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The Power of Dreams

Vehicle Safety Communications in Honda

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Respect for Humankind is the very basis of everything

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Concept of Honda Safety

Crash-free vehicle

Safety coexistence

Vehicle-Infra. cooperation system

Road-to-vehicle
Vehicle-to-road-to-vehicle
Inter-vehicle
Communication

Prevision/ Prevention Collision Avoidance

Active safety

Night vision
AFS
HiDS

Pre-crash safety

Collision Mitigation

CMBS
E-pre tensioner

Passive safety

External sensing

Crash-compatibility body

Pedestrian injury reduction

Occupant crash protection

Motorcycle airbag

Training

Driving simulator
Riding simulator

Body structure
Restraint device

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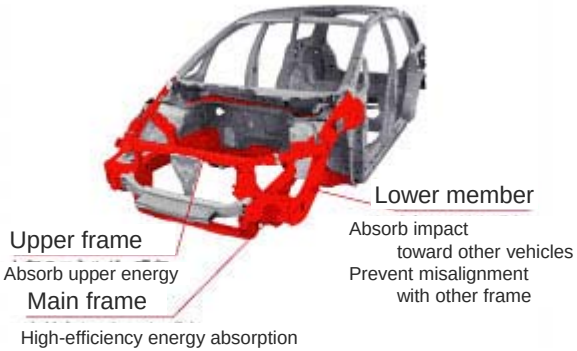
Passive Safety

“Establish safety technology that meets real-world needs

◆Crash-compatibility body

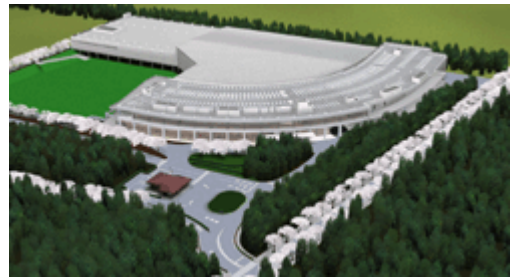
G-CON
G-FORCE CONTROL TECHNOLOGY

Achieve balance of "Evolving self-protection" and "Reduction of damage toward other vehicles"



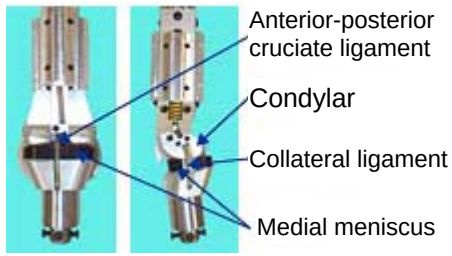
World's first

Omni-directional indoor crash test facility



◆Pedestrian dummy development (World's first)

“More similar in structure to human body to collect detailed data”



ITS W(ss in London

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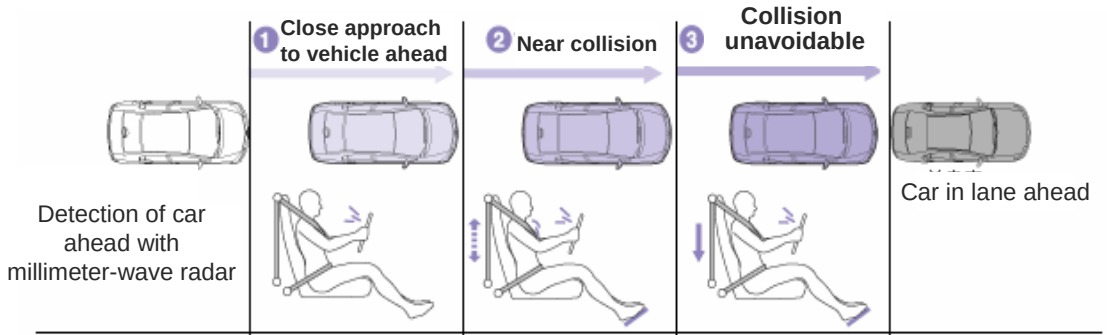
Pre-crash Safety

“Precaution by predicting impact”

