

Safety



Nissan aims to create cars that embody the “pleasure and richness of driving” while prioritizing customers’ peace of mind through the pursuit of a high level of real-world safety. This means, of course, working to improve passenger safety in our vehicles. It also means researching and developing Intelligent Transport Systems (ITS) that help to reduce accidents and traffic congestion, as well as promoting educational activities to raise safety awareness among drivers, pedestrians and even people riding in other cars. Looking toward the realization of a safer society with more mobility, we are involved in a wide range of activities with other stakeholders.

Pillars of Activity

Helping to reduce traffic accidents requires a comprehensive approach addressing not just automobiles, but people and the traffic environment too. To help contribute to the realization of a truly safe society, Nissan uses a triple-layered approach, taking measures in the areas of vehicles, individuals and society.

1. Vehicles: Developing Safety Technologies

Based on our unique “Safety Shield” concept, we are working to develop automotive technologies from the perspective that people are at the center of the driving experience. We focus on solutions that help maintain distance from potentially dangerous conditions. We also provide technologies that aim to activate vehicle systems (for example, the brakes) when a collision is unavoidable, thereby helping to reduce injuries.

- Technologies that help the driver to maintain comfortable driving (Intelligent Pedal, Distance Control Assist, Around View Monitor, etc.)
- Technologies that help the driver to recover from dangerous conditions to safe driving (Lane Departure Prevention, 4-Wheel Active Steer, etc.)
- Technologies that help to minimize injuries when a collision is unavoidable (Zone Body construction, etc.)

2. Individuals: Our Traffic Safety Activities

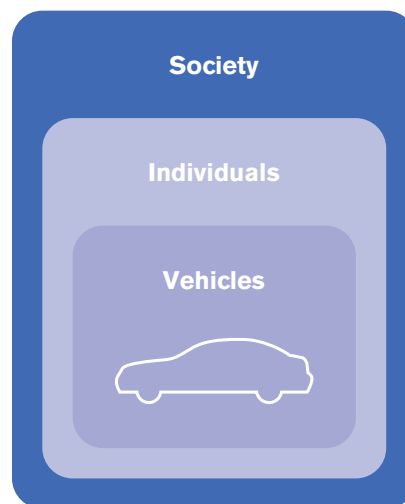
To help create a better mobility society, it is important for as many people as possible, including drivers and passengers in vehicles as well as pedestrians outside them, to share an understanding of road safety. We take part in educational activities to boost this safety awareness, measures to improve drivers' skills behind the wheel and a range of other safety promotions.

- The Nissan Hello Safety Campaign to promote traffic safety
- The Quest for Safety Program (North America)
- The Nissan Safety and Environment Technology Tour (China)
- The Omoiyari Light Campaign to promote headlight use in early evening hours

3. Society: Working Together with Society

We believe it is possible to help create an even safer mobility society by using information from the traffic environment surrounding the vehicles on the road. Together with a wide range of governmental agencies, universities and companies, we are participating in various projects intended to promote the eventual achievement of a safer, more pleasant mobility society utilizing ITS.

- Adoption of telecommunications-based ITS technologies
- The ITS Project to research vehicle-to-infrastructure communication and pedestrian detection (Kanagawa Prefecture)
- The ASV intervehicle communication project sponsored by Japan's Transport Ministry

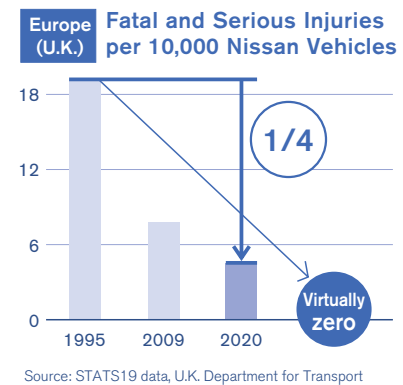
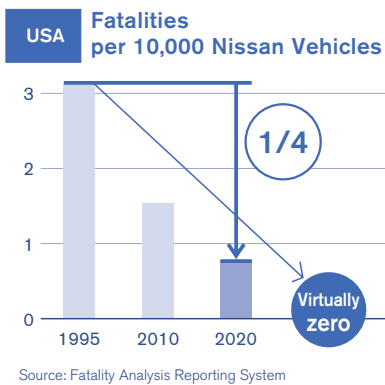
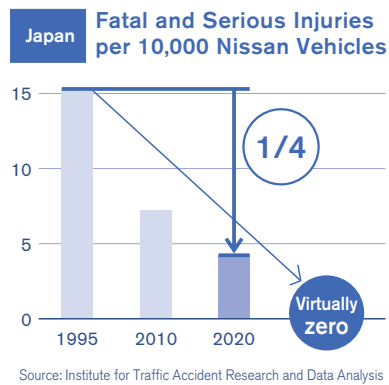


