

Future Direction for Enhanced Safety

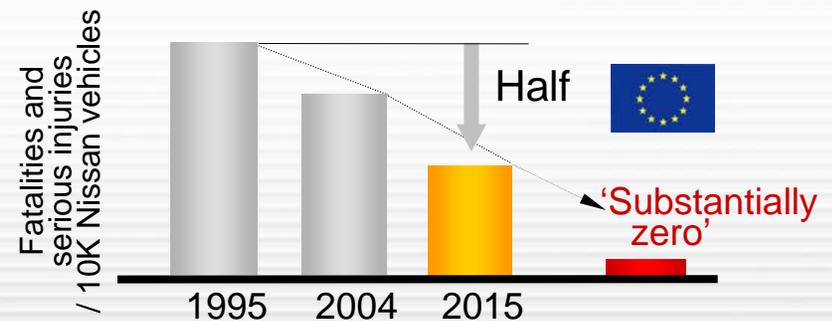
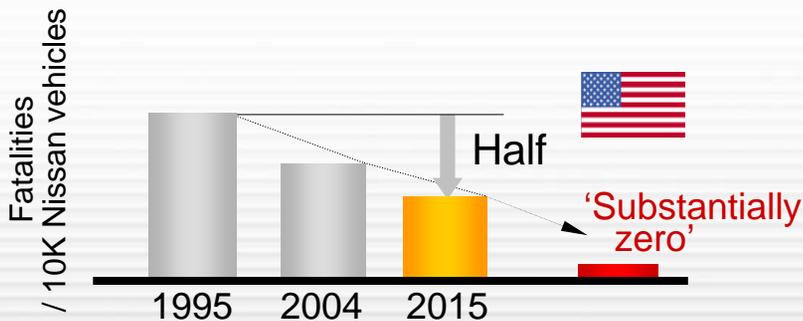
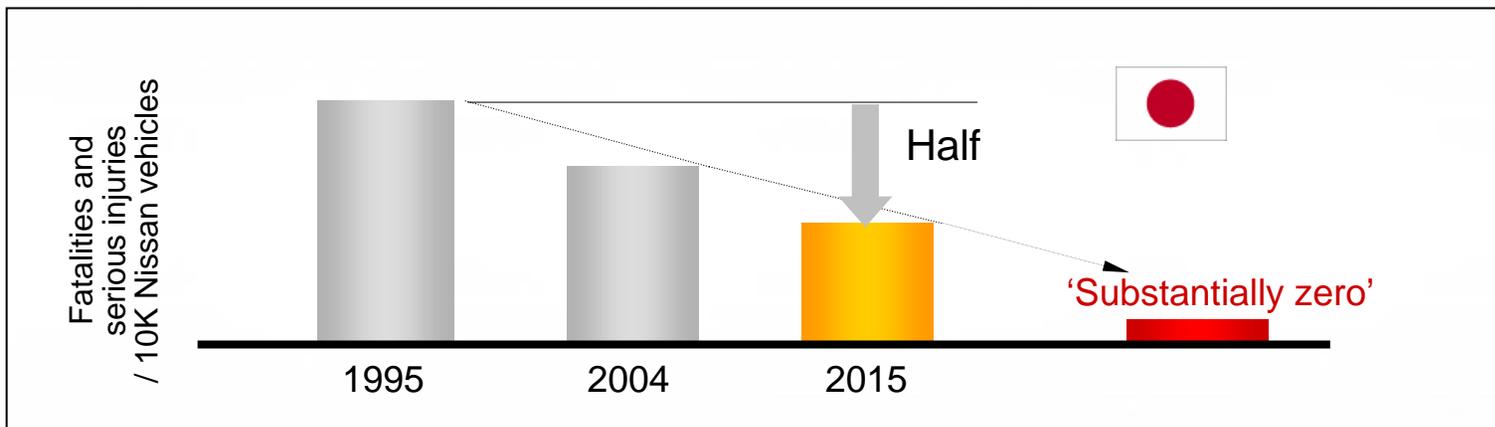
June 18 , 2007
Minoru Shinohara
Nissan Motor Co., Ltd.

