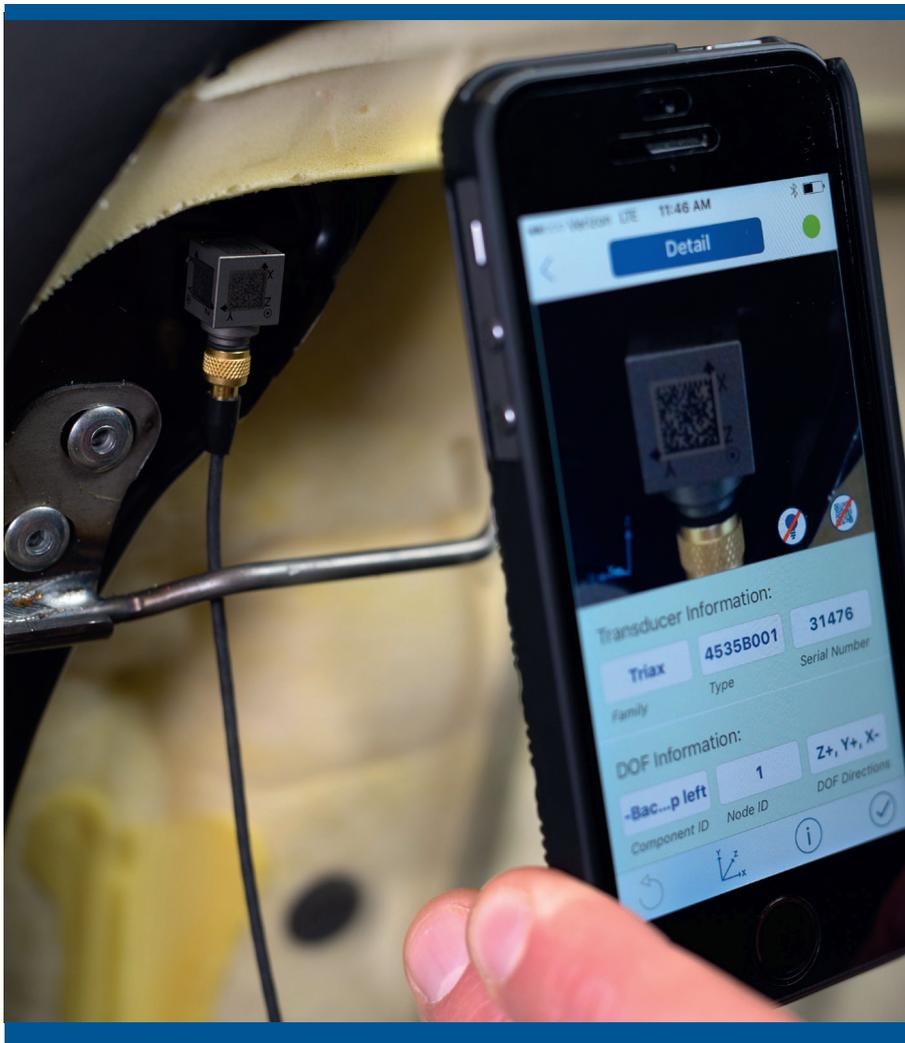


# SMARTPHONE APP IMPROVES VIBRATION TESTING SETUP AT FAURECIA

To simplify modal analysis of automotive seating, Faurecia uses the Transducer Smart Setup app and saves valuable time during testing set-up.



## CHALLENGE

Setting up transducers is time-consuming to do correctly, and manually adding information about alignment and location can take hours. Engineers want to avoid mixing up transducers and making input errors.

## SOLUTION

The Transducer Smart Setup app reads data matrix codes on transducers and seamlessly transfers the information to PULSE Reflex Measurements. It provides instant access to specifications, documentation, and calibration data.

