Commitment to “Peace of Mind”

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Senior Executive Officer, CTO
DENSO Corporation

DENSO supports the Sustainable Development Goals (SDGs).
DENSO’s Commitment to “Peace of Mind”

① **ZERO Traffic Accidents**  
Eliminating traffic accidents and realizing freedom of mobility for all

② **Comfortable space**  
Creating peaceful, comfortable spaces

③ **Support for workers**  
Establishing a society where people are supported and their potential is nurtured
ZERO Traffic Accidents

Eliminating traffic accidents and realizing freedom of mobility for all
Reducing traffic accidents is a global issue.

EU: Vision Zero

UN: 2021-2030
Halve global traffic fatalities

U.S: Road to Zero

Japan: 11th Fundamental Traffic Safety Program

2,000 or less in 2025

Source: NHTSA, TRAFFIC SAFETY FACTS,
the RAND Corporation, THE ROAD TO ZERO: A Vision for Achieving Zero Roadway Deaths by 2050
European Commission, EU road safety policy framework 2021-2030: Next steps towards ‘Vision Zero’
United Nations, Resolution adopted by the General Assembly on 31 August 2020
Cabinet Office, 11th Fundamental Traffic Safety Program

Eliminate fatalities by 2050

Social background and challenges
DENSO started to offer passive and active safety products in the 1980s to contribute to reducing traffic accidents around the world.
DENSO’s Vision

Spread safety products with both “depth” and "width" with the aim of “eliminating traffic accidents”, the ultimate goal

**Depth**
- Further evolution of ADAS
- Hazard prediction by applying AI
- All-around sensing
- Introduce the products to many more advanced mobility vehicles

**Width**
- Provide attractive and affordable products
- Expand the lineup of retrofittable products
- Spread the products to as many vehicles as possible
## Solutions Offered by DENSO

### Main Products

<table>
<thead>
<tr>
<th></th>
<th>2016~</th>
<th>~2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision Sensors</td>
<td><img src="image1" alt="Rear-end collision" /> <img src="image2" alt="Pedestrian crossing" /> <img src="image3" alt="Missed signs" /> <img src="image4" alt="Intersections (right/left turns)" /> <img src="image5" alt="Intersections (crossing)" /></td>
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<td>Millimeter-wave radar</td>
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<td>(Front and Corner)</td>
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<tr>
<td>Sonar</td>
<td><img src="image6" alt="Blind intersections" /></td>
<td><img src="image6" alt="Blind intersections" /></td>
</tr>
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<td>Back Camera</td>
<td><img src="image6" alt="Blind intersections" /></td>
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<td>Driver Status Monitor</td>
<td><img src="image10" alt="Driver incapacitation" /> <img src="image11" alt="Taking eyes off of the road/drowsiness" /></td>
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</tr>
<tr>
<td>Map</td>
<td><img src="image12" alt="intersections with bad visibility" /></td>
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<tr>
<td>V2X</td>
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※Sensors are just images

Cope with many more accident situations based on surround monitoring, coordination with infrastructure and in-vehicle sensing
Develop technologies that prevent the driver from getting close to hazards by offering hazard prediction information.
Expand the lineup of retrofittable products in line with the evolution of ADAS

Solutions Offered by DENSO

Reduce accidents by offering retrofittable systems for vehicles on the road

System to suppress acceleration caused by stepping on the wrong pedal when moving forward

Stepping on the wrong pedal when the vehicle is stopped

Detection of taking eyes off of the road, drowsiness, and sleep

Overspeed, sudden acceleration

Operation management system

Drive recorder for business use

Safe driving diagnosis

Cloud-based operation management system

OBU for SMAS-Smart Connect Advance
*Service provider: Sumitomo Mitsui Auto Service Co.

Use of image recognition technologies/AI analysis technologies

Offer value for various situations and needs

Monitor daily driving/prevent mistakes

+ Prevent accidents

Accident situations  Vehicle types  Software update

DENSO DIALOG DAY 2021 / May 26th, 2021
Comfortable Space
Creating peaceful, comfortable spaces
Social Background and Challenges

Air pollution
91% of the population live in areas that exceed WHO standards and 4.2 million lives are lost annually * 1

COVID-19 pandemic
Spread all over the world
More than 160 million people infected * 2

Europe
North America
India
China

Anxiety for air pollution
Concern about virus infection and invisible air

Sources
1* : WHO health-topics, air pollution
2* : Johns Hopkins University, Coronavirus resource center

Quickly meet the social needs for an air environment that gives peace of mind as a leading maker of car air conditioning system
DENSO’s Vision

