

Toyota Boshoku Participates in Autonomous Driving Field Test and Exhibition Held at Aichi Expo Memorial Park with "MOOX" Autonomous Vehicle Interior Concept Space

Kariya (JAPAN) – February 12, 2020 – Toyota Boshoku will participate in a demonstration experiment and exhibition highlighting practical applications for autonomous driving at the Aichi Expo Memorial Park (Aichi Prefecture, Japan) from February 12th (Friday) to 19th (Friday).

This demonstration experiment is one element of Aichi Prefecture's projects promoting the autonomous driving society implementation, conducted by a consortium led by NTT Docomo, Inc. Toyota Motor Corporation, JTB Corporation, and Toyota Boshoku are joining in this demonstration experiment as new participants. Toyota