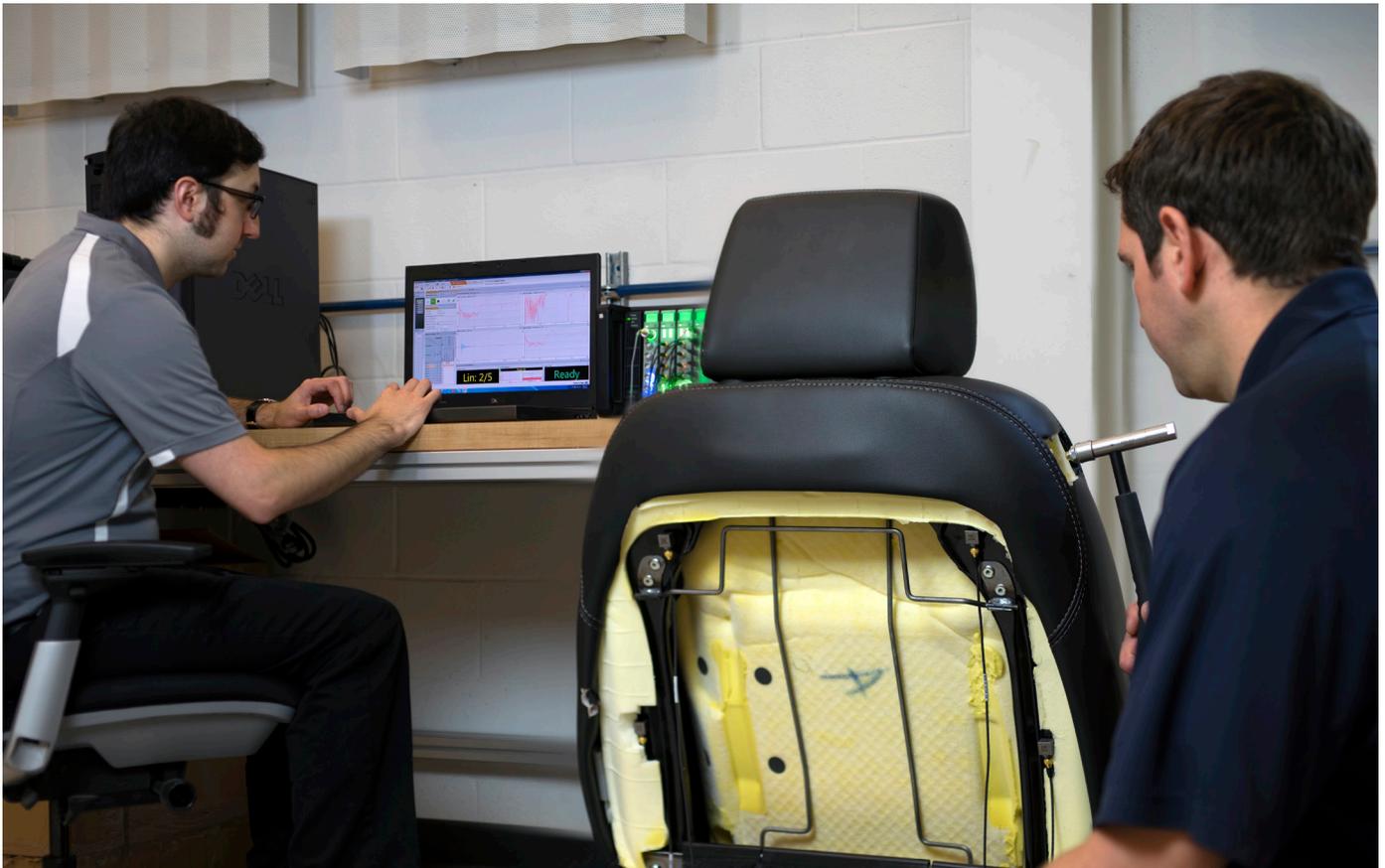
## RESULTS

The transducer set-up process is as simple and automated as possible, saving significant time and frustration. Data entry errors are minimized and human error is eliminated.



“FOR ME PERSONALLY, THAT’S THE MAIN BENEFIT – THAT THE FRUSTRATION AND WORRY OF MAKING DATA ENTRY ERRORS JUST GOES AWAY.”

*Chris Kus, NVH Engineering Expert at Faurecia*



## BACKGROUND

Faurecia is a leader in the design, development and manufacture of automotive seating. Founded in 1997, Faurecia has grown to become a major player in the global automotive industry and is one of the largest automotive suppliers worldwide. The company produces a full line of components that go into automotive seating, from frames, mechanisms and mechatronics to trim covers, electronic and pneumatic systems. With 330 sites including 30 R&D centres in 34 countries around the world, one in four cars is equipped by Faurecia.

“The seat is one of the customer’s first impressions when test-driving a vehicle,” explains Chris Kus, NVH Engineering Expert at Faurecia. “We always strive to supply products that provide the best driver and passenger experience.”

When Chris had to perform a modal analysis on an entire front row seat for complete

assembly mode shape and natural frequency estimations – with several accelerometers placed on the seat cushion and seat back– he knew he was in for a long haul.

