



## The Evolution of the Smart Car – Intelligence Outside and Inside

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My wife and I had our first child a couple months back. We had to adapt to doing a lot of things differently, but particularly, as a couple who've always enjoyed long road trips and good conversations, nothing was more difficult to adapt to than learning a new way to "communicate" while driving, now that my wife was always in the back seat with the baby. Although our family car is loaded with all the latest smart-car features (blind spot monitoring, 360 viewing, etc.), I've experienced first-hand the struggles of trying to understand each other because we are whispering so we don't wake the baby, or not being able to make an important call because we had a "crier onboard."

Most OEMs focus their vehicle intelligence towards interactions between the driver and the outside world (i.e. brake notices, radar, sensors), but for vehicles to fully realize "smart" status, there also needs to be visibility, intelligence and awareness inside the cabin that can dynamically adapt and interact based on occupants, their locations and their varying needs. The issue is compounded with the increasing demand for in-vehicle content and functionality, so the need to simultaneously support multi-passenger interactions is becoming a must-have.

That is why Cereence's Multi-Seat Intelligence (MSI) solution was developed. As is typical in our approach to innovation, we focused on the entire in-vehicle experience, not just the driver, and put together a holistic solution that allows both driver and passengers to customize the acoustic environment best suited for their immediate needs. And these aren't just futuristic concepts – MSI is available today and being deployed on some of the most intelligent vehicles on the road, both now and coming in the future. To create this world-class in-cabin experience, we leverage technologies like:

### [Speech Signal Enhancement \(SSE\) ...](#)

...processes and cleans all that nasty ambient and internal noise to give the occupants the highest quality audio, whether you're on a handsfree call, speaking to your voice assistant, or conversing with other occupants in the car.

SSE also allows for multiple passengers to customize the cabin into private "zones" that can allow the vehicle to simultaneously personalize the interaction and command experience for each occupant. For instance:

- A "bubble zone" for the driver would allow him/her to take a call without any noise interference from other passengers in the vehicle – including a crying baby.
- A passenger in the rear could say "roll down my window," and the vehicle would know which exact window to roll down.

### [In-Car Communications \(ICC\) ...](#)

...allows the driver to safely and clearly communicate to other occupants in the vehicle by using the existing microphones to pipe in-cabin communications via the speakers. Ultimately this improves communication quality with your passengers and reduces the drivers' cognitive distraction.

### [Emergency Vehicle Detection \(EVD\) ...](#)

...can detect the sound of an emergency vehicle siren before the human ear and notify the driver of the oncoming direction of the emergency vehicle. This innovative safety feature can greatly increase the driver's awareness, even if they're listening to music.

Together, these technologies put the in-car experience at the forefront, prioritizing both driver and passenger to meet their needs while on the go. By leveraging and deploying our Multi-Seat Intelligence, our OEMs are creating smarter, safer and more enjoyable experiences for their customers – and I'm getting back to those long road trip conversations with my wife.