◆CMBS (Collision Mitigation Brake System) +E-pretensioner

“Predict impact and warn driver, prepare braking and pretensioner for possible collision”



	1 Close approach to vehicle ahead	2 Near collision	3 Collision unavoidable	
Audio and visual warnings	Buzzer display warning	Buzzer display warning	Buzzer display warning	
CMBS		Light braking	Strong braking	
E-pretensioner		Light belt retraction (Driver seat)	**Strong belts retraction (Driver and Passenger seat)**	

1. Close approach to forward vehicle (Detect possible collision) ➡ Audio and visual alerts ➡ Urge driver to take risk-avoidance operation
2. Near collision ➡ Tactile signal with light braking and light belts tightening ➡
3. Impact is unavoidable ➡ Assist avoidance operation and reduce damage at collision through strong braking and strong belts tightening ➡ Assist operation & reduce damage

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Active Safety

「Prevent accidents」

◆Intelligent Night Vision System

"**World's first** reminder system to let driver recognise less-visible pedestrians with audio and visual alert during night driving "

Far-infrared stereo camera

Remind driver of pedestrians with audio and surrounding frame alert

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Efforts toward “SMARTWAY”

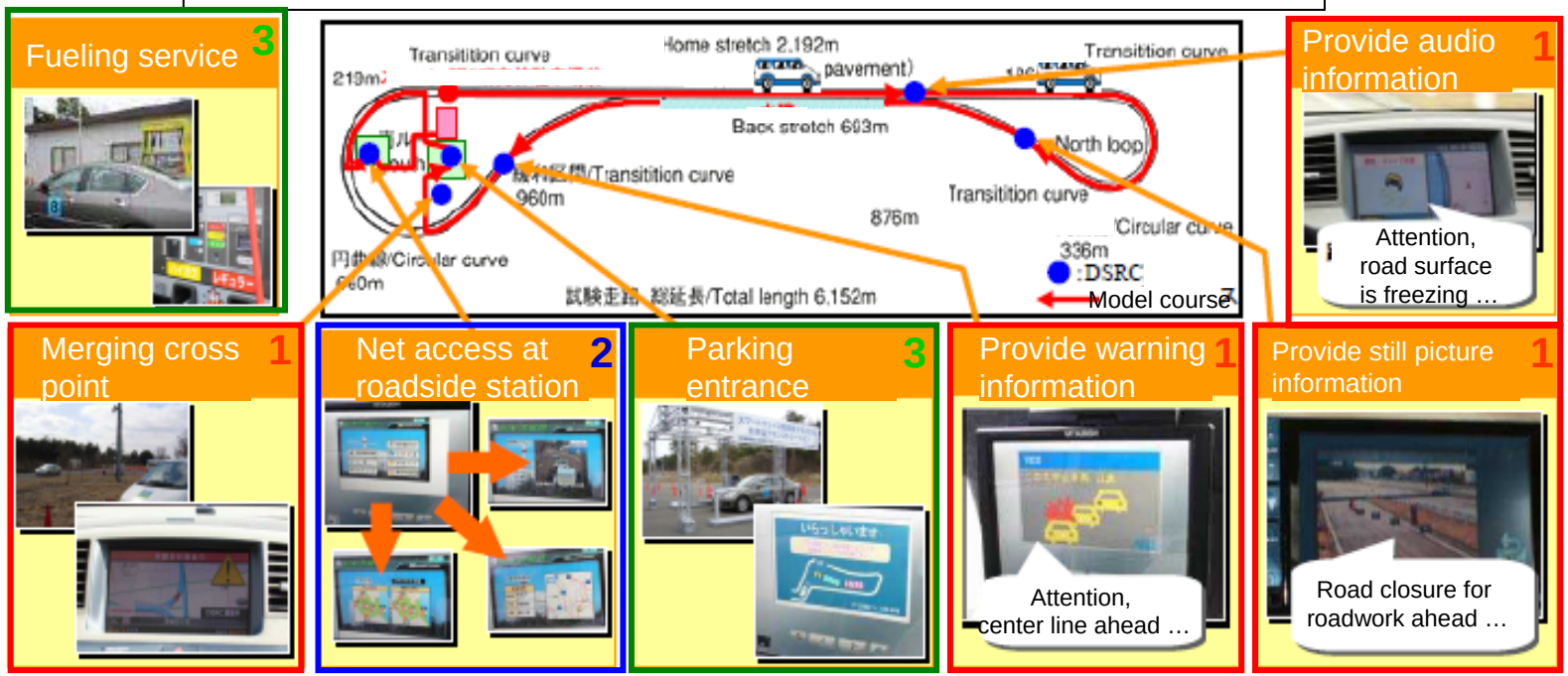
Ministry of Land, Infrastructure and Transport Bureau of Public Roads