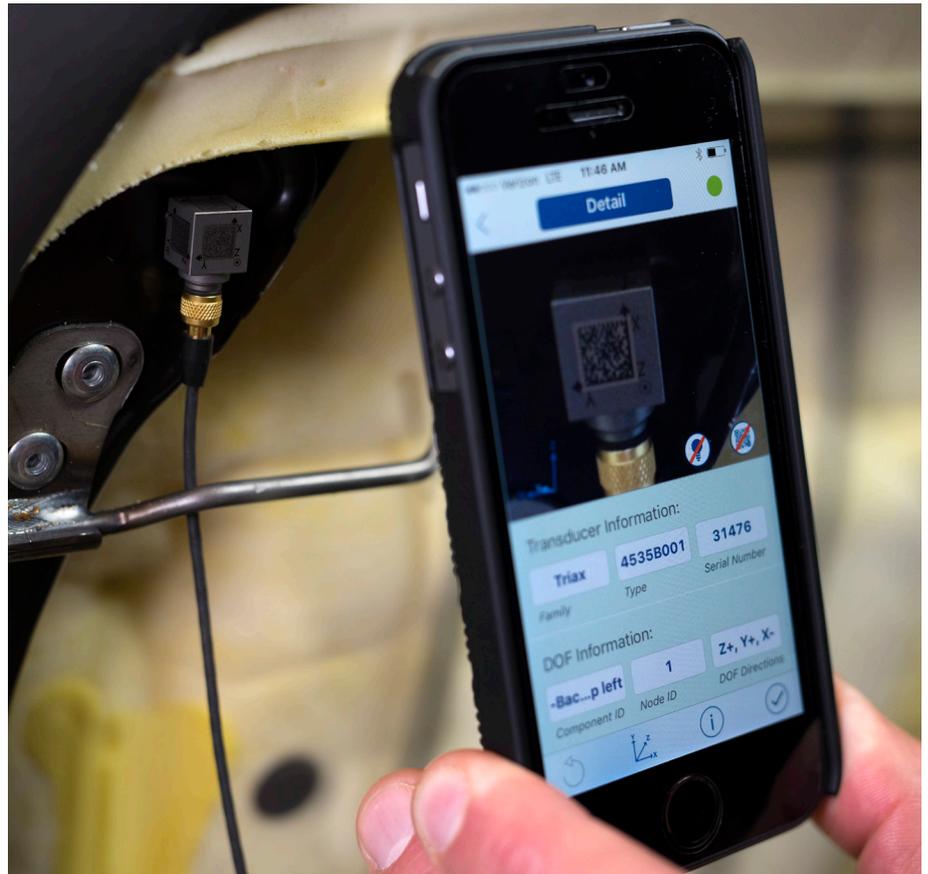
## CHALLENGE

Modal analysis is vital to Faurecia NVH engineers’ understanding and optimization of the inherent dynamic properties and behaviour of car seats. Reducing vibration for the driver requires that Faurecia understands the real-life response of their seating to the vibrations coming from the powertrain during operation. Whether generated by the vehicle or the road, vibration transfers to the driver or passenger through the car seats and although some vibration is acceptable, too much can cause great discomfort.

The testing challenge is complex, as many different forces and factors interact. “Modal analysis of automotive seating is necessary to find the first and second mode shapes and

natural frequencies,” says Chris. “Lateral and fore/aft motions in an unoccupied passenger seat become coupled with vehicle input frequencies, causing the seat to shake, which is undesirable for the driver and passengers. We try to find areas to which we can add stiffness to avoid this, but we also look for potential areas from which we can remove mass.” As gas mileage improvements are an increasing demand, a growing criterion for the automotive industry is to find potential areas in a vehicle where mass can be removed.

The set-up is the most time-consuming part of the testing procedure and it is easy to mix the transducers up or induce human errors into the many inputs: “A normal set-up with multiple accelerometers can take hours to complete even before testing begins,” says Chris. When several transducers have been mounted onto the test objects, it can be very time-consuming to link them to the measurement software correctly. The tester needs to identify each



---

transducer and trace its cabling through to the data acquisition hardware, before they can manually add information about its alignment and location.

## SOLUTION

Faurecia used the Transducer Smart Setup app, which is specifically designed to make transducer set-up as simple and automated as possible. The app reads the data matrix codes on transducers and seamlessly transfers the information to PULSE Reflex™ Structural Measurements software on a PC.

Using a smartphone's camera to scan the transducer, the app recognizes the accelerometer, its location and its orientation (Component ID, Node ID and DOF Direction). It then automatically synchronizes this information with the measurement software, so it doesn't matter which transducer is plugged into which input connector. With a modal test involving 100 accelerometers, this can save hours.

## RESULTS

Modal analysis leads to lighter, stronger and safer constructions, less energy consumption and greater comfort. Chris explains, "Understanding the natural frequencies and mode shapes of our seats allows us to evaluate the design and make any necessary improvements." And being able to simplify the process and save time is a huge benefit for Chris and his team.

"The smart transducer app has saved us well over an hour on our large test set-ups by eliminating the step of finding each accelerometer's position and orientation and entering them manually into the system. I have to admit that I was very surprised to discover that the app also works with our other accelerometers – those without a data matrix code."

## CONCLUSION

The Transducer Smart Setup app simplifies the measurement set-up process and saves a significant amount of time, ensuring that the transducer set-up is accurate and efficient. The app removes the need to trace cables and reduces input errors.

The Transducer Smart Setup app works best with accelerometers and microphones with data matrix codes. A patented algorithm automatically detects the orientation of an accelerometer from the code. However, as Faurecia discovered, for accelerometers and microphones without a data matrix code, the Transducer Smart Setup app semi-automates inputs, such as alignment and location, saving time and reducing inputs in comparison to traditional set-up procedures – and removing the need to trace cables.

"The app eliminates the chance of human error that easily happens when you have to manually find and input the local orientation into a global coordinate system," says Chris. "For me personally, that's the main benefit – that the frustration and worry of making data entry errors just goes away."

[www.bksv.com/casestudies](http://www.bksv.com/casestudies)

Copyright © Brüel & Kjær. All rights reserved.