Offer and spread “a peaceful space” by 2025 and design “a vibrant space” by 2030

2030  “+” Vibrant space

2025  “0” Peaceful space

Image of space to be attained

Needs level

“−” Concern

Remove concern about life and health of humans

A space that heals the mind and gives confidence and pleasure

Temperature environment

Sound environment

Air environment

Visual environment

Warmth that brings relaxation

Comfortable temperature when getting into a vehicle

Capable of having a conversation without stress

Constantly purify air and make the status visible

Enabling the driver to check hazards

Sound that gives peace of mind

View that gives a sense of freedom

Air that revitalizes the body

Remove concern about life and health of humans
Solutions Offered by DENSO

Improvements to offer and spread “a peaceful space” by 2025

Achieve “air quality” that gives peace of mind by removing viruses and visualizing hazardous substances

Existing solutions

- HVAC unit
- Cabin air filter
- In-vehicle plasma cluster ion generator
- Oxygen sensor
- Humidity sensor
- PM sensor

New Solution

Sold in February 2021 Puremie
Captures viruses that are 25 times smaller than conventional model

- In-vehicle air cleaner (fine particulate matter, viruses)
- Air cleanliness monitor

Future Policy

Purification technology
From capture of fine particulate matter and viruses to purification technologies using photocatalysts, etc.

Sensing technology
From detection of fine particulate matter to detection of hazardous substances (gases, viruses)

Deploy products to the in-vehicle space (e.g., passenger cars, public transport services) and public spaces to spread “a peaceful space.”
Support for workers

Establishing a society where people are supported and their potential is nurtured
Social Background and Challenges

Decrease in the working population

Declining working population is a serious issue in agriculture, logistics industry, and manufacturing sites.

Source: National Institute of Population and Social Security Research

Aging, lack of successors

Manpower shortage

<table>
<thead>
<tr>
<th>Year</th>
<th>Labor force population</th>
<th>Labor force population ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>10000</td>
<td>60%</td>
</tr>
<tr>
<td>2065</td>
<td>5000</td>
<td>50%</td>
</tr>
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</table>
DENSO’s Vision
Offer “peace of mind” to all people and industries by using technologies refined in the development of automotive components

Industries in which DENSO plans to offer “peace of mind” in the future

**Agriculture**
- Automation of cultivation and harvesting
- Refrigeration technologies and connected services
- Food traceability

**Logistics**
- Automation of transport
- Efficient operation management
- In-plant logistics support robots

**Factory・FA**
- Automation of production lines
- Logistics assistance robot in the factory
Solutions Offered by DENSO

Decrease in farming population and food shortage
Agriculture that enables anyone to achieve stable production
“Turnkey solutions”
Greenhouses with advanced control, like vehicles that are started simply by turning the ignition key

Driver shortage
Increase in e-commerce
Support for distribution of goods by automating transport
“Last one mile logistics by automatic transport”
Automate logistics by using technologies for automated driving Level 4

Ensure peace of mind for food and eliminate food loss
Digitalized food distribution
“Food traceability”
Optimize supply and demand and ensure traceability by using QR/RFID and ICT

Solve issues across the food value chain and contribute to peace of mind and stable supply
### DENSO's Vision

**Peace of Mind**

Aiming to be a leading company that provides “peace of mind” to society

<table>
<thead>
<tr>
<th>Goal</th>
<th>DENSO’s activities Value proposition</th>
<th>Current Achievement Level</th>
<th>Target</th>
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<td><strong>①</strong> ZERO Traffic Accidents</td>
<td>Spread safety products in both “depth” and “width” with the aim of “eliminating traffic accidents”</td>
<td>① Developing products to cover all types of accidents ② Expanding sales of core products and variation of retrofit products</td>
<td>① Assortment of in-vehicle sensors ② Sales 320 billion yen</td>
</tr>
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<td><strong>②</strong> Comfortable Space</td>
<td>Offer and spread “a peaceful space” by 2025 and design “a vibrant space” by 2030</td>
<td>- Relieve anxiety about invisible air - Creating comfortable space with four environment, &quot;Temperature&quot; &quot;Sound&quot; &quot;Air&quot; &quot;Visibility&quot;</td>
<td>Launching commercial products in Japan</td>
</tr>
<tr>
<td><strong>③</strong> Support for worker</td>
<td>Solve the problem in each industries using DENSO’s technologies</td>
<td>Providing solutions that systematize technology and quality in total</td>
<td>Demonstration and commercialization</td>
</tr>
</tbody>
</table>

*DSM: Driver Status Monitor

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**DENSO's Sustainability Management; Solving social issues through business.**

"promotion of products and systems" x "safety"
With DENSO technology,
Create a society filled
with “peace of mind”