-Realization of three next-generation road services in 2007
-Further driving safety assist and private service deployment utilizing these platforms
-Promotion of further ITS environment construction such as database

Schedule: 2004 Collaborative research → 2005 Standardization and specification → 2006 Pilot program → 2007 Start actual services → 2008

"SMARTWAY DEMO 2006" was conducted in Feb. 2006 as part of public-private partnership

1. **Provision of timely driving-support information**
2. **Regional guide suited to area and needs**
3. **Smooth passing through various gates**



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Efforts toward “DSSS”

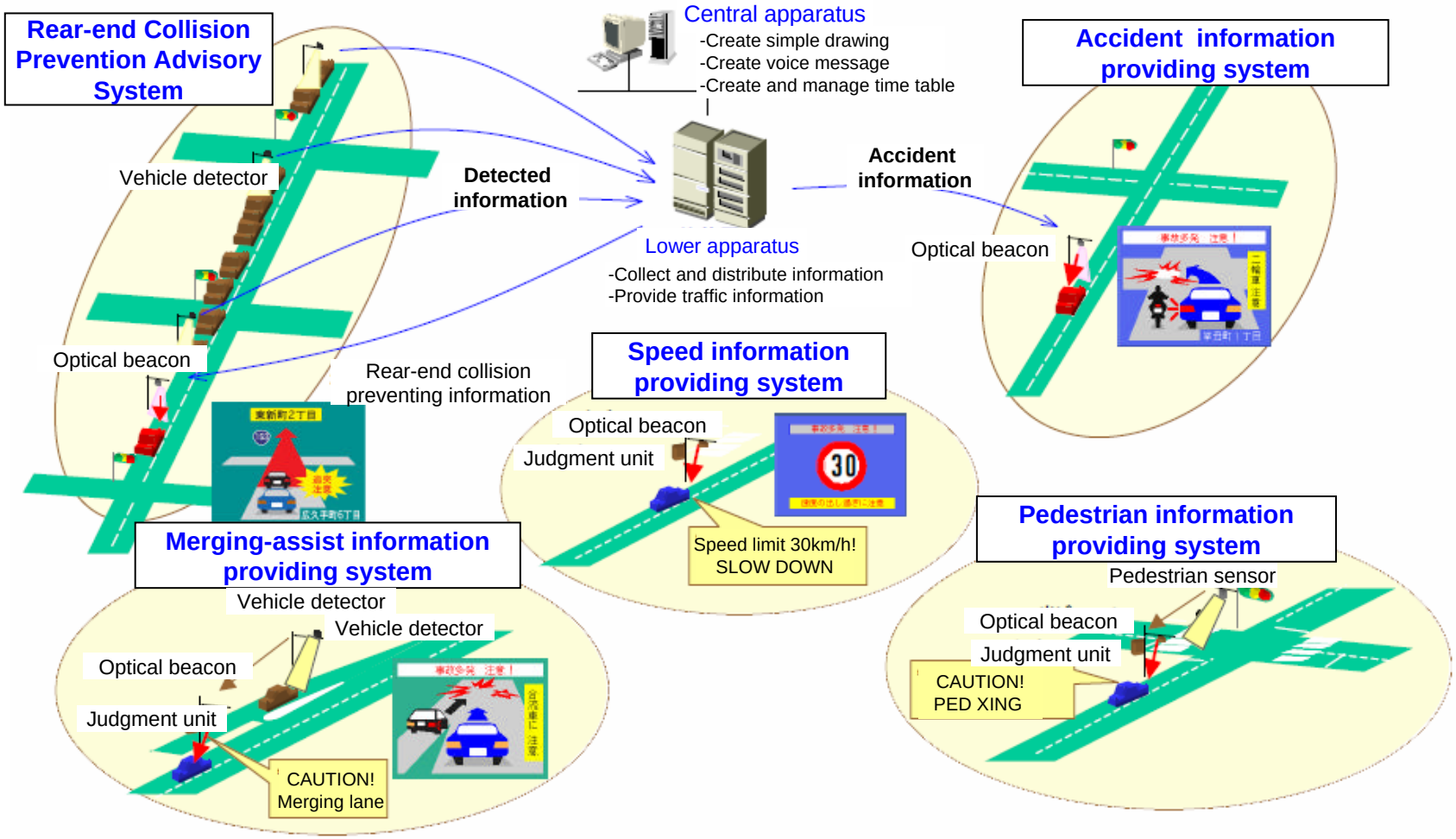
National Police Agency

Driving Safety Support Systems

Various types of sensors detect bicycles, motorcycles or pedestrians that are difficult to see for the driver, and provide information through the in-vehicle unit or traffic information board to raise attention.

Schedule

2004	2005	2006	2007	2008