Safety Technology Development

Nissan's safety vision

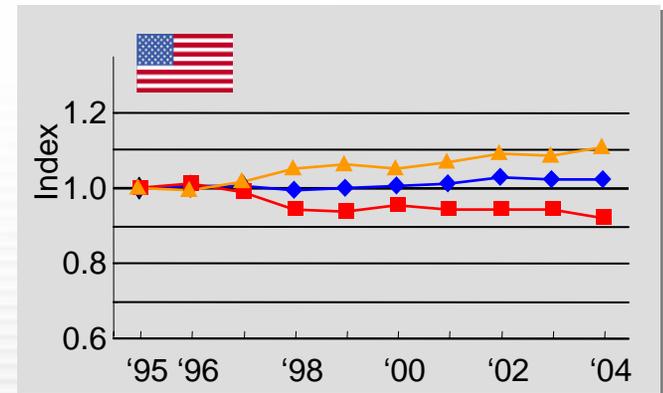
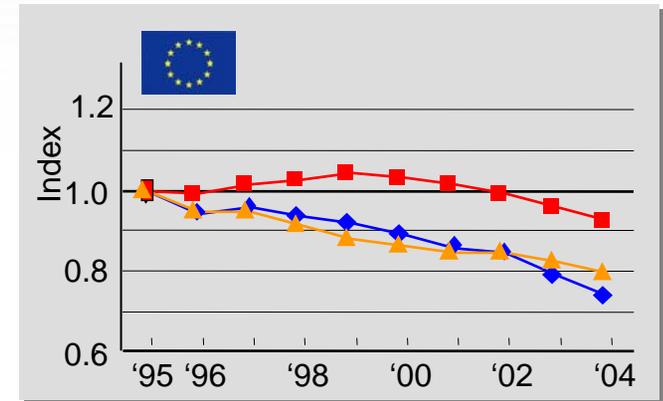
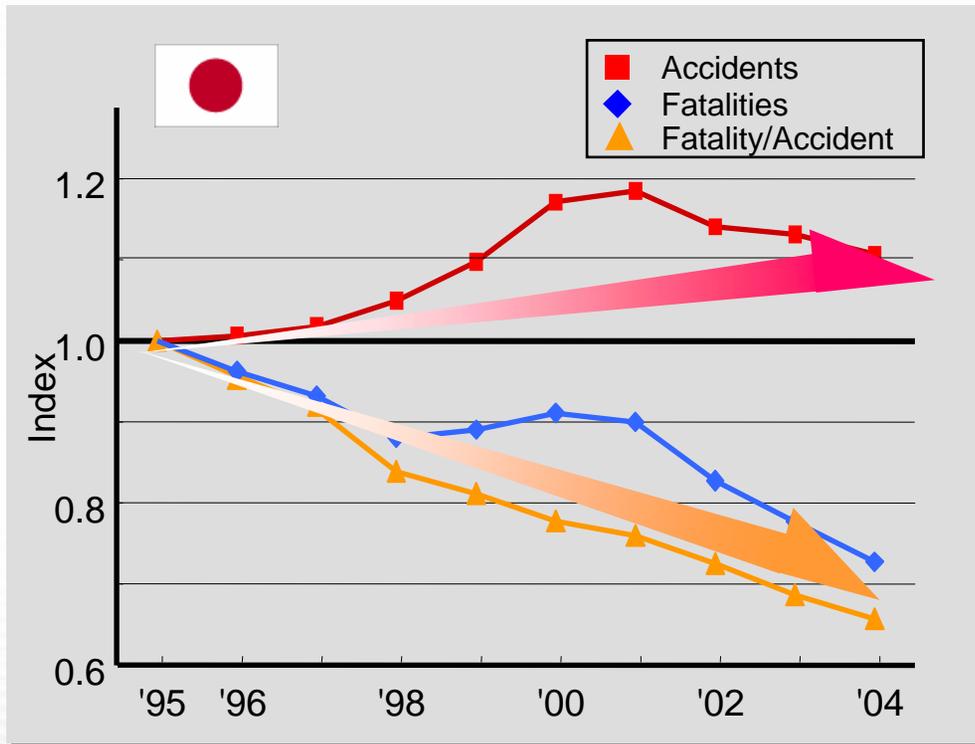
Reduce fatalities and serious injuries involving Nissan vehicles:

- Half of 1995 rate by 2015
- Ultimate goal to be substantially zero



Trends in number of accidents & fatalities

- Fatalities decreasing, but accidents are not (JPN).
- Toward 'substantially zero' need more efforts to decrease accidents

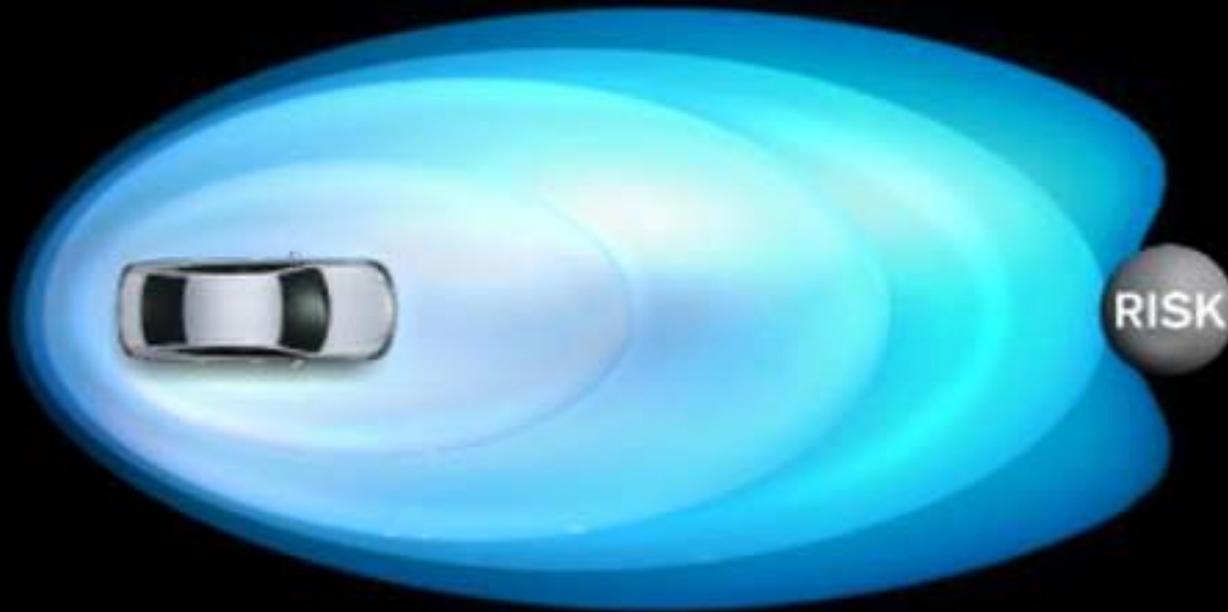


SOURCE:
 Japan: ITARDA, "Institute for Traffic Accident Research and Data Analysis"
 (Involvement of Nissan Vehicles in Traffic Accidents)
 USA: NHTSA Traffic Safety Facts 2005 - Final Edition, Jan 2007
 EU: Road safety evolution in EU, July 2006

Safety Shield Concept

“The Vehicle That Helps Protect People”

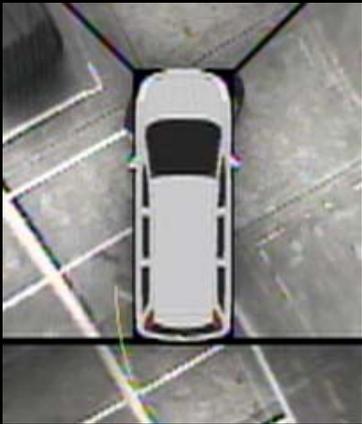
The vehicle activates various barriers to help the driver, passengers and other road users avoid danger from normal driving conditions through post accident conditions.



