

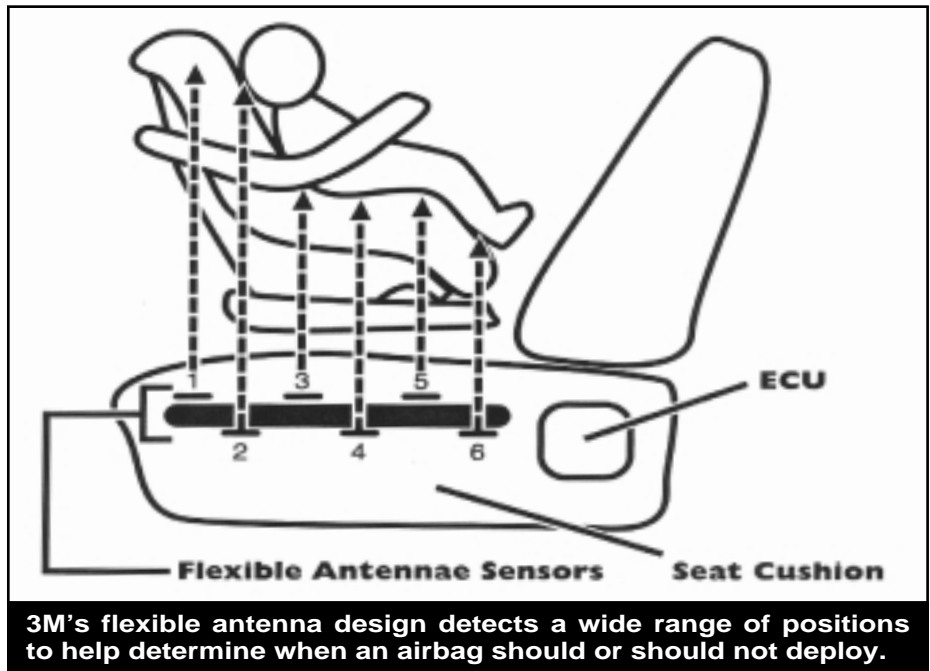
The U.S. National Highway Traffic Safety Administration (NHTSA) mandates that by 2004, 35% of new cars be equipped with occupant sensing systems linked to their airbag systems. The sensors suppress airbag deployment for babies in infant seats, small children, people below 5th percentile in size or when nobody is present. All new cars must have this capability by 2006.

Automakers and their suppliers are developing several approaches to maximize performance and minimize cost. One intriguing solution from 3M is a flexible antenna array that can be built right into vehicle seating.

3M's Electrical Products Division has been working with NEC Technologies' Automotive Electronics Division since 1998 to develop such an array for NEC's SeatSentry™ occupant-sensing system. The antenna detects the relative mass and relative position of the occupant. The antennae generate low-level electric fields that, when perturbed, can determine who, if anyone, is sitting in a seat. If a baby, child, fifth-percentile person or inanimate object is in the seat, the airbag will be suppressed or deployed more softly. The Seat Sentry meets or exceeds all NHTSA proposed rules for position sensing, which means children are detected in a wide range of positions, even if they are out of their seat belts.

"NEC's product is superior because it doesn't just measure the weight of the passenger," explains Jim Christianson, market development manager, Electrical Products Division. He says SeatSentry is more precise, reliable and cost-effective than other choices and is sensitive enough to discriminate between a 3-year-old and a 6-year-old.

The technology behind the "smart" airbag system was invented at the Massachusetts Institute of Technology.



Smarter Airbags

*3M to supply occupant-sensing antenna
for 2003 model year*

NEC licensed and developed the antenna concept and demonstrated its capabilities in a production SeatSentry system for side airbag systems. But that version used a relatively expensive woven metal cloth for antenna material. NEC wanted something less expensive with comparable or better performance and approached 3M because of the company's expertise in materials. 3M combined several of its core technologies to develop an array that met NEC's requirements.

"It was an opportunity to provide a solution, not a product," says Sywong Ngin, who led the 3M engineering team that created the specialized antenna. "We were able to give them something that was not what they expected initially but was very ideal for the intended application."

The result are sensor strips measuring about two inches wide, 16

nickel-copper-nickel layers on a polyester film that is then laminated to a flame retardant glass cloth. The construction is tough, durable, inexpensive and very flexible. It can be added to existing seat constructions, pre-mounted on foam or molded into the seat foam. Because the flexible film is so thin, SeatSentry is virtually undetectable by the user.

Once the antenna architecture has been defined, 3M works with the vehicle manufacturer and seat maker to integrate it into the passenger seat. Each antenna is designed to fit a specific vehicle seat. The first cars to employ the SeatSentry system with 3M's antenna will roll off the line in 2003. **3M**

SeatSentry is a registered trademark of NEC Technologies, Inc. To learn more about 3M's occupant sensor antenna system, call (800) 328-1684.