Field test	Open proving test	Get in model operation (five systems)	Effect verification	Domestic expansion



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Efforts toward “ASV”

Ministry of Land, Infrastructure and Transport Bureau of Road Transport

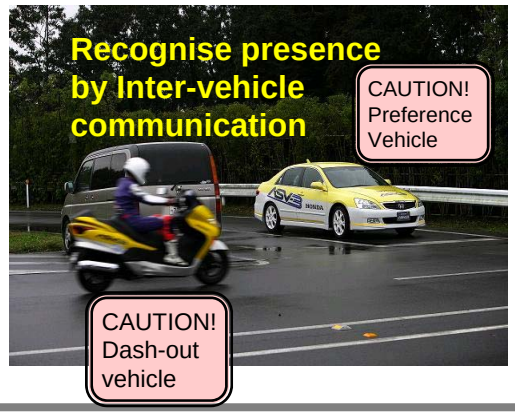
Technology to provide the vehicle with high intelligence, to make dramatic enhancements of safety and convenience through new technology such as electronics

	2004	2005	2006	2007	2008
Schedule	3rd phase	Consider promotion New technology development		Start of 4th phase	

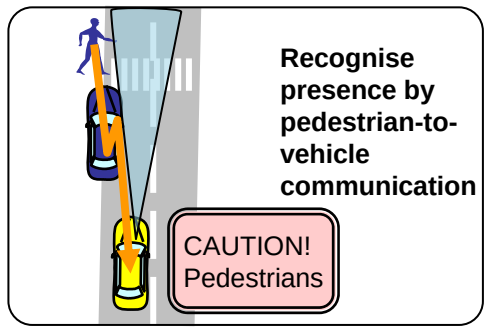
Autonomous-Detection Type Driving Support System	⇨	**Full-fledged promotion**
Roadside Information-Based Driving Support System		
Inter-Vehicle Communication Type Driving Support System	⇨	**Practical application on part of system**

◆ Inter-vehicle communication type driving support system

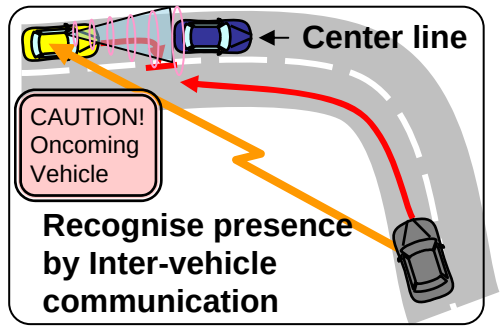
Intersection Collision Avoidance



Pedestrian collision Avoidance



Dazzle Avoidance



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Efforts toward “Ubiquitous ITS”

