

Massa Proprietary *Hidden Transducer Technology* Produces Vehicle Obstacle Detection Sensors that Mount onto the Inside Surface of the Bumper or the Car Body Leaving the Exterior Surface Undisturbed

## THE PROBLEM: Existing Vehicle Obstacle Detection Systems Use Flexural Type Ultrasonic Transducers



*An Automobile Bumper Showing How It Appears with the Existing Transducers that Protrude Through the Bumper and Are Exposed*

- The surface of the transducers must protrude through the surface of the vehicle and be exposed.
- Their performance is rapidly degraded by a slight buildup of road dirt on the transducer surface.
- The acoustic frequency and radiation patterns cannot be customized.

## THE SOLUTION: Massa's "Hidden Transducers" Combine Elements of Sonar and Air Ultrasonic Transducer Design



*An Automobile Bumper Showing How It Would Appear with the Massa "Hidden Transducers" that Cannot be Seen*

- Massa "Hidden Transducers" cannot be seen.
- The sonar based Massa transducers are extremely resistant to change in performance due to normal road dirt buildup.
- Massa can customize the frequency of the transducers and both the horizontal and vertical angles of their fan-shaped acoustic radiation patterns to cover the detection area with fewer transducers.