Nissan's Approach to Safety

Nissan's fundamental approach is to pursue "real world safety." In 2011 there were 4,611 deaths resulting from traffic accidents in Japan. It was the 11th straight year for this figure to decline. Around the world, though, more than 1.2 million people lose their lives each year in automobile accidents, and the World Health Organization warns that this figure could climb as high as 1.9 million by 2020 if steps are not taken.

We set a target of reducing the number of fatalities and serious injuries involving Nissan vehicles to half of the 1995 level by 2015. In Japan and the United Kingdom, this target was reached six years ahead of schedule, in 2009. Today we are engaged in activities aimed at halving this once again in Japan, the United States and the United Kingdom by 2020. As an ultimate goal, we are seeking to progress toward a world with virtually no accidents leading to death or serious injury.

In emerging countries, meanwhile, traffic accidents remain a serious social issue, and we are striving to obtain and analyze accurate data to better understand the situation.



Developing Safety Technologies

The "Safety Shield" Concept

Nissan bases its efforts to create safer automobiles on its original "Safety Shield" concept. This defines the conditions surrounding a vehicle in terms of six phases, from "risk has not yet appeared" through "post-crash," and guides our development of technologies to help address each phase, based on the idea that cars should help protect people.

<p>Risk has not yet appeared</p> <ul style="list-style-type: none"> Distance Control Assist System Navigation-enabled Intelligent Cruise Control with full-speed range following capability Adaptive Front-Lighting System (AFS) Around View Monitor 	<p>Helps the driver to maintain comfortable driving</p>
<p>Risk has appeared</p> <ul style="list-style-type: none"> Lane Departure Prevention Lane Departure Warning 4-Wheel Active Steer Blind Spot Warning Blind Spot Intervention Back-up Collision Intervention 	<p>Helps the driver to recover from dangerous conditions to safe driving</p>
<p>Crash may occur</p> <ul style="list-style-type: none"> Anti-lock Braking System (ABS) Brake Assist Vehicle Dynamic Control (VDC) 	
<p>Crash is unavoidable</p> <ul style="list-style-type: none"> Intelligent Brake Assist Front Pre-Crash Seatbelts 	
<p>Crash</p> <ul style="list-style-type: none"> Zone Body construction SRS Airbag Systems Pop-up Engine Hood 	<p>Helps minimize injuries when a collision is unavoidable</p>
<p>Post-crash</p> <ul style="list-style-type: none"> Automated Airbag-Linked Hazard Lamps 	

Aiming for “Collision-Free Cars”

Even a careful driver may encounter some situations where blind spots occur, and even in zones that the driver can see, risks can arise to threaten the safety of the driver. Nissan is developing technologies to one day support the concept of “collision-free cars” as part of an all-around drive-support system that seeks to detect such risks in advance, warn the driver of them and, in emergency situations, intervene to help prevent accidents.

In our all-around drive-support system we have brought together various safety technologies, including our world-first Back-up Collision Intervention technology, which detects large objects in the path of the vehicle when the driver backs up. Other safety and convenience technologies found in some Nissan vehicles include Distance Control Assist, which helps the driver maintain distance between the car and the vehicle in front; Lane Departure Prevention, which helps the driver return the vehicle to its designated travel lane; and Blind Spot Intervention, which assists in lane changes by alerting the driver to the presence of a vehicle in the blind spot and helping him or her return the vehicle to its travel lane.



Please see our website for more information on our Adaptive Front-Lighting System (AFS) and other systems.
<http://www.nissan-global.com/EN/SAFETY/INTRODUCTION/COMFORTABLE/>

Distance Control Assist System

Nissan’s Distance Control Assist System uses a radar sensor to calculate the distance between the car and the vehicle in front. Based on the gap and relative speed between the cars, the system then supports the driver’s pedal operations when braking, thus helping to maintain an appropriate space between the vehicles. We first installed this system in the 2007 Fuga marketed in Japan.

