects spurious signals such as clutter and countermeasures; computes a time delay to determine when the fuze pulse will be generated and sends the necessary signals to the warhead to cause detonation. The fuze may utilise angle, angle rate, range, and range rate to determine when the warhead is to be detonated.

Typically an active proximity fuze transmits from at least two antennas, one on each side of the missile, creating a 360° angle illumination and detection of the target around the missile.

A fuze can also be designed into a dual beam containing a forward beam and an aft beam. One simple approach is that if a large target flies through the beams and occupies both beams at the same time, an approximate time delay can be chosen to hit the target centre.

For dual beam fuze applications, it is desired that an antenna be capable of generating at least two simultaneous beams to meet the desired performance. It is also desired that this antenna be capable of adapting to changes in the environment so as to maintain a high-level of security of the overall fuze system. Conformal smart microstrip antennas fixed to the body of a missile attempt to understand the RF environment comprehensively, and receive and transmit selectively.

The purpose of this paper is to identify suitable microstrip antenna designs; demonstrate how such antennas can be utilised to performance of antenna arrays used in fuze systems; and explain important antenna parameters and characteristics that provide desired performance of fuze systems.