Ministry of Internal Affairs and Communications

Research and development of Ubiquitous ITS (Advanced Road Traffic System) are currently conducted through organic integration of vehicle, road, and human

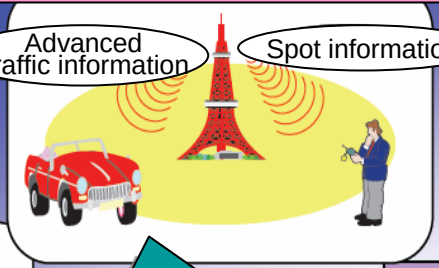
Schedule: 2004 | 2005 | 2006 | 2007
- 2004–2006: Research and development of Ubiquitous ITS
- 2007: Establishment of Ubiquitous ITS technology

Promote by industry-academia-government collaboration and cooperation with Ministry related to ITS

Ubiquitous ITS

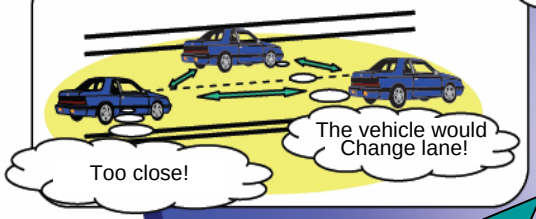
Ubiquitous network society

Apply Digital Terrestrial Broadcasting to ITS



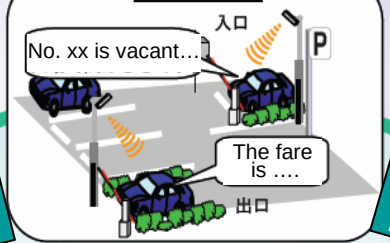
ITS for pedestrians with electronic tag

Telecommunication fitting to inter-vehicle communication



Telematics by cell-phone system (3G, 4G)

DSRC



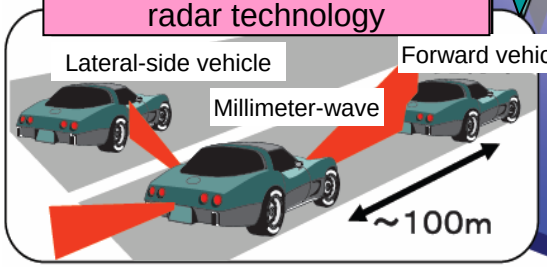
Advanced IT

Universalization

Safe & secure

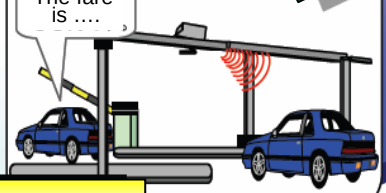
Increase speed

New in-vehicle millimeter-wave radar technology



VICS

ETC



High-speed millimeter-wave transmission

Current ITS

ITS World Congress in London

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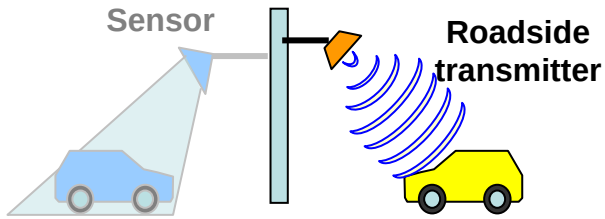
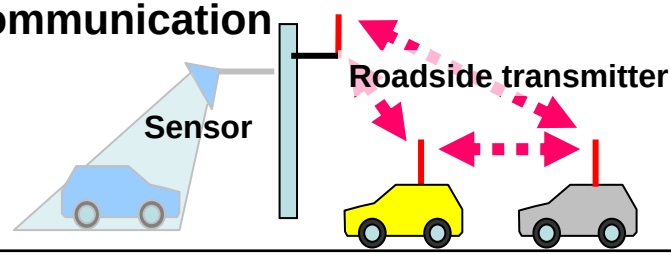
Comparison of information-telecommunication media

