



CASE STUDY /

Ansys + KSR International

"Simulation has enabled KSR engineers to optimize inductance sensor designs prior to building a prototype. The new approach substantially reduces the time required to engineer its products to fit customer applications. The net result is a substantial decrease in engineering costs and a reduction in time to market."

Lingmin Shao

Technical Specialist / KSR International

Ryan Elliot

Sensor Team Leader / KSR International

An electronic throttle control works behind the scenes to remove the mechanical link between the automobile accelerator and throttle, and instead controls the throttle with an electric motor. An electronic control unit (ECU) determines the correct throttle position based on data collected from two automotive sensors that track the position of the gas pedal. The motor that controls the throttle is then driven to the required position via closed-loop control from the ECU.

Reducing Inductance Sensor Design from Three Months to Two Weeks

/ Company Description

KSR is an industry leader in the design, engineering and manufacture of an array of products for the transportation industry (autos, light trucks, ATVs), including automotive sensors, electronic throttle controls, adjustable and fixed pedals, electric steering control units and power modules.

/ Challenges

Most inductance sensor applications can be addressed by a common design; however, as KSR expands the technology to different applications with different sensing ranges and packages, a custom design is required. Trial and error takes approximately three months to develop custom inductance sensor designs. The company needed to reduce development time, and therefore, costs and time to market.

/ Technology Used

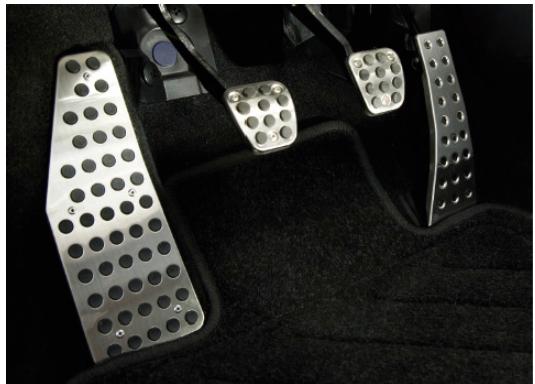
- Ansys HFSS®
- Ansys Nexxim®

/ Engineering Solution

- Use Ansys HFSS to compute the full electromagnetic field pattern inside the sensor, then reduce the full 3D electromagnetic behavior of the structure to a set of high-frequency circuit parameters.
- Employ Ansys Nexxim to simulate sensitivity of analog and wireless frontend circuits as well as robustness and capacity needed.
- Perform a parametric study of the air gap between the rotor and transmitter and receiver coils to ensure that inevitable manufacturing variations will not affect the sensor accuracy.

/ Benefits

- Simulation helps KSR engineers to address the issues that inevitably arise in real-world applications and to correct these issues before manufacturing.
- KSR has reduced the time required to engineer a custom inductance sensor application from three months to only two weeks.



Electronic throttle control pedal position sensor.

ANSYS, Inc.
Southpointe
2600 Ansys Drive
Canonsburg, PA 15317
U.S.A.
724.746.3304
ansysinfo@ansys.com

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge or put on wearable technology, chances are you've used a product where Ansys software played a critical role in its creation. Ansys is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and engineer products limited only by imagination.

Visit www.ansys.com for more information.

Any and all ANSYS, Inc. brand, product, service and feature names, logos and slogans are registered trademarks or trademarks of ANSYS, Inc. or its subsidiaries in the United States or other countries. All other brand, product, service and feature names or trademarks are the property of their respective owners.

© 2020 ANSYS, Inc. All Rights Reserved.