We have also developed a world-first technology integrating the car’s navigation system with these functions. Our new system can import data from the navigation system on upcoming curves in the road and help to apply the brakes gradually in preparation for them. When the driver continues depressing the accelerator pedal, the system provides support by lifting the pedal to assist the driver in switching to the brakes. The system also implements smooth deceleration when the accelerator pedal is lifted, helping make it easier to navigate curves. This upgraded system made its debut in the Fuga marketed in Japan in November 2009, and is available in the Infiniti M in the United States.

Lane Departure Prevention

This system helps the driver return the vehicle to its designated travel lane when the vehicle is drifting out of the lane. A camera unit installed behind the rear-view mirror detects lane markers in front of the vehicle and calculates its position relative to them. When the system judges that the car may unintentionally leave its lane, it alerts the driver with visual and audible warnings and briefly activates the brakes on one side of the vehicle to assist the driver’s efforts to return to the lane center. We rolled out this system in the Skyline Crossover launched in July 2009 in Japan. In the United States, it is available in the Infiniti EX, FX, JX, M and QX.

Blind Spot Intervention

This system supports the driver’s operations when initiating a lane change, helping to avoid a collision with another vehicle that may be traveling in the blind spot. Sensors installed in the rear of the car detect a vehicle in the adjacent lane, and the system alerts the driver with audible and visual warnings. Moreover, the braking mechanism of each wheel is controlled separately, and if a vehicle is detected in the blind-spot area and the vehicle is approaching the lane marker, the system generates part of the necessary yaw movement to help the driver keep the car away from the other vehicle. The Infiniti M launched in North America in March 2010 was the first to feature this technology.

Back-up Collision Intervention

When the vehicle is in reverse, such as backing out of a parking space, Back-up Collision Intervention goes to work. Sensors mounted on the rear and sides of the vehicle are used to detect vehicles and other large obstacles in the car’s path. If an object is detected visual and audible warnings are provided, and then the brakes are activated momentarily to help the driver avoid a collision. This system is featured in the Infiniti JX that went on sale in the United States in March 2012.

Forward Collision Avoidance Assist Concept

This concept system supports the driver in avoiding collisions at speeds of up to 60 km/h. It uses a highly sensitive radar sensor to monitor the distance from the vehicle in front and its relative speed and supports the driver's efforts to avoid a forward collision. When the system detects an object in the vehicle path that could pose a collision danger, it actively prompts the driver to perform avoidance maneuvers by providing visual and audible warnings, as well as by pressing back on the acceleration pedal. By helping the driver to reduce speed smoothly, it may also contribute to reduced occurrence of rear-end collisions following sudden braking.

Around View Monitor

This world-first technology uses images from four cameras installed at the front, back and sides of the vehicle, combining them in a composite, bird's-eye view on the car's navigation monitor. This allows the driver to easily grasp the position of the vehicle in relation to the parking space, simplifying tasks like parallel parking or entering a garage. The system made its debut in the Elgrand released in Japan in October 2007, while the first model to carry the system in North America was the Infiniti EX35 launched in December that year.

We later added the following three functions to the system, two of them world firsts, and incorporated this upgraded version in the Skyline Crossover launched in Japan in July 2009.

1. Front/rear wide-view function

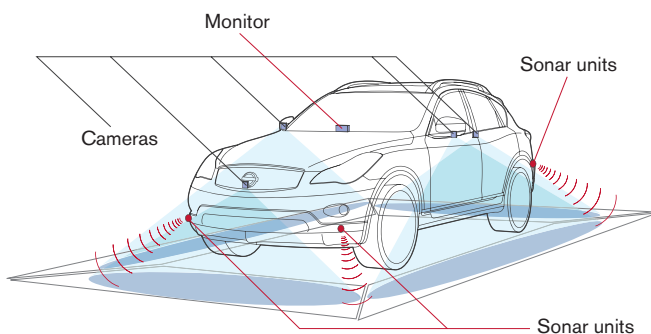
The monitor displays views covering approximately 180 degrees from both the front and rear cameras, helping the driver to check for other vehicles that may be approaching. This helps the driver navigate when the car travels through blind intersections or exits a parking space. The rear wide-view function in particular is a world first.