Type of media	Road-to-vehicle communication		Road-to-vehicle and inter-vehicle communication
			
	Infrared beacon	ARIB T75 DSRC	Improved ARIB T75
Frequency	Near-infrared light	5.8GHz	5.8GHz
Speed	1Mbps	4Mbps	4Mbps
Access	1 : 1 communication	1 : 1 communication	Ad-hoc network
Transmission distance	3.5m spot	30m	(100m or more)
No. of Vehicles	1	4	(320)
Features	-Pinpointed information-providing spot -Possible to recognize exact location	-Narrow information providing area -Can send rich content	-No restriction of information-providing area enabled by omni-directional transmission -Difficult to do over-the-horizon communication (may be required repeater)

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New IT Reform Strategy

IT Office
Cabinet Secretariat

- Realising Ubiquitous and Universal Network Society Where Everyone Can Enjoy the Benefits of IT -

January 19, 2006

IT Strategic Headquarters

Priorities in IT Policies by 2010

The Pursuit of IT Structural Reform Capabilities

(1) Responding to Social Issues that Should Be Resolved in the Twenty-First Century

(2) Realisation of a Safe and Secure Society
- The world's leading safe and secure society
- The world's safest road traffic environment

(3) Socio-Economic Activities in Twenty-First Century

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Target and Schedule

IT Office
Cabinet Secretariat

Current Status

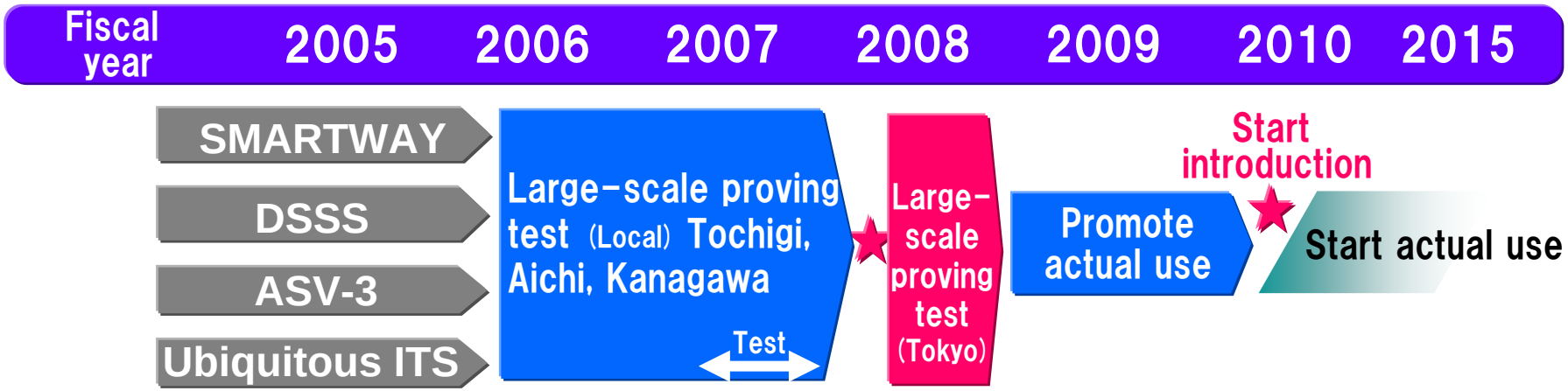
The trend of traffic fatalities has been declining recently, the number of traffic accidents remains high.

Target

Reduce the number of traffic fatalities and serious injuries by deploying Cooperative Driving Safety Support Systems.