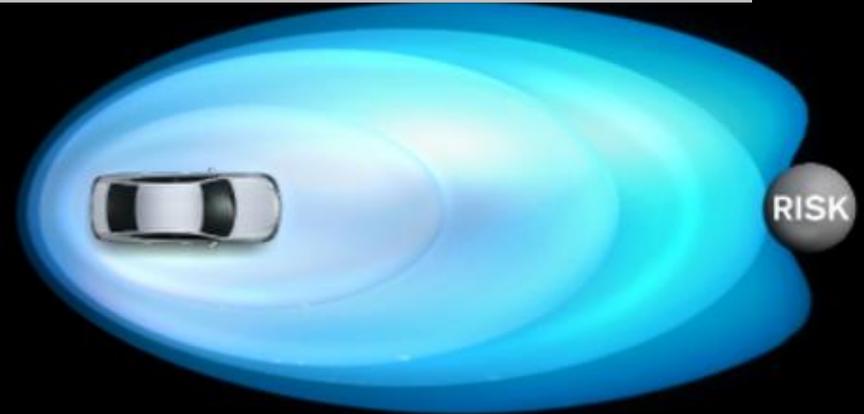
Safety Shield Concept

❑ Risk has not yet appeared

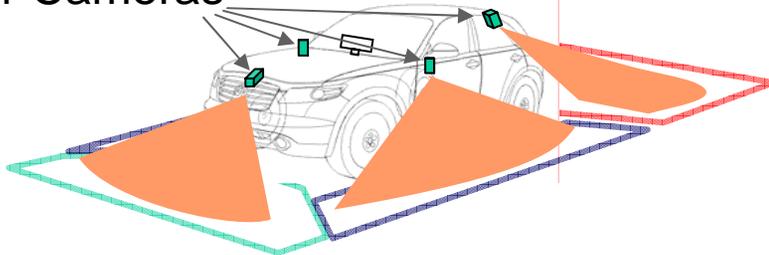
Helps the driver to maintain comfortable driving.



- Intelligent Cruise Control (with low-speed following capability)
- Adaptive Front-lighting System
- Xenon Headlamp
- Side Blind Spot Monitor
- **Around View Monitor (AVM)**



4-Cameras



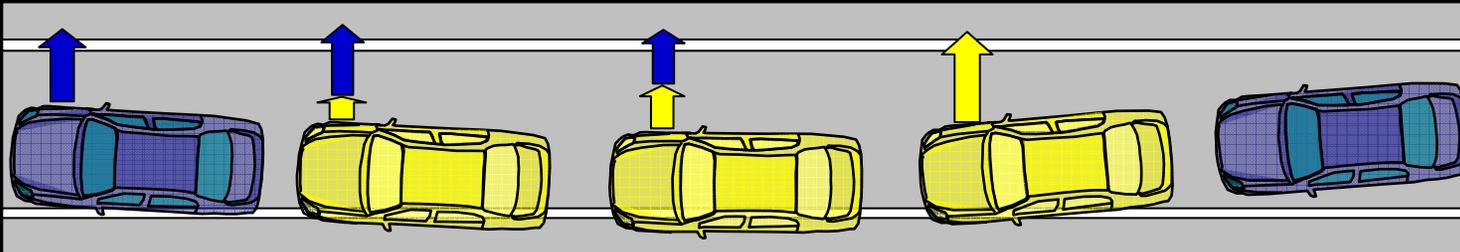
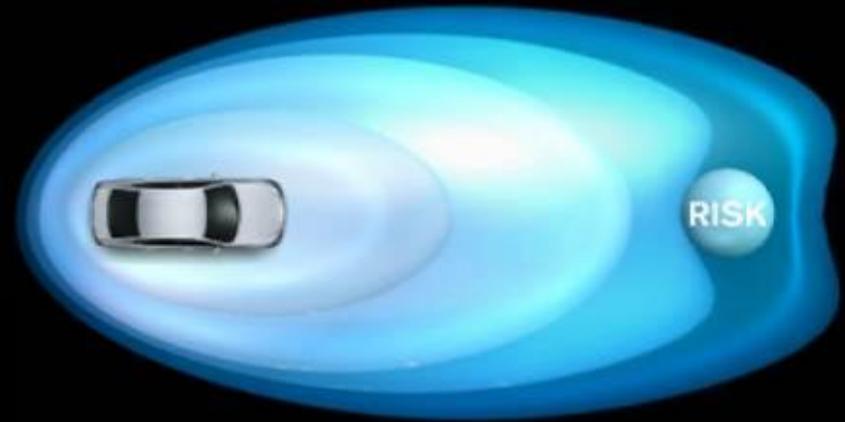
Around View Monitor (AVM)

Safety Shield Concept

❑ Risk has appeared

Helps the driver to recover to safer driving.

- Electronic Brake force Distribution (EBD)
- Lane Departure Warning System
- Lane Departure Prevention (LDP)



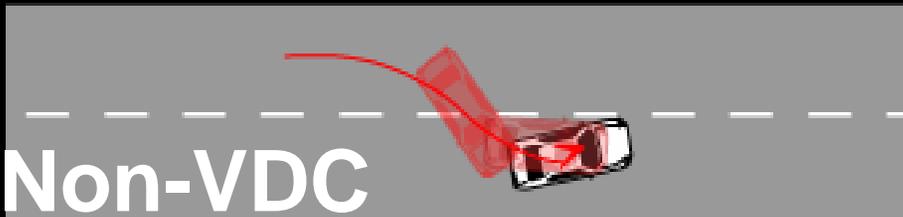
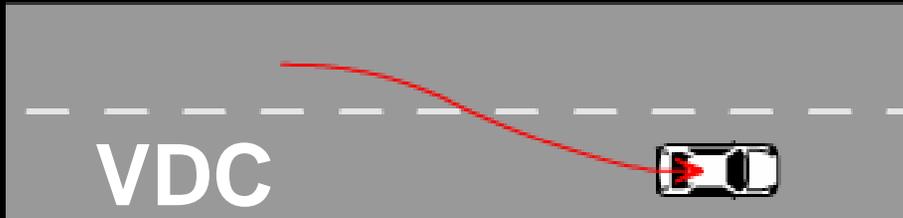
Lane Departure Prevention (LDP)

Safety Shield Concept

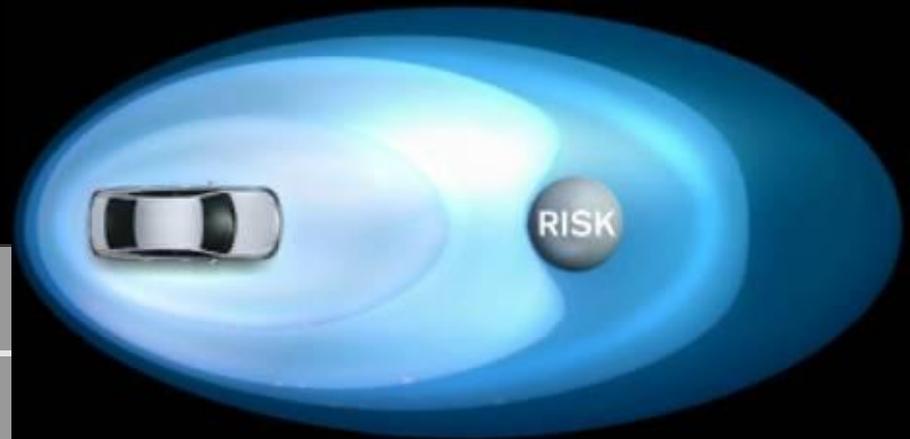
❑ Crash may occur

Helps the driver to recover to safer driving.

- Anti-Lock Braking System (ABS)
- Brake Assist
- Vehicle Dynamics Control (VDC) = ESC



Vehicle Dynamics Control (VDC)



Safety Shield Concept

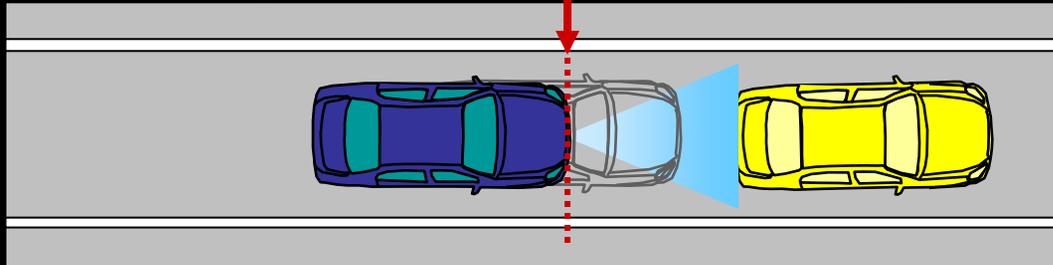
❑ Crash is unavoidable

Helps minimize the damage

- Intelligent Brake Assist (IBA)
- Brake-operated Front-seat Pre-crash Seatbelt



Activate Braking



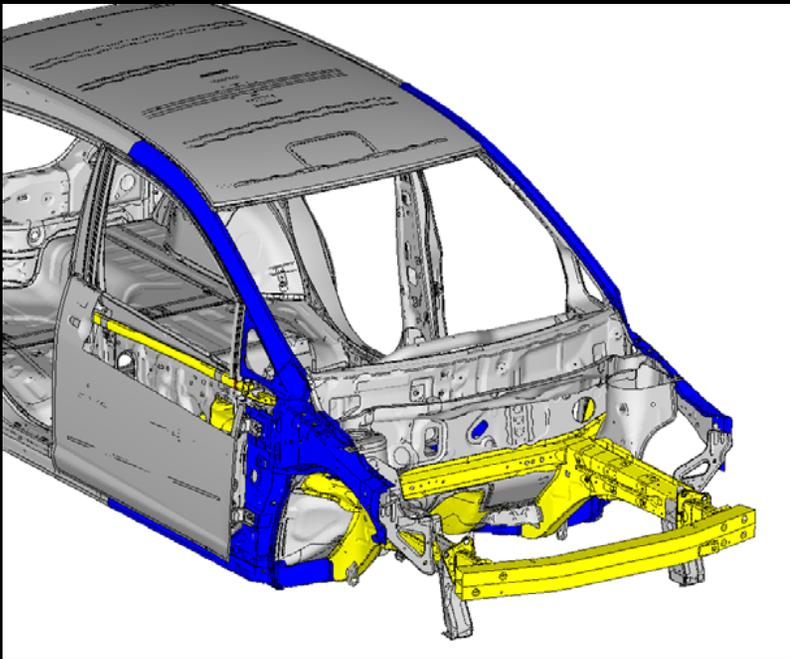
Intelligent Brake Assist (IBA)

Safety Shield Concept

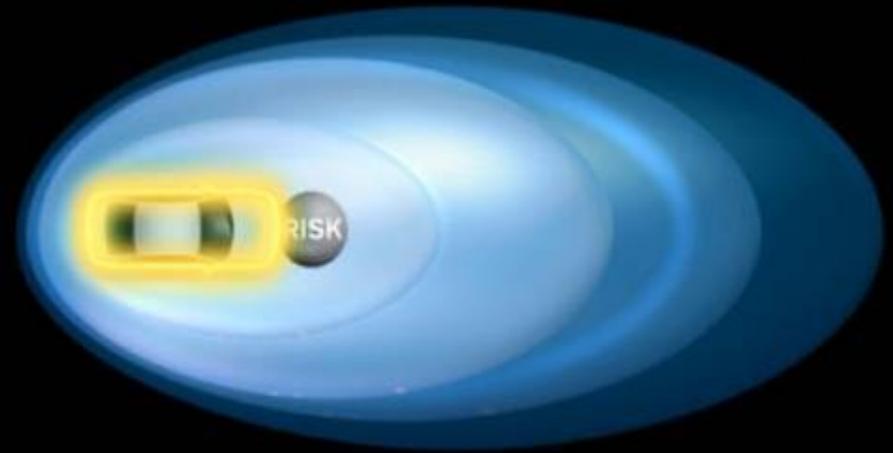
❑ Crash

Helps minimize the damage

- Zone body
- Active Head Restraint
- SRS Airbag



Zone Body



Safety Shield Concept

□ Post Crash

Helps minimize the damage

SAFETY SHIELD

■ Helpnet



Emergency Call Service

Further Challenges for Enhanced Safety

Further challenges

- Enhance covered area of accidents

- Intersection and pedestrian
- Infrastructure cooperative approaches

- Enhance adoption of technologies

- Engineering efforts on technologies
- Raise public awareness, driving force for promotion

- Enhance regional scope

- 1.2 million of fatalities globally

Intersection accident

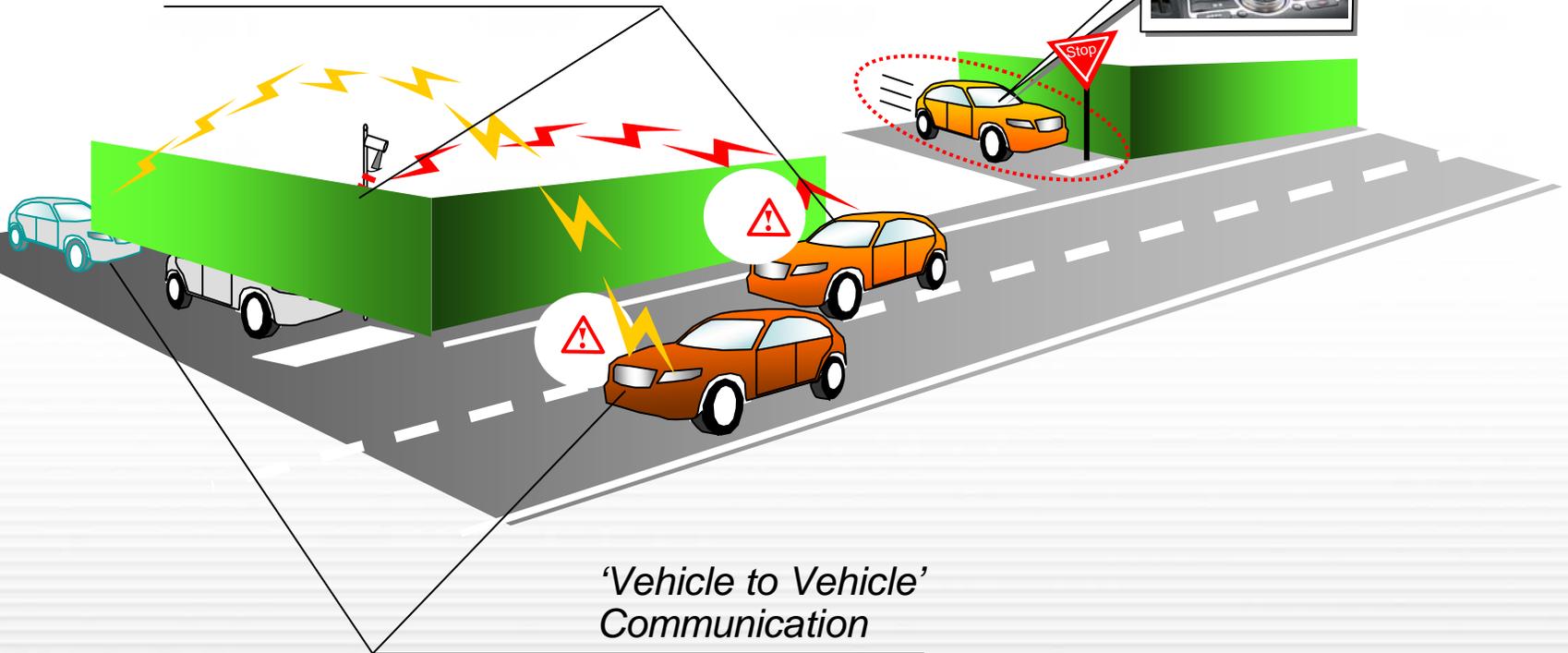
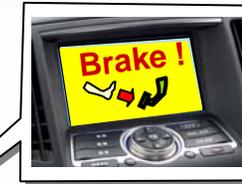
- Covered area
- Adoption of technologies
- Regional scope

Mid term

*'Vehicle to Roadside'
Communication*

Short term

NAVI Intersection Warning



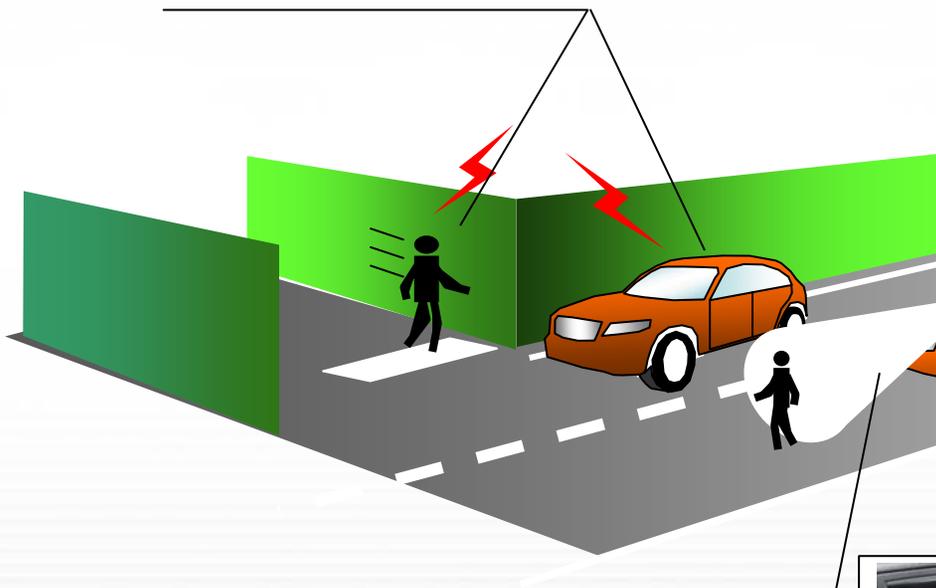
*'Vehicle to Vehicle'
Communication*

Pedestrian accident

- Covered area
- Adoption of technologies
- Regional scope

Mid term

*Pedestrian-Tag
(GPS Phone)*



*Pedestrian Detection
(Camera)*



Short term

*NAVI
Area Warning*



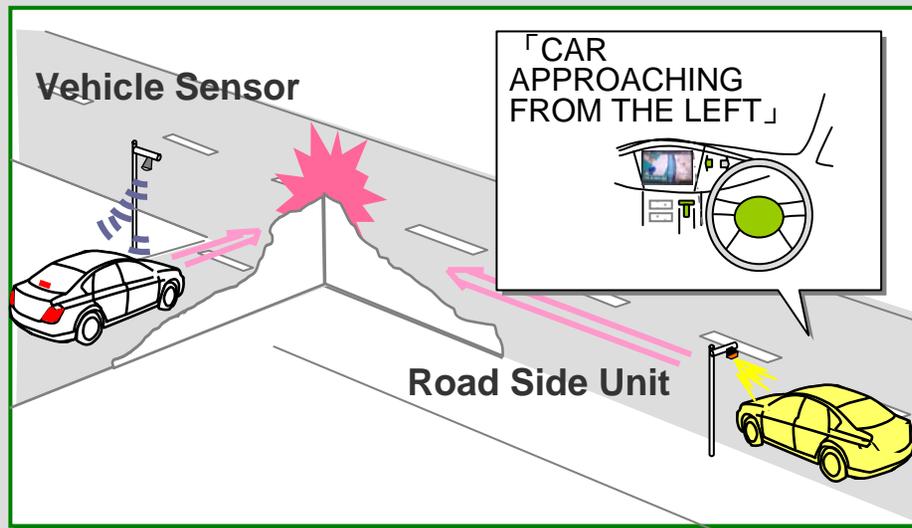
Infrastructure cooperative approach

'SKY Project' in Japan



- Covered area
- Adoption of technologies
- Regional scope

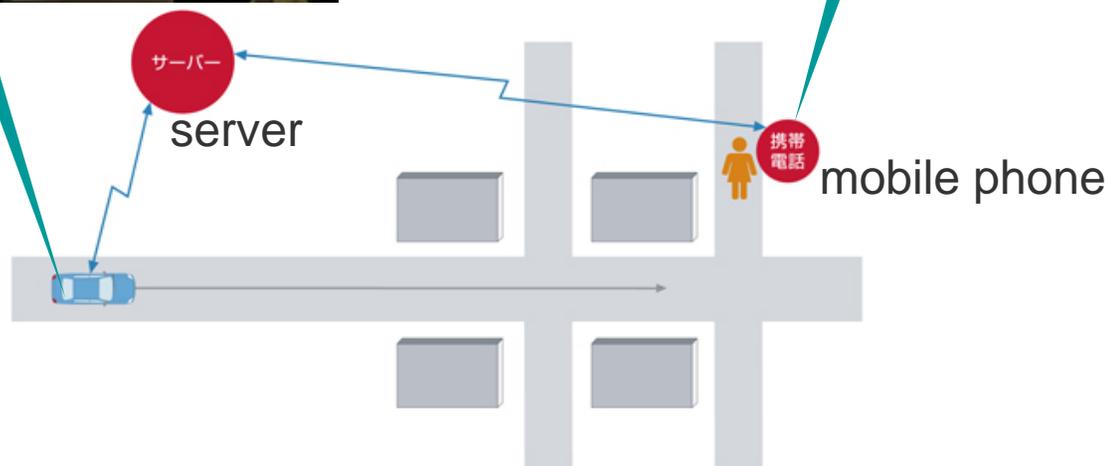
- To support accident reduction
 - ▶ Cross-path collision / Pedestrian collision avoidance
- Field test ongoing in Yokohama.



Infrastructure cooperative approach

- Covered area
- Adoption of technologies
- Regional scope

- Started development and field test for pedestrian detection by GPS mobile cooperative system



Enhance adoption of technologies

- Covered area
- Adoption of technologies
- Regional scope

Customer

Value for money
Motivated purchase
Learn proper usage

Industry

'Rational' technologies
Effective
Accessible
Well balanced attractiveness

Government

Driving force for promotion
Regulation
Assessment
Incentives

Collaborative Task

Evaluate real world effectiveness
Raise public awareness of safety

'Rational' technologies

- Covered area
- Adoption of technologies
- Regional scope

■ Effective

- Focused major area of the accidents
- HMI, well perceived by the driver
- Effectiveness proven quantitatively

■ Accessible

- Basic features
- Optimized features

■ Well balanced attractiveness

- Environmentally friendly
- Not to compromise 'Driving Pleasure'

Accessible - Basic features

- Covered area
- Adoption of technologies
- Regional scope



<Lighting>



<Airbags>



<Safety body>



<ISO FIX>



<Active head restraints>

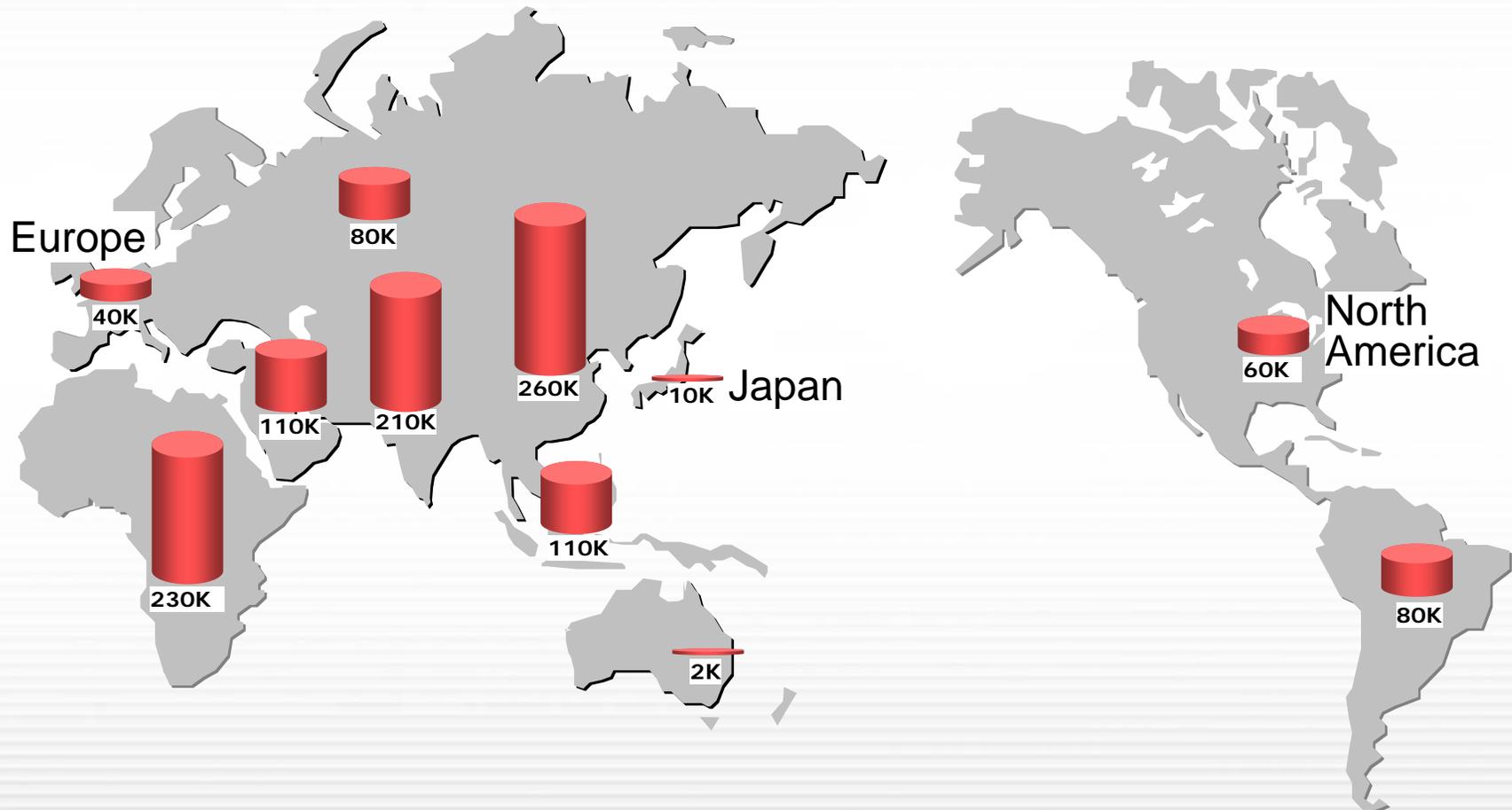


<Brake control>

Enhance regional scope

- Covered area
- Adoption of technologies
- Regional scope

■ 1.2 million of fatalities annually. (WHO estimate)



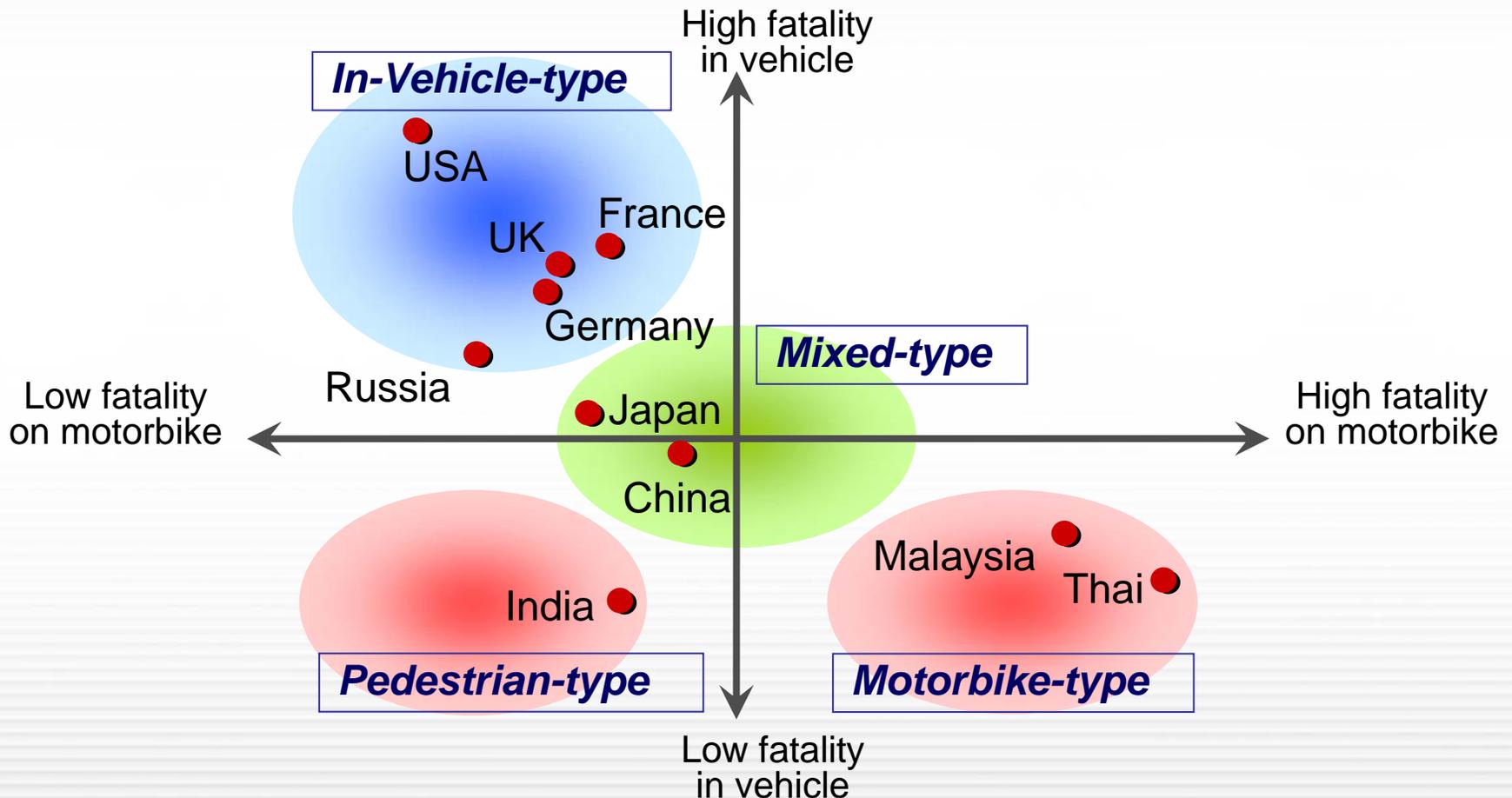
WHO) Death and DALY estimates for 2002 by cause for WHO Member States

Global accidents view (2)

Road user type in fatal accidents

- Covered area
- Adoption of technologies
- Regional scope

- Type of accident varies among regions
- Important to understand the accident environment



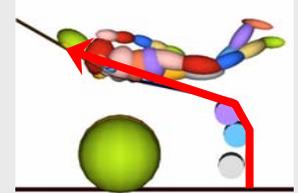
Key approaches to global fatalities reduction

■ Accident analysis: Grasp situation of real-world accidents

- Accident and vehicle investigation
- Driver and pedestrian behavior, etc

e.g. (Nissan in China)

- Driver behavior analysis with Tsinghua Univ.
- Accident analysis with CATARC



■ Providing 'Rational' technologies

- Effective, Accessible, Well-balanced attractiveness

■ Raise people's awareness of safety

- Seminars
- Workshops
- Driving schools

e.g. (Nissan in China)

- Nissan Safety Driving Forum



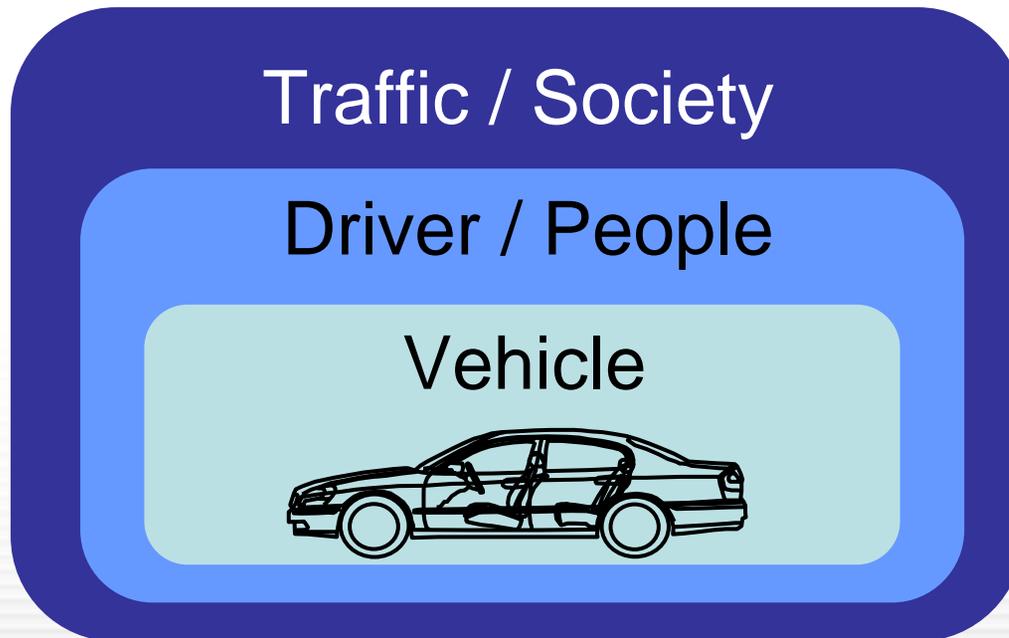
■ Build up infrastructure and institutions

- Basic road infrastructure
- Traffic management system

Triple-Layered Approach

Comprehensive approach is necessary:

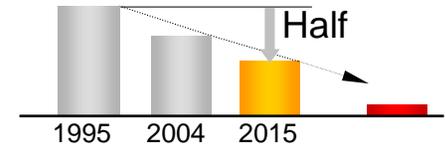
- To realize the true safe mobility society, considering diversities in transport circumstance in various regions



Summary

■ Vision 2015 :

- Reduce fatal & serious injuries to half
- Reducing accidents is the key for the final goal



■ “Safety Shield Concept” :

- ‘Vehicle helps to protect people’ , providing technologies according to driving conditions



■ Further challenges for enhanced safety

- Enhance covered area of accidents:
Intersection & Pedestrian
Infrastructure cooperative approach
- Enhance adoption of technologies:
‘Rational’ technologies and Public awareness
- Enhance regional scope globally:
For diversified transport structure, circumstance
Triple Layered Approach

