

Technology for Today and Tomorrow

Good day, and welcome again, to the Paris Motor Show. Thank you for coming.

I am Koichi Fukaya, president of DENSO Corporation.

As I was waiting to begin my speech, I was reminded of a question we often are asked by journalists.

That question is:

Who are DENSO's customers?

Of course, the expected answer is:

DENSO's customers are automobile manufacturers.

But that answer is not 100 percent accurate.

Yes, we regard automakers and their employees as customers and partners in the business of improved automobiles.

However, we do not regard **only** automakers as customers.

If you want to know our customers; look around you.

You are our customers—drivers, passengers, pedestrians.

You inspire our technology and drive our mission.

And if DENSO is working toward not only satisfying your demands for precision and quality, but **anticipating** needs and requests you haven't yet imagined, our success will be assured.

So, what **do** you wish for?

You want vehicles that are more comfortable and more convenient, more efficient and safer.

You want vehicles to do less harm to the environment.

We do too.

In fact, “harmonization with the world” has always been part of DENSO’s mission. That’s also one of the core themes in our company’s new long-term policy. The question we ask ourselves in our new policy is, how can we help make cars that fulfill your needs, but are in harmony with nature and society?

Today, I will briefly outline some of DENSO’s past, current and future technologies that answer this question.

I have divided our technology into these areas:

- Environment.
- Safety.
- Comfort.
- Convenience.

First, “environment” and our dream of a cleaner, greener world.

DENSO began thinking about environmental protection and improved fuel efficiency in 1966, when engineers applied electronic technologies to develop the electronic fuel injection system.

In 1991, DENSO launched an air conditioning system which used HFC-134a. HFC-134a replaced the ozone-depleting refrigerant CFC-12.

In 1995, DENSO engineers developed the world’s first electronically controlled diesel common rail system.

And we haven’t stopped looking for ways to combine efficiency and environmental protection since.

DENSO developed the first vehicle air-conditioning system that uses carbon dioxide as a refrigerant, further decreasing the environmental impact of refrigerants.

And DENSO developed the 1800-bar diesel common rail system, which produces the world's highest fuel injection pressure. That leads to engine efficiency, which decreases fuel consumption as well as exhaust emissions and their harmful impact.

Now, in conjunction with Koito Manufacturing and Royal Phillip Electronics, DENSO has developed the world's first mercury-free, high-intensity headlamp system. This new system matches the power and lifespan of the current mercury-based systems.

In other ``green'' advancements, DENSO engineers have been able to eliminate the use of lead from ALL brushes used in automotive electric motors.

And we achieved that *ahead* of European Union regulations.

We are proud to say that we are leading the way.

Now ... to safety and our hope for an accident-free world.

We at DENSO are not newcomers to the idea of safety.

Our engineers have been developing driving control and safety products since the 1970s.

In 1986 we introduced our anti-lock brake system.

And in 1989, we introduced the air bag sensing system.

But we know that we must do more than simply make vehicles safer through *passive* safety systems.

We also must help make drivers and passengers safer through *enhanced* safety systems to help prevent accidents.

Enhanced safety systems:

- Provide driver perception assistance.
- Provide driver decision assistance.
- Help provide vehicle control for the driver.

Our adaptive front lighting system improves night-driving visibility by turning the headlamps, almost like a pair of eyes, with the turning of your car. This illuminates the direction of your vehicle's travel at night as you negotiate curves in the road.

That's one major breakthrough.

In our latest technology, DENSO is supplying components for the **world's first** adaptive cruise control, or ACC system, that can regulate speed at rates from zero to 30 km per hour. Conventional ACC systems only regulate speeds around 40 km per hour and higher.

This ACC system allows drivers to use cruise control in high traffic areas, without having to continually brake and accelerate.

Next, another world's first: Our pre-collision system, developed in conjunction with Toyota, identifies inevitable obstacles a split-second prior to collision. Then it automatically tightens passenger seat belts, while helping to activate a pre-collision brake system to reduce vehicle speed.

DENSO developed three key components for the system:

- A millimeter-wave radar
- A pre-collision electronic control unit
- And a seatbelt ECU to retract the seatbelt mechanism.

The pre-collision system was first launched in the Toyota *Harrier*. It currently is available on the Lexus LS 430 in North America and will be available in Europe by the end of this year.

Next, comfort.

You can see from our history that we have always searched for ways to increase individual comfort in the vehicle.

In the 1950s, when household air-conditioners were a luxury item, DENSO engineers were investigating the possibility of affordable vehicle heating and air-conditioning units.

In 1952 we unveiled our first auto-heating unit.

And in 1957, we introduced our first air conditioner.

Fourteen years later, in 1971, we launched an air-conditioning system that automatically controlled cabin temperature in accordance with manual switches.

This is something we take for granted, today.

But at the time, it was a pioneering development.

DENSO continues to take the lead in providing a more comfortable cabin environment.

Our latest technological advancement, the electric air conditioner for hybrid electric vehicles, uses a newly developed electric compressor. This keeps the air conditioning system running even during "idle" stops, when the engine shuts down to save fuel and emissions. That means everyone in the vehicle stays cool.

Our final technology category is "convenience." We view "convenience" as a combination of communication, information and mobility.

DENSO recognized long ago that communication systems for cars were going to grow in importance.

That's why we launched our first car transceiver in 1973.

And DENSO was among the first in the industry to begin developing car navigation systems in the 1980s.

In 2002, we formed a joint venture with Bosch to develop large-scale integrated circuits and other core components for car navigation and multimedia systems.

Now we're working with Bluetooth technology to wirelessly connect car navigation systems and cell phones. DENSO began supplying an electronics multi-vision board using this technology for car navigation systems last year.

Calls can be dialed using touch keys on the car navigation system, and the navigation system's microphone and speaker system is then used for those calls.

But what about tomorrow's technology? The technology that anticipates your needs and wishes?

In terms of future environmental products, DENSO engineers are working on a new 2000-bar common rail diesel system that should be available in two to three years.

This system will further improve engine efficiency, leading to decreased emissions and lower fuel consumption.

Regarding safety:

The most important technology in safety systems is sensors. DENSO is developing sensing technology that is designed to help detect and protect pedestrians.

In the field of comfort.

DENSO is working on developing a sensor that can monitor biological data such as body temperature and heart rate. Sensors like these would be able to measure the comfort level of anyone in the vehicle, and make adjustments in systems like heating and air conditioning.

As we anticipate your needs in terms of convenience, we focus on windshield display technology.

Windshield display technology is a combination of display, sensing, and human machine interface technology. Basically, all the information drivers need will be visible on the windshield directly in front of them. The data

displayed includes vehicle speed, navigation information, and virtual images of nearby objects or people, even if they are not readily visible.

These are just a few of the ideas and innovations we are working on. Innovations we know will meet your future needs and lead to greater harmony with the world.

Because that is the spirit of DENSO—to contribute to a better world and to serve you, our customers, with the best products that make your jobs and your lives easier.

Thank you.