- Traffic fatalities to 5,000 or below by the end of 2012 -

Schedule



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Efforts of Honda toward ITS

Concept

Safety coexistence

Safety for everyone coexisting in the mobility society

To realise traffic society with enhanced safety, develop "Infrastructure-linked Driving Safety Assist System" which appropriately inform drivers about presence of car, motorcycle, and pedestrian, in addition to development of autonomous system

Primary policy

- The system which covers low visibility of vulnerable road users including motorcycle
- Infrastructure and in-vehicle unit considering practical application and easy spread

Efforts of Honda

■Contents of proving test

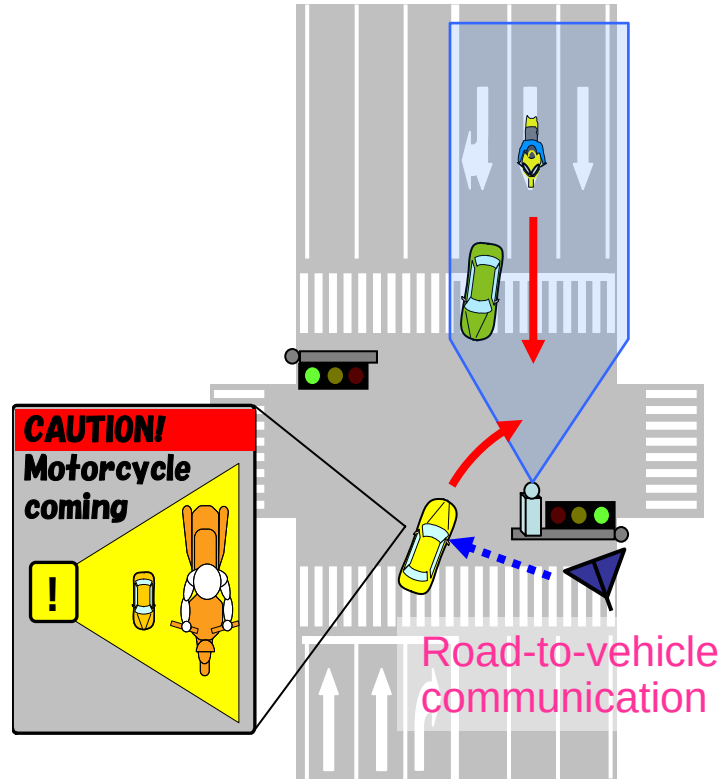
1. Intersection information providing system

