



Department of Mechanical Engineering
Return to Mike Colucci, ME481 Capstone Coordinator: colucci3@egr.msu.edu

Application for Sponsorship of a Capstone Design Project

Project Sponsor (Company Name): General Motors LLC

Information Requested:	Technical Contact:	Billing Address/Contact:
Title & Name:	Douglas Moore, Senior Project Engineer Andrew Herman, Program Engineering Management	Matthew Ply, Engineering Group Manager, Business Analytics
Address:	3300 GM Rd, Milford, MI 48380 30001 Van Dyke, Warren, MI 48090	GM Technical Center 30001 Van Dyke Ave Warren, MI 48090
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Email:	Douglas.b.moore@gm.com Andrew.Herman@gm.com	Matthew.M.Ply@gm.com

PROJECT TITLE: Directional Speakers and/or Systems

PROJECT CHECKLIST: Ideally, your project should ...

Yes or No

- use significant creativity to solve a problem where there are many potential solutions Y
- require the design of a system, or subsystem rather than a single part Y
- require the use of conventional analytical and computational methods rather than specialized equipment and/or software Y
- permit our students to display their results at the end-of-semester Design Day, which is attended by the public Y
- Be completed in a 13 week working semester by a team of senior ME students Y
- permit our students to visit to your facilities Y_

IMPACT OF THIS PROJECT ON YOUR COMPANY Directional speakers will allow General Motors to provide electric and hybrid-electric vehicles with the necessary pedestrian safety sound required by regulation, while minimizing the mass, cost, and packaging space required. Most importantly, directional speakers will minimize driver and passenger annoyance issues related to intrusive and unwelcome noise intruding on the quiet interior of electric and hybrid electric vehicles.

1 page Project Summary

Problem Statement: Safety regulations requiring sound emission on the exterior of vehicles cause annoying noise inside the vehicle. Traditional speaker designs and placements cannot maximize the ratio of sound radiated to the exterior of the vehicle and minimize noise radiated to the interior of the vehicle.

Users of final design: All General Motors electric and hybrid-electric vehicle programs.

Project Objectives: Speaker designs, and/or speaker system designs which can be installed on vehicles, applied to existing vehicle surfaces, or otherwise integrated into a production vehicle.

Useful Skills: Knowledge of wave mechanics. Sound generation, reflection, transmission, and propagation. Practical skills in translating theory into workable prototypes. Simulation and laboratory measurements.

GM Technical Contact: Douglas Moore, Vehicle Performance Owner, Passby/Legal; General Motors Global Noise and Vibration Center, Milford Michigan

Intellectual Property Considerations – Do not anticipate a confidentiality agreement. Expect General Motors will own any intellectual property resulting from this work.