

NEW TYPES OF FLUSH-MOUNTED TELEMETRY ANTENNAS

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Summary. Over the past few years new and unique types of cavity-backed, slot antennas have been developed that mount flush to the surface of a missile. These antennas have been designed and built to operate in the 300 MHz to 3 GHz frequency range and to produce low-gain (typically isotropic) wide-angle coverage with moderate radiation efficiency. As well as insuring good electrical performance, the basic design employs a copper-clad, dielectric-loaded cavity into which the radiating slot is machined or etched. This construction technique provides four important advantages: (1) The almost arbitrary shape or form factor of the cavity allows flush mounting to the surface of the missile or sandwiching between internal components with only the radiating slot exposed to the exterior of the missile. (2) Fabrication is simple. (3) Cost is low. (4) Mechanical strength is high. The cavity backing the slot is filled with a moderately high, dielectric constant material (such as a silicone, Teflon, or epoxy fiberglass) with a relative permittivity in the 2.5 to 4.5 range to decrease the size of the cavity and to provide mechanical strength to the antenna. The RF connection to the cavity is made by an inductive post and a coaxial connector. A 50 ohm input impedance is obtained over frequency bandwidths of 3 to 10 percent. By connecting two or more of these slot antennas together in a prescribed phase and amplitude relation, the direction of the radiation pattern can be controlled. Side-looking or forward-looking patterns are possible by simple changes in feed network cable connections. The easy tunability of one of these new types of antennas allows application over greater than a 2:1 frequency range without any change in antenna dimensions.