2. Front wide-view function linked to the navigation system

After the driver registers a location on the navigation system's map, the monitor will automatically switch to front wide-view mode when the vehicle arrives at that location and comes to a stop. This lets the driver check for approaching vehicles more smoothly, without the need to manually activate the front-view camera. We hope this world-first technology will help to enhance users' peace of mind at intersections with poor visibility.

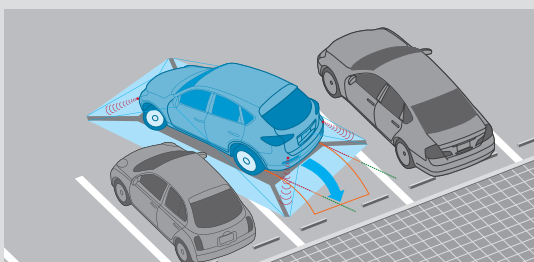
3. Parking Guide function

This new function enhances our Around View Monitor, making it easier than ever to move the car in and out of garages or parking spaces. The driver can use the touch panel on the navigation screen to get an overhead view of the vehicle in relation to its surroundings, along with audio and visual guidance on parking maneuvers.

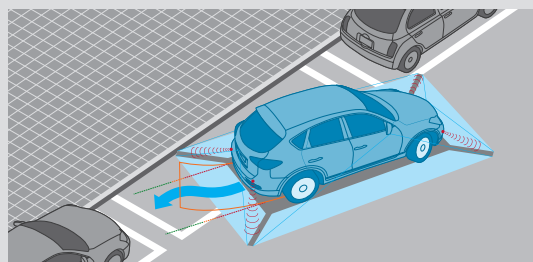


The system gives helpful views when backing into a space.

The Parking Guide system gives the driver an intuitive feel for the vehicle's position while parking.



When parallel parking, the driver can simultaneously check the car's rear, side and curbside front views.



New Safety Technologies in Fiscal 2011

Acceleration Suppression for Pedal Misapplication

This technology aims to reduce the risk of accidents involving misapplication of the brake and acceleration pedals in parking areas or similar environments. When the driver accidentally presses the accelerator instead of the brake or presses the accelerator too hard, it can result in a collision with nearby obstacles. To help prevent this sort of accident, this system takes visual data from the four Around View Monitor cameras, detects whether the vehicle is on the road or in a parking area and helps to suppress acceleration when the gas pedal is pressed all the way down and the system detects that the vehicle is in a parking area. In cases when there may be a collision with a nearby object, the system detects the obstacle with sonar and attempts to engage the brakes automatically. We aim to bring this technology to market within the next two years.

Multi-sensing System with Rear Camera

This system uses a rear-mounted camera and our Around View Monitor's image-processing technology to help alert the driver to potential dangers in the form of people, other cars and roadway position to the rear and sides of the vehicle. We will roll this system out globally over time after installing it first in the new Altima in 2012, with the following three features:

- **Blind Spot Warning**

When the driver initiates a lane change, the system's rear camera works to detect vehicles in the blind spot area, alerting the driver to their presence with an indication lamp near the door mirror and an alert sound to help the driver avoid collisions.

- **Lane Departure Warning**

This feature uses a rear camera to detect lane markers. It supports the driver by providing audible and visual warnings when the driver starts to drift out of the lane without signaling a lane change.

- **Moving Object Detection**

This system analyzes images from the vehicle's cameras. If it detects a pedestrian or other moving objects near the car, it provides visual and audible warnings to the driver. This function appeared in the Elgrand that went on sale in November 2011.

Predictive Forward Collision Warning

To help prevent forward collisions, this system uses sensors mounted in the vehicle's front to calculate the relative speed and distance to the vehicle directly ahead, as well as to the vehicle in front of that one. When the system judges that reduced speed is necessary, it alerts the driver with audible and visual warnings and by tightening the seatbelt.

Safety Technologies for Electric Vehicles

Nissan LEAF uses high-strength body construction that helps protect its lithium-ion battery in the event of a collision. Nissan LEAF also features insulation around its high-voltage parts used in such areas as the battery and the motor. Moreover, the vehicle is designed so that the high-voltage electrical system automatically shuts down in the event of a collision. Nissan LEAF is further equipped with a lithium-ion battery controller system that continuously monitors battery conditions to prevent overcharging, excessive discharging or overheating, which could lead to severely reduced capacity or malfunction.