-1. Provide information to prevent right-turn collision

-2.Provide information to prevent involving others at left turn

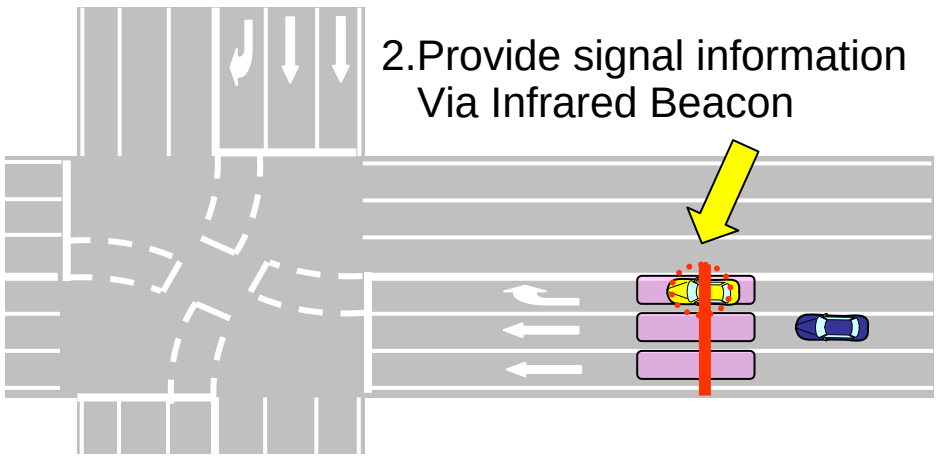
2. Signal information providing system

1-1. Provide information to prevent right-turn collision



Display for car driver

2.Provide signal information Via Infrared Beacon



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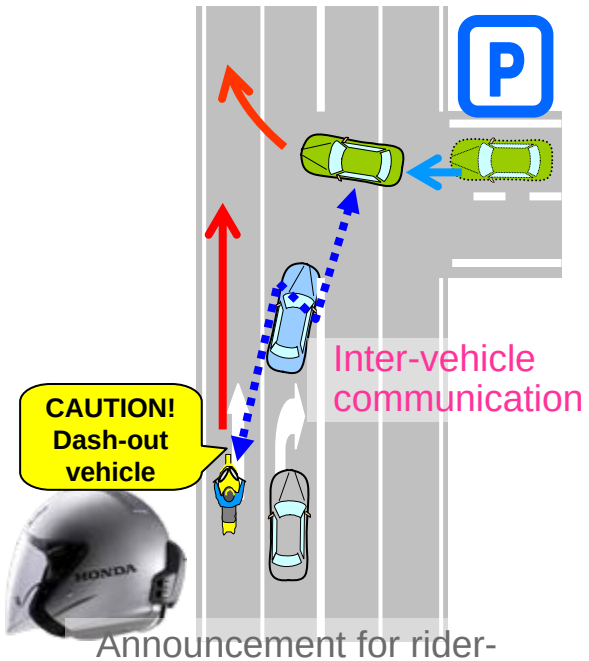
Efforts of Honda

3.Motocycle detection system

-1. Provide information to prevent crossing collision

-2. Provide information on vehicle travelling behind

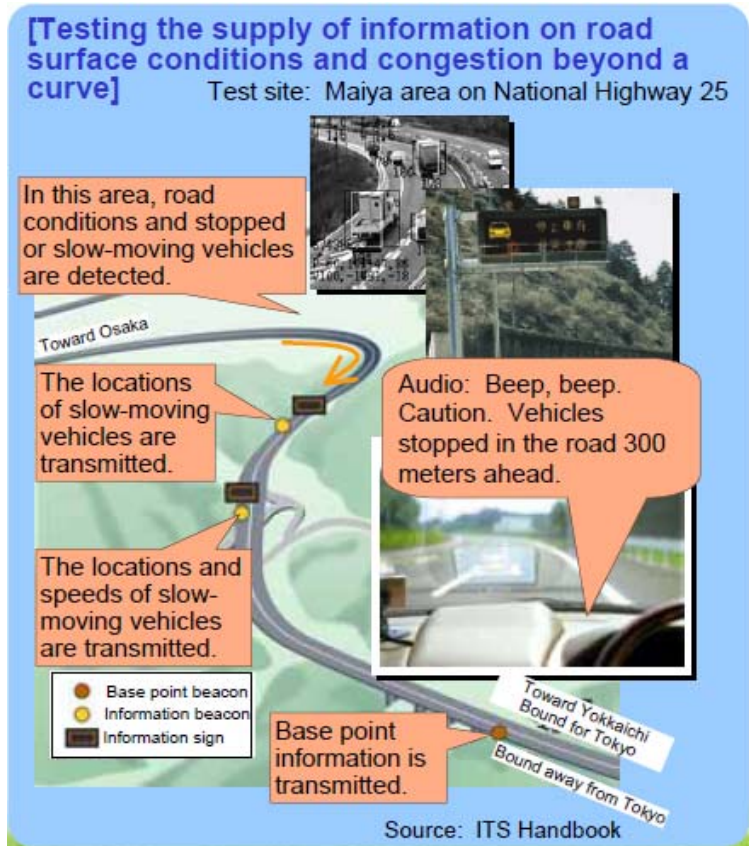
3-1. Provide information to prevent crossing collision



4.Information provision system along roadways

-1.Static images of road surfaces taken by roadside cameras

-2. Information on congestion beyond a curve etc……



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Future Work

Honda has made efforts toward safety
through development and actual use of
Autonomous Driving Assist Systems

To realise enhanced safety in the future,
it is necessary
to show drivers what they cannot see and
to inform them of what they do not know.
To that end, system structure utilising wireless transmission such as obtaining information from road side sensors with road-to-vehicle communication systems, or sharing information through intervehicle communication systems will become more and more important.

Honda has an aim to establish
Infrastructure-linked Driving Safety Assist Systems
which can protect vulnerable road users including motorcycles
from accidents by utilising these technologies concertedly.

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The Power of Dreams

"Safety for Everyone" through Honda Safety Technologies