

Achieving Cost-Effective Fuel Efficiency

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– Bill Vergin, General Manager, Flex MCI

Flex R&D Leads to Smart Airflow Controls

The pressure to create more fuel-efficient vehicles is mounting thanks to a mixture of government regulations and environmentally conscious consumers. One automaker wanted to improve its fuel efficiency by exploring an emerging trend in vehicle design—active grille shutters. These are shutters that are integrated into the vehicle’s front intake grille to alter the flow of air to the engine, promoting cooling when open and fuel-sparing aerodynamics when closed.

Active grille shutters are a relatively new technique in automotive design, and they carry some challenges, particularly in safety and durability. For example, the vendor must be confident that a grille won’t get stuck in ways that would affect vehicle performance or overheat the engine.

The automaker turned to the Flex Sketch-to-Scale™ ecosystem to help it introduce the active grille shutter design in a safe, reliable and affordable format.

Flex MCI: Combining Simplicity and Safety

The importance of active grille shutters to a vehicle’s operation, along with the technology being relatively new, means that an active grille must be factored into the earliest stages of a vehicle’s design process. Flex’s Sketch-to-Scale™ product design and manufacturing capabilities helped produce a safe, reliable and high-performance design from the outset.

Flex used its Mirror Controls International (Flex MCI) subsidiary, which specializes in advanced actuation technology for the active grille shutters to work. The company’s strong focus on research and development has created a unique array of actuators that can be used in various active aerodynamic applications.

By working with Flex and Flex MCI from the beginning of the project, the customer created a simple, highly integrated solution with fewer complex parts, beginning with a shutter system that was combined directly into the vehicle’s grille.

Although this approach is more efficient and elegant from a vehicle design perspective, Flex MCI needed to put the customer's safety and security concerns to rest. To do this, it brought to bear two features that are unique to its line of actuators.

The first is called Smart Control. This feature controls multiple actuators using a single centralized intelligence system, removing the need to put a separate printed circuit board assembly in each actuator. This enabled the customer to build a simpler, more cost-effective active grille shutter system with fewer parts that could fail.

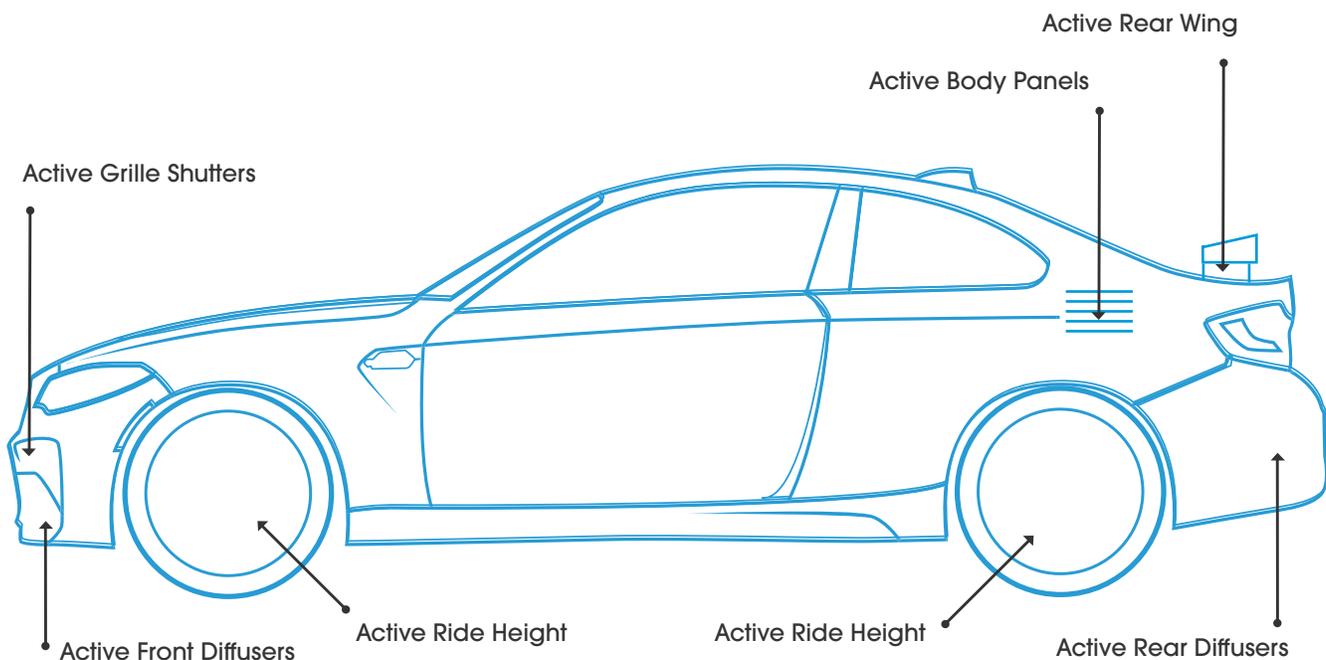
Flex MCI also made fail-safe operation a fundamental part of the actuator's design. This defaults the shutter to 'off' mode, meaning that if the system loses power or its control signal, the grille air intake would open, eliminating the risk of an overheated engine.

A More Efficient and Enjoyable Vehicle

Thanks to Flex MCI's technology, the client was able to achieve its primary fuel efficiency goals cost-effectively by reducing the drag effect from unnecessary air intake. It did this while hitting safety targets that are critical in a highly regulated manufacturing sector where the cost of product recalls can run into the millions of dollars.

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The automaker also reaped some additional benefits from the active grille shutter. A more controlled intake of air led to lower noise from the motor, and it also reduced the level of wind noise in the cabin, creating a more pleasant driving experience.



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