Since EVs are extremely quiet when running, Nissan LEAF is equipped with the Approaching Vehicle Sound for Pedestrians system. The car begins emitting a sound when the driver puts the car into drive gear and releases the brake. This sound fades out when the vehicle tops 30 km/h and starts up again when the vehicle decelerates, at speeds below 25 km/h. Another warning sound is generated when the car is put in reverse.

We have also prepared a special instruction manual for use in assistance and rescue operations in the case where a mechanical problem or accident does take place.

High Safety Ratings for Nissan LEAF

The safety systems onboard Nissan LEAF have earned high marks all around the world. The electric vehicle earned a Top Safety Pick award from the U.S. Insurance Institute for Highway Safety (IIHS) in April 2011. In the following month the European New Car Assessment Programme (Euro NCAP) gave the car five stars in its comprehensive safety testing, which was followed in July by another five-star rating in the U.S. National Highway Traffic Safety Administration's New Car Assessment Program testing (NCAP). Nissan LEAF was the first 100% EV to win any of these awards.

The IIHS program rated Nissan LEAF as "Good" in front and side crash testing, as well as in a roof strength test. IIHS also rated the vehicle "Good" in its evaluation of seat/head restraints in a rear impact test and noted the presence of ESC. These results earned Nissan LEAF its Top Safety Pick rating. The Euro NCAP safety program, meanwhile, involved a grueling battery of tests for front, side and side pole impacts and whiplash from rear impacts. Nissan LEAF earned high scores in areas like protection of adult and child occupants, electronic stability control, onboard safety support systems and pedestrian protection. The 48 modules in the battery pack installed under the vehicle floor were also tested for safety in all types of collision, helping to earn Nissan LEAF its overall five-star safety rating.

The U.S. NHTSA testing for the NCAP involved front, side and side pole crash tests, as well as rollover resistance. Nissan LEAF earned its NCAP overall five-star rating under the more stringent testing standards that the NHTSA began using in 2011.

Traffic Safety Activities

Educational Programs in Japan

Traffic accidents are statistically more likely to occur during the dusk hours from 4:00 to 6:00 p.m. each day. As part of its Hello Safety Campaign, Nissan began urging drivers to turn on their headlights earlier in the evening in the Omoiyari Light Promotion, launched in 2010. During fiscal 2011 we narrowed our focus to activities in the city of Yokohama, where we held a town meeting for residents and various educational events. These efforts, together with the citizens of Yokohama, aimed to reduce the number of traffic accidents in the city. At the same time, with the slogan "A Million Cars with Headlights On Early," we organized a broad promotion campaign via social networking services, posters, radio programs and a dedicated website. Our message is starting to spread and be picked up by companies in other industries, NPOs and individuals throughout Japan.



Omoiyari Light Promotion Logo

Safety Education in Korea and the Middle East

Nissan Middle East FZE educates children about traffic safety through a dedicated website. Launched in October 2009, the site uses puzzles, pictures for coloring and other features to make learning online fun as well. The website shares easy-to-understand information with elementary school students in Arabic, English and French.

Nissan Korea Co., Ltd. launched its Nissan Kids Safety Campaign in April 2009. This campaign features similar content to that of the Middle East project and uses a website and booklets to educate children on traffic safety.

Promoting Traffic Safety in China and Indonesia

Traffic safety has become an increasingly important issue in China, which is seeing a rapid increase in the number of automobiles on the road. In 2005 Nissan (China) Investment Co. hosted its first safety program to improve drivers' skills and safety awareness in cooperation with the China Road Traffic Safety Association. In fiscal 2010 forums were held in September and October. Many customers, government officials and media representatives attended the forums, which featured programs for learning braking, cornering and other driving techniques from qualified instructors, contributing to deeper understanding of traffic safety. Programs for eco-driving skills were also included. Today these activities are implemented by the passenger automobile division of Dongfeng Motor Co., Ltd., as part of the Nissan Technology and Safety Driving Forum, a program of activities in which dealerships also participate.

The company also designed a contest to test Chinese high school students' knowledge of traffic safety and environmental protection issues. The year 2011 was the sixth for the event, which aims to increase interest and awareness of safety issues among young people, the drivers of tomorrow. In addition to taking simple quizzes on basic traffic rules, automotive safety devices and environmental issues, participating students made their own presentations on automotive and traffic safety.

In Indonesia, we started the Nissan Smart Driving program as a way to emphasize the importance of traffic safety. The program started out as a cooperative project with a lifestyle magazine designed to promote safe driving habits, but the scope of activities has since broadened to include hands-on safety workshops led by driving instructors for university students. We are now planning to roll out similar safety education activities in India and other countries.

