



ADVANCED SAFETY VEHICLE



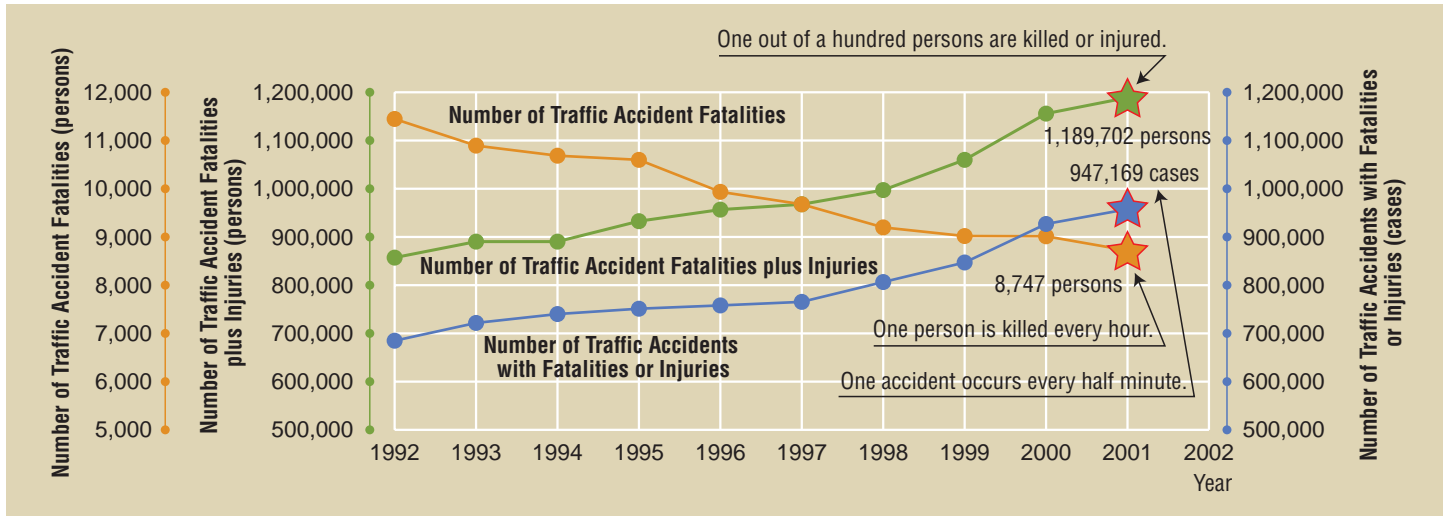
## Phase 3 (2001–2005)

Ministry of Land, Infrastructure and Transport  
Study Group for Promotion of ASV

ASV means advanced safety vehicle and employs latest electronic technologies to improve safety and amenity. ASV is also positioned as a core technology of Intelligent Transport Systems (ITS).

# Traffic accident fatalities are still at critical levels.

## Number of Traffic Accident Fatalities, Number of Traffic Accident Fatalities plus Injuries and Number of Traffic Accidents with Fatalities or Injuries

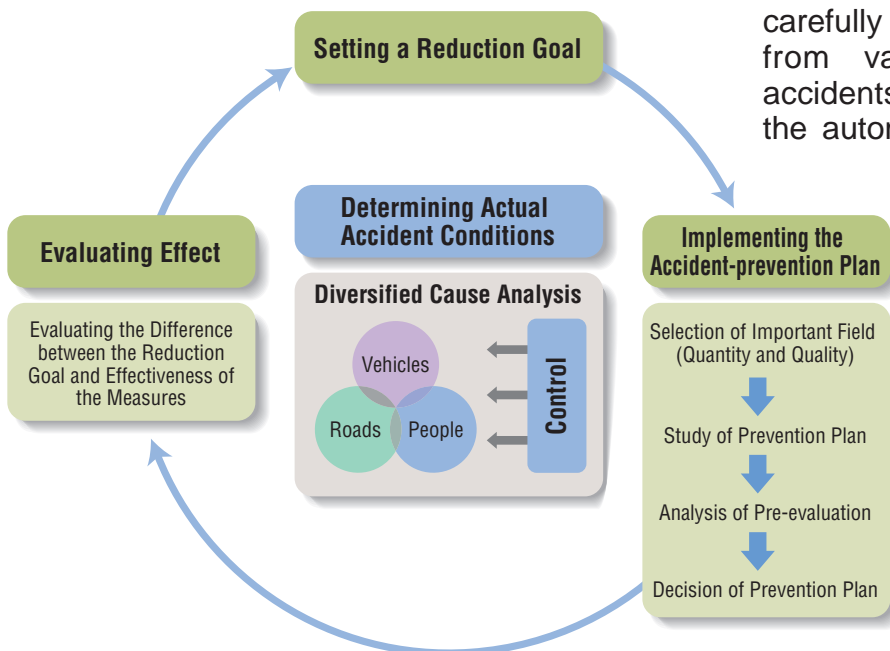


Goal set by the Council for Transportation Technology\*:  
**Reduce 1,200 fatalities**  
 By 2010

The number of traffic accident fatalities is decreasing, but about nine thousand persons are killed each year. This means that one person is killed each hour. The number of persons killed or injured is getting worse year by year. As a result, over one million persons were killed or injured for the past few years. This means that one percent of Japan's population is killed or injured annually. In order to resolve this tragic situation, Japan has set a goal to prevent traffic accidents.

# Enthusiastic Promotion of Motor Vehicle Safety Measures

## Cycle of Motor Vehicle Traffic Safety Measures



In order to effectively and efficiently implement automobile traffic safety measures, we must carefully analyze accident information collected from various sources, determine actual accidents conditions, and repeatedly execute the automobile traffic safety cycle of setting a reduction goal, implement the plan, evaluating effect, and setting new reduction goal.

\*The Council for Transportation Technology: An advisory body that was requested the minister of Transport to investigate future motor vehicle traffic policy considering safety and the environment. The Council submitted a report in June 1999, i.e. a vehicle safety plan to reduce the number of persons killed in 30 days by 1,200 persons by the year 2010.

# What are ASV Technologies?

**ASV technologies increase the intelligence level of motor vehicles, seek to significantly improve safety and convenience through new electronics technologies.**

For example, ASV technologies

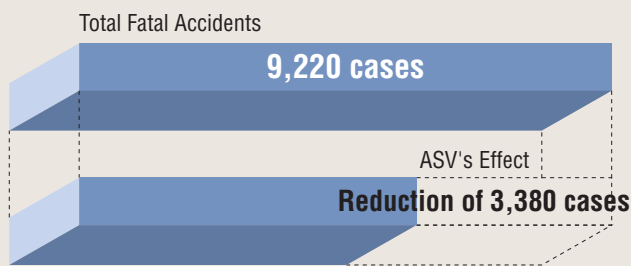
- Detect and report obstacles in advance
- Report unusual situation that a driver cannot notice.
- Assist drivers avoid risks.

Warn drivers of tendencies to be careless or absent minded.  
Tell drivers when they are about to encounter a risky driving situation.

Help drivers to reduce fatigue from long hour driving.

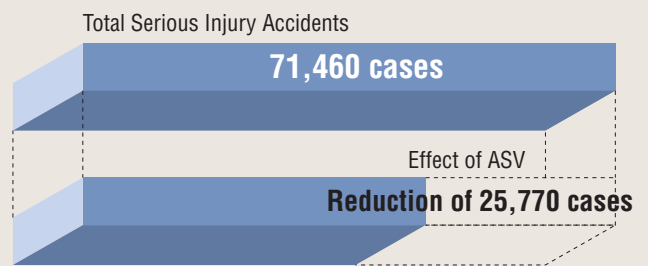
**If various ASV technologies were developed and installed in all vehicles, the present number of serious traffic accidents could be reduced by about 40%.**

## Possibility of Reducing Fatal Accidents by 36.7%



1997 data Investigated by Ministry of Land, Infrastructure and Transport

## Possibility of Reducing Serious Accidents by 36.1%



1997 data Investigated by Ministry of Land, Infrastructure and Transport

## Image of Advanced Safety Vehicle (ASV)

### Computer

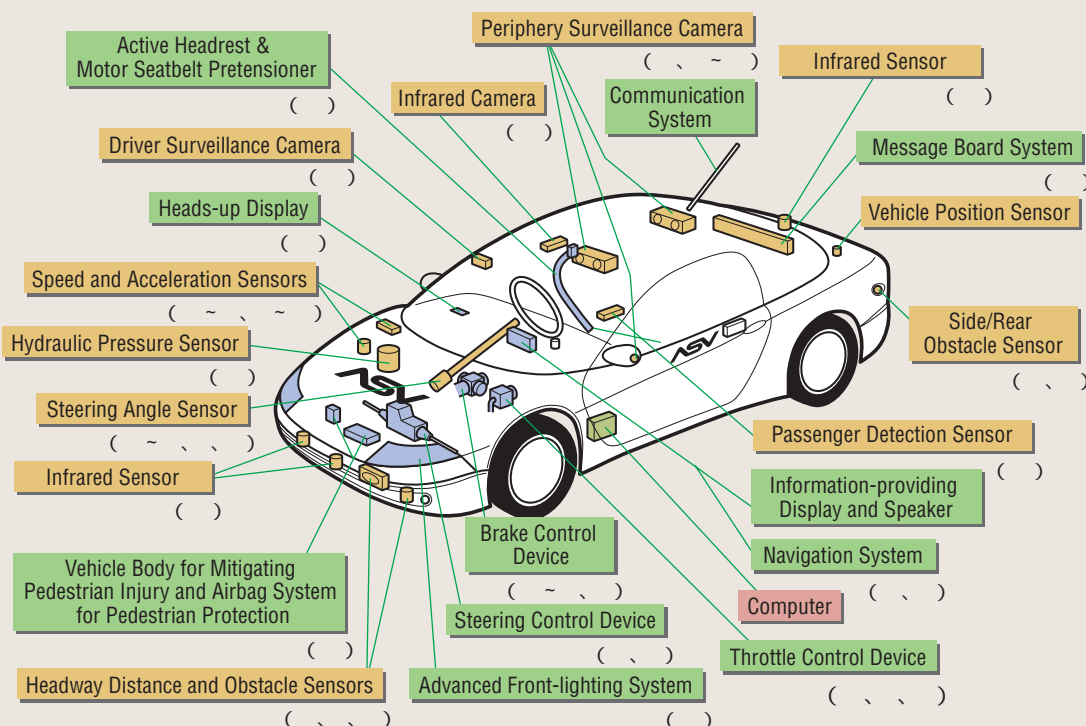
Recognizes a risk, judges it from sensor information and transmits it to a control device.

### Sensor

Recognizes driving environment and vehicle conditions.

### Control device

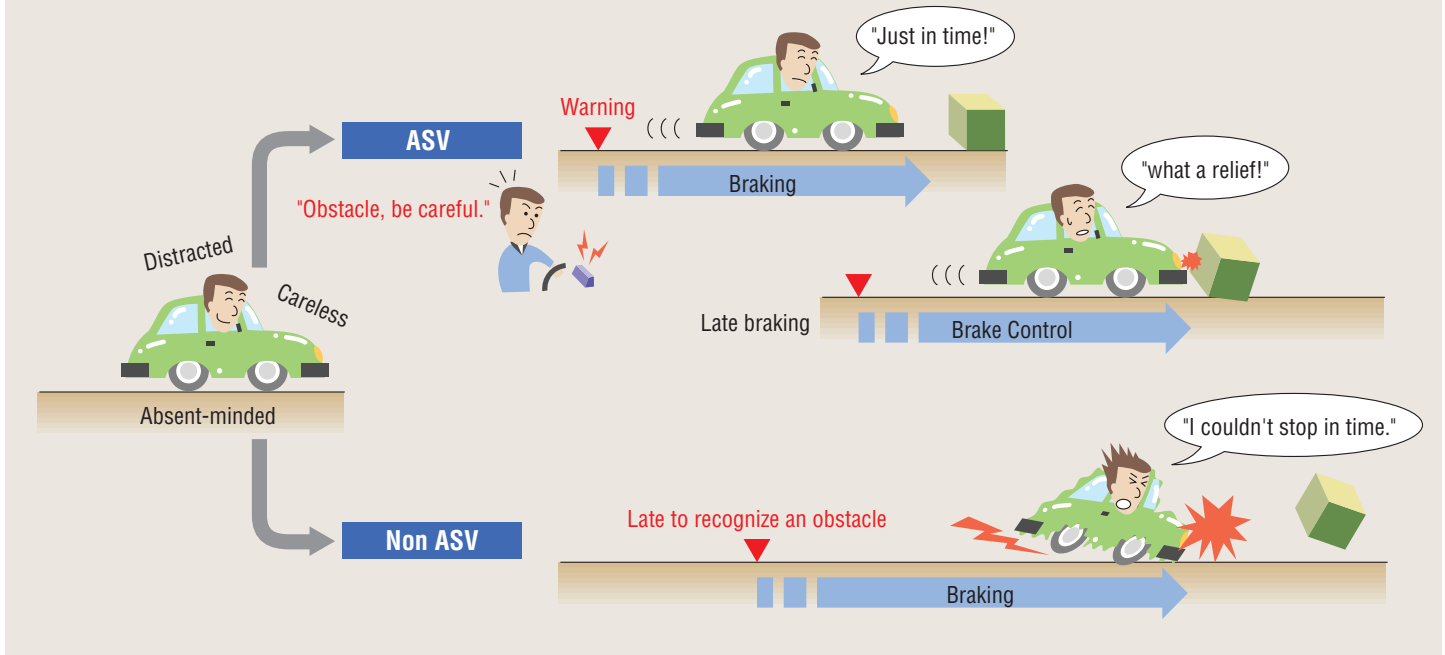
Provide information and warning based on computer information and assist driver's operation.



### Major Systems Developed in the ASV-2

- Forward Obstacle Collision Prevention Support System
- Curve Overshooting Prevention Support System
- Full Speed Range Adaptive Cruise Control System with Brake Control
- Lane Departure Prevention Support System
- Lane Keeping Assistance System
- Blind-spot Obstacle Collision Prevention Support System
- Advanced Front-lighting System
- Neck Injury Mitigation System for Rear-end Collision
- Vehicle Body for Mitigating Pedestrian Injury and Airbag System for Pedestrian Protection
- Drowsiness Warning System
- Seatbelt Warning System for All Passengers
- Side Obstacle Advisory System
- Emergency Braking Advisory System for the Following Vehicle's Driver
- Nighttime Pedestrian Monitoring System

## Functions of ASV (Example : Forward obstacle collision prevention support system)



## What are the common principles in developing ASV technologies?

We established the design principles and design guidelines so that ASV technologies could correctly be developed and popularized.

### Design Principles of ASV

The following three basic concepts must be the focus in developing ASV technologies.

#### 1. Driver Assistance

ASV technologies should understand driver's wills and support their safe driving based on the concept of driver responsibility.

#### 2. Driver Acceptance

ASV technologies should be easy to use and be trusted by drivers. This means that a human-machine interface design should be appropriately implemented.

#### 3. Social Acceptance

ASV technology-equipped vehicle must operate with unequipped vehicles and pedestrians. Therefore, we must consider how to obtain proper understanding of the public.

### Design Guidelines

In order that vehicle manufacturers may follow the basic concepts and develop ASV technologies based on a common understanding, we drafted design guidelines for 58 technologies.

# Development results to date



Each manufacturer exhibited its development results at Smart Cruise 21 Demo 2000 in November 2000.

Thirty-five ASVs participated.

Participating Vehicles



Thirty-five ASV technologies were demonstrated or exhibited.

Demonstrated Technology Examples



Damage Mitigation Brake Control System



Right Turn Collision Prevention Advisory System

# Ministry-authorized ASVs are operated on public roads.



Ministry-authorized vehicles are test vehicles that are permitted to drive on public roads following instructions given by the Minister of Land, Infrastructure and Transport in order to test advanced safety technologies; such vehicles are not on sale yet, and are generally not permitted on public roads. The Ministry-authorized ASV test vehicles have gathered valuable data on public roads that cannot be acquired on a test course and the data have been utilized to improve ASV technologies.



Ministry-authorized ASV



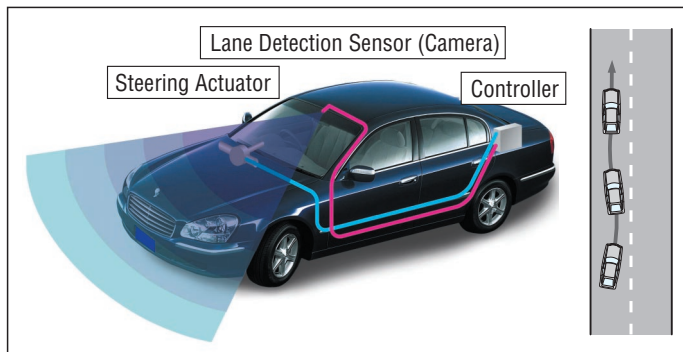
The following technologies have been commercialized.

## Curve Warning System



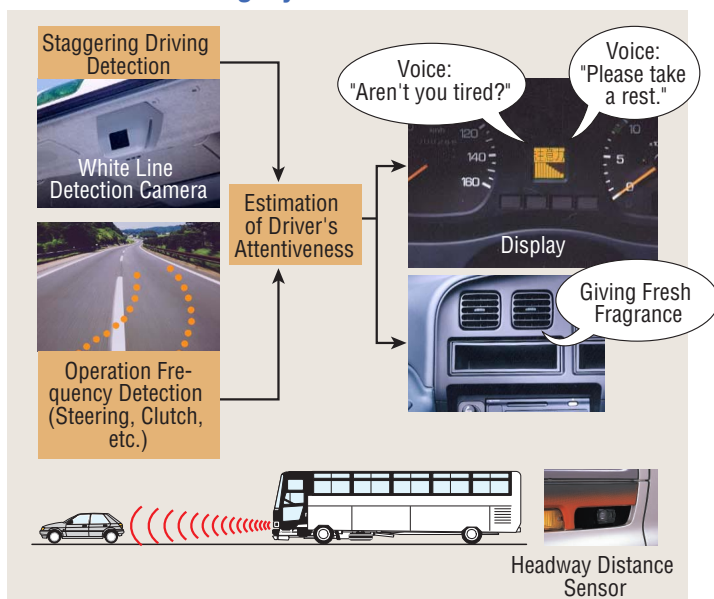
If the curve entry speed exceeds the safety speed, this system gives a driver a vocal warning and activates shift-down control depending on the situation.

## Lane-keeping Assistance System



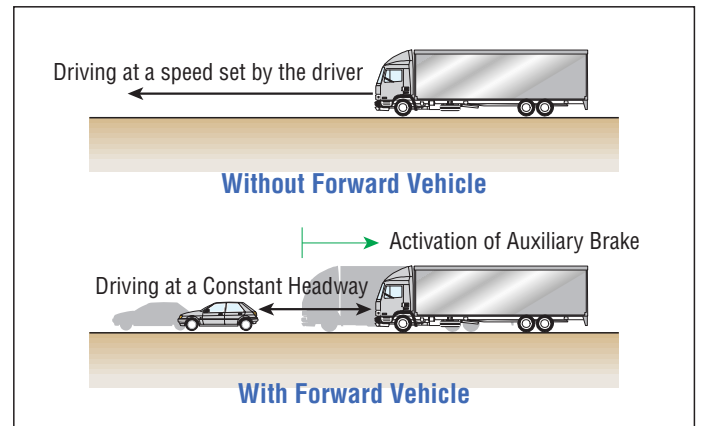
This system recognizes the forward straight lane on a freeway with a camera and supports steering to keep in the lane.

## Drowsiness Warning System and Headway Distance Warning System



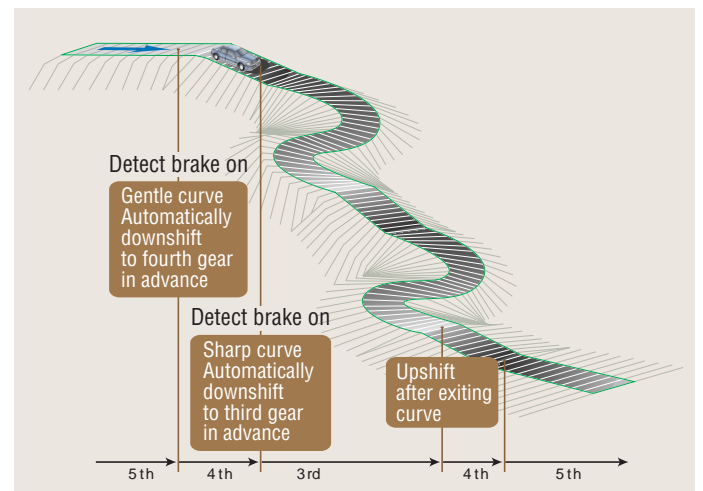
These systems detect headway distance and meandering with a camera and give a vocal warning and/or fragrance in case a driver is inattentive.

## Adaptive Cruise Control System with Brake Control (ACC)



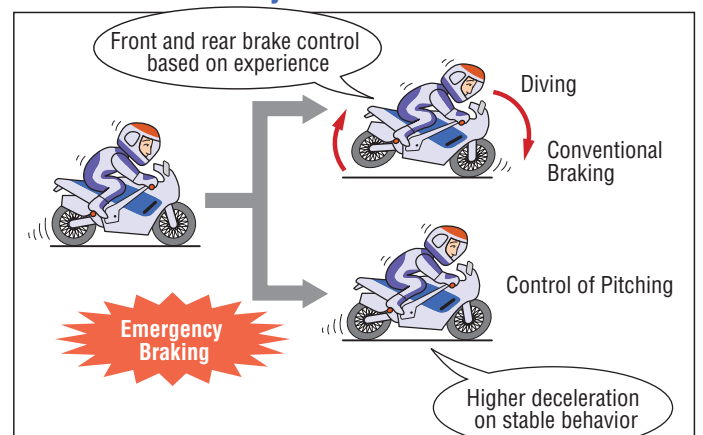
This system controls the vehicle speed into the cruising speed set by the driver. When there is a slower vehicle ahead, the system controls the headway distance adequately.

## Shift Control System Cooperating with Car Navigation System



This system shifts to an appropriate gear position based on information about road curvature from the car navigation system, slope and driver's operation.

## Combined Brake System

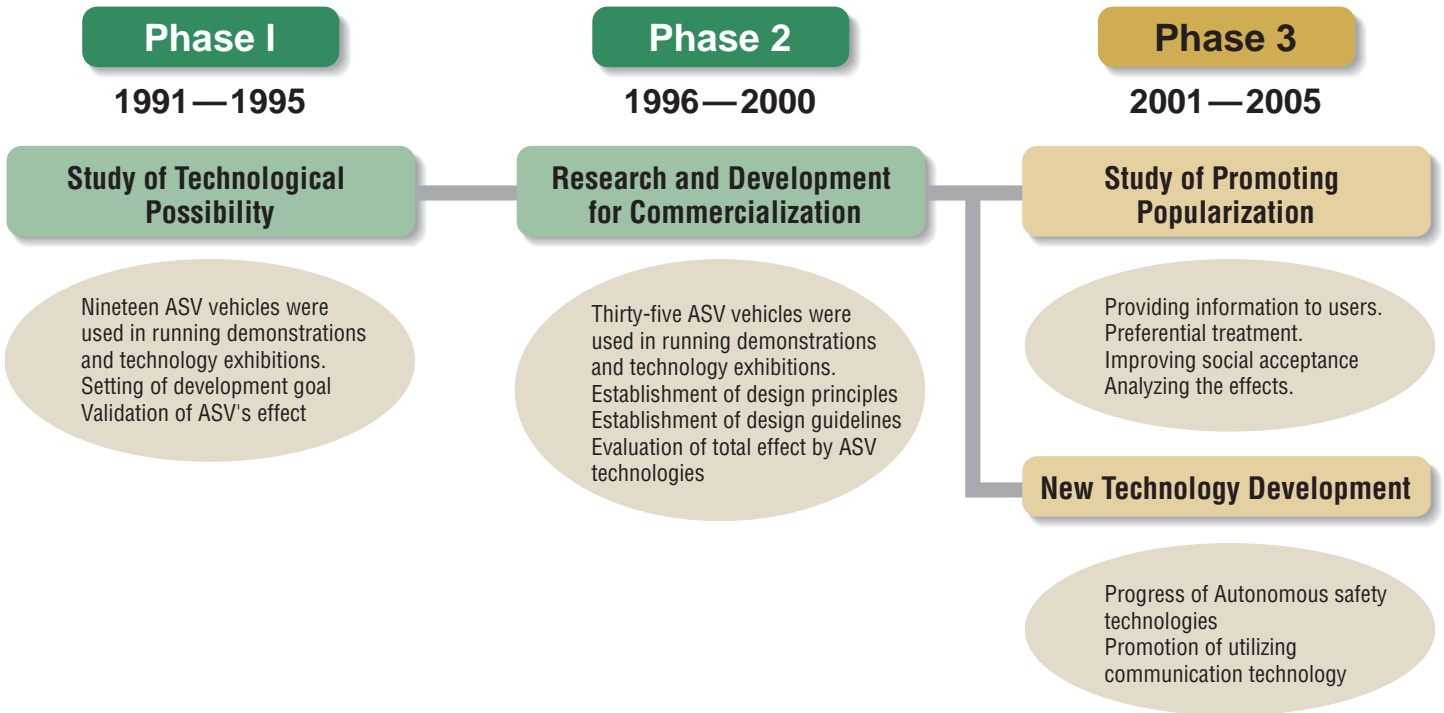


By appropriately distributing front and rear braking forces, it is possible to reduce speed effectively.

# ASV Projects — Past and Future



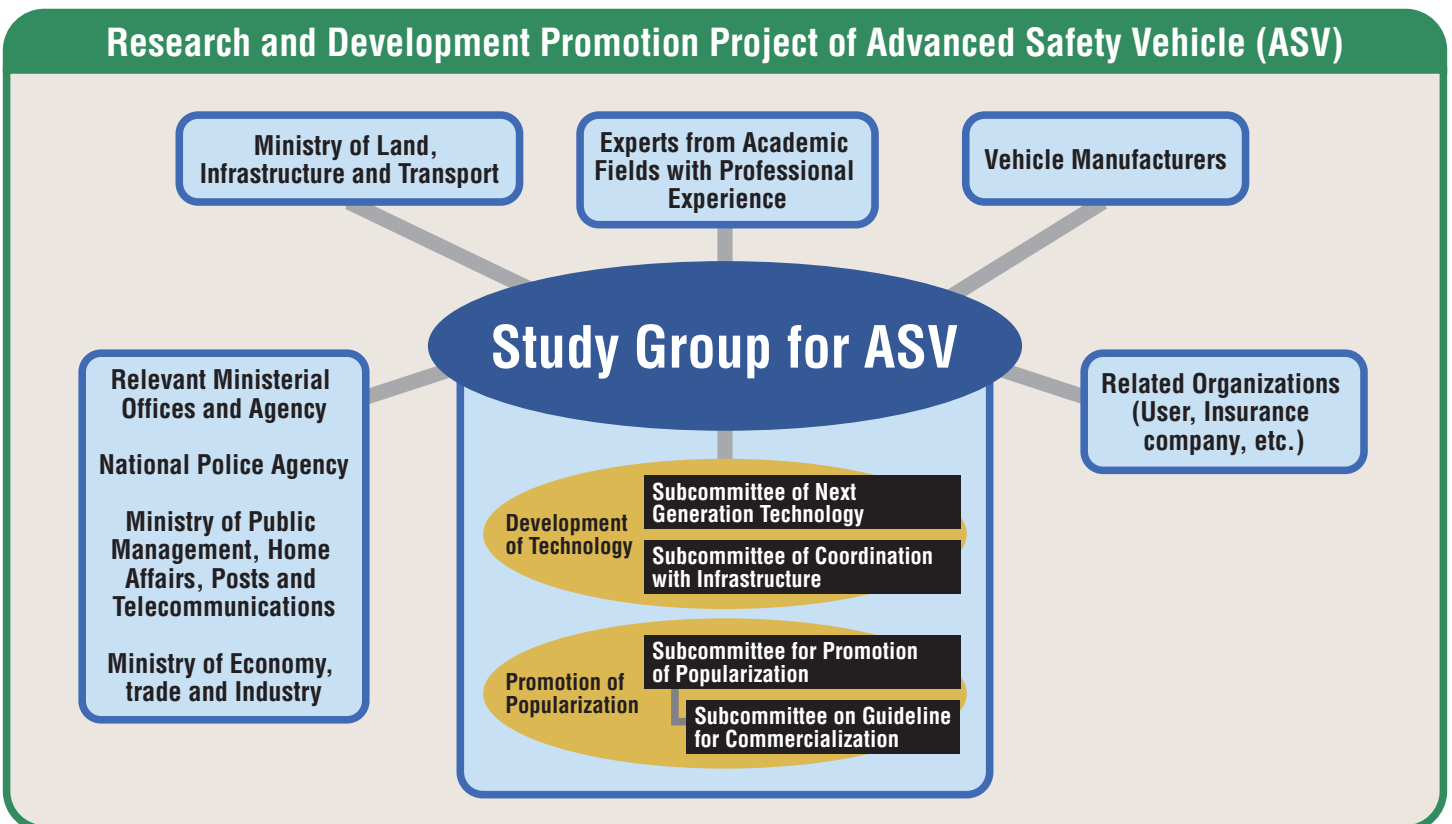
We have been carrying on the ASV project for over 10 years. Therefore we get to work on promoting popularization of ASV technologies and promoting development of next generation safety technologies at the present stage.



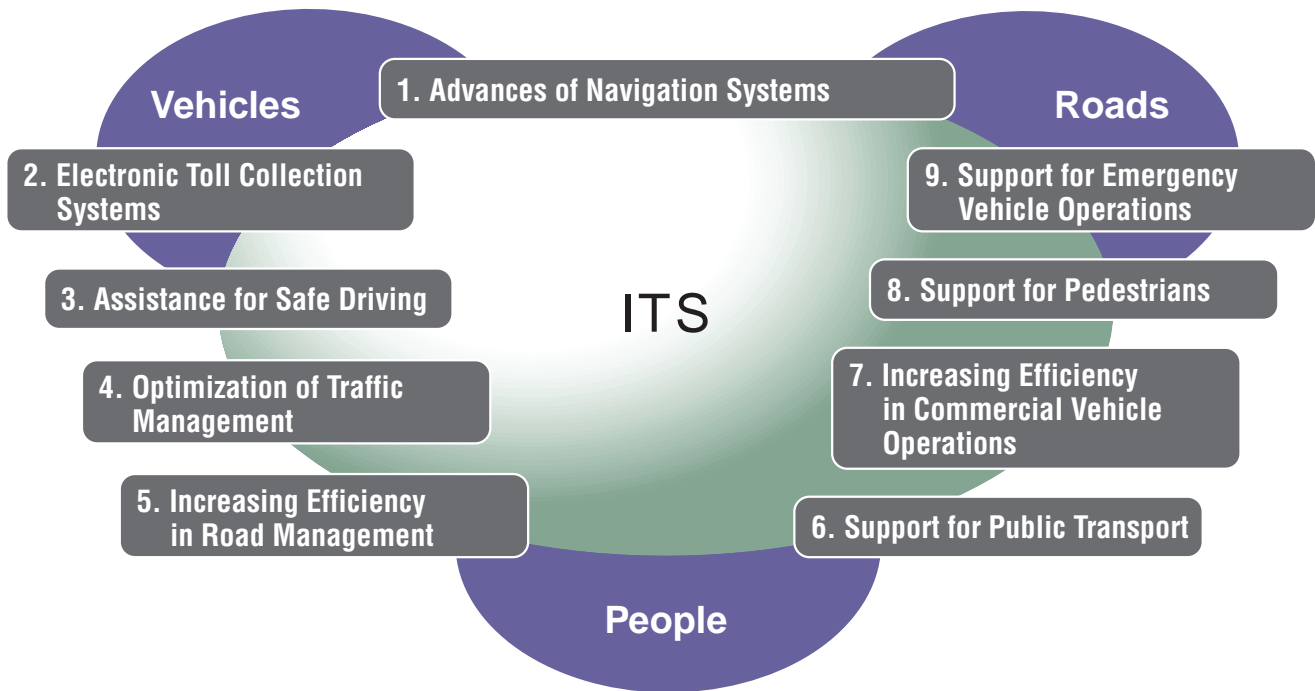
## What is the study system of phase 3 ASV Project?



ASV Project is being promoted through the mutual cooperation of governments, universities and private companies.



ITS stands for Intelligent Transport Systems. ITS seeks to establish a total traffic system of people, roads and vehicles through the most advanced electronics technologies and to realize safety of road traffic, efficiency of transport, remarkable promotion of comfort and preservation of the environment. In Japan, the following research fields are mainly studied as the ITS. ASV corresponds to "3. Assistance for safe driving".



## Promotion System of ITS

In order to promote efficient research of ITS, the three related ministerial offices and an Agency have regular meetings to promote cooperation.



### Secretariat of "Study Group for Promotion of Advanced Safety Vehicle",

Technology Planning Section, Engineering and Safety Department, Road Transport Bureau,  
Ministry of Land, Infrastructure and Transport

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