Working Together with Society

Helping Reduce Accidents and Congestion with ITS

In 2006, Nissan launched the ITS Project in Japan's Kanagawa Prefecture. This project seeks to use Intelligent Transport Systems to create integrated networks of people, roads and vehicles, thereby helping to reduce traffic accidents and ease road congestion. The ITS Project gathers and uses information on nearby vehicles and the traffic environment in order to help reduce accidents involving other parties that can be difficult for a driver to see and react to.

We are building on the results of the ITS Project with our development of the Driving Safety Support System (DSSS). This will be an ongoing project promoted by Japan's National Police Agency and the Universal Traffic Management Society of Japan, an organization operating under its aegis. It uses the latest ITS technologies, such as optical-beacon communication tools to connect vehicles and the network of roads, with the aim of reducing traffic accidents. At intersections with reduced visibility, roadside infrastructure communicates with vehicles to deliver information to drivers via onboard navigation systems, warning them of potential dangers like crossing collisions and helping make sure they notice stop signs, signals and vehicles stopped at lights.

Helping Reduce Wrong-Way Accidents

Recently Japan has seen a number of serious accidents caused by vehicles traveling in the wrong direction on expressways. Working together with West Nippon Expressway Company (NEXCO), Nissan has developed a navigation program that uses GPS to notify drivers of vehicles driving the wrong way on an expressway. The system detects wrong-way vehicles based on GPS coordinates, maps, traveling speeds and other data. The driver of a vehicle going the wrong way receives audible and visual warnings. The Nissan Fuga Hybrid released in October 2010 is the first vehicle in the world to employ this system.

Combating Drunk Driving

Accidents involving driving under the influence of alcohol are a serious problem that blights society to this day. Nissan is actively engaged in a number of programs aimed at helping to eliminate drunk driving. In August 2007, working with the city of Kitakyushu, Fukuoka Prefecture, the Tochigi prefectural government, the town of Kaminokawa in Tochigi and the city of Atsugi in Kanagawa Prefecture, we began trials of a system to help prevent drunk driving.

Nissan has also carried out joint research with the University of Occupational and Environmental Health in Kitakyushu on the physiological, psychological and behavioral effects of alcohol on the human body. This research is aiding our development of technologies to quickly and accurately detect the errors and abnormalities in vehicle operation under the influence of alcohol. Other Nissan approaches to help reduce drunk driving include a function added to our Carwings navigation system in Japan that displays warnings against driving under the influence during the most common hours for such behavior, with the aim of increasing driver awareness of the danger of getting behind the wheel after consuming alcohol.

Messages from Our Stakeholders

Earlier Headlight Use to Reduce Accidents

Hitoshi Niwa

Assistant Manager
Traffic Safety and Neglected Bicycles Division
City of Yokohama Road and Highway Bureau



The city of Yokohama is carrying out a traffic safety program. As one part of this, we are organizing a movement to get drivers to turn on their headlights earlier in the evening to help make the roads safer. During the last year more than 14,000 accidents took place within the city limits, bringing misfortune not just to the victims but also to the responsible parties and those around them. To make accidents a thing of the past, it is important for drivers and pedestrians alike to show consideration for one another.

We are working together with everyone at Nissan in the Omoiyari Light Promotion, a form of “communication through light” aimed at preventing road accidents. Together we are pursuing the goal of a safer, even more livable Yokohama.

Area Leaders' Messages

A Comprehensive Approach to Vehicle Safety

Manabu Satou

General Manager
Technology Planning Department
Planning and Advanced Engineering Development Division



Nissan's “Safety Shield” concept is based on the idea that vehicles should help protect people. In addition to our existing suite of crash-safety technologies, we are working to advance driving support technologies that can help the driver to avoid the risk of collisions from all directions. In fiscal 2011, we brought a number of world-first advanced systems to market, including Moving Object Detection, which helps alert the driver to moving objects around the car, and Back-up Collision Intervention, which provides an alert and prompts braking when a vehicle is approaching from the side while the car backs up. Meanwhile, to help reduce traffic accidents, it is important to focus comprehensive efforts on individuals and society as well as on vehicles. We are involved in safety promotion activities around the globe, and we are now expanding our Safe Driving Forums, held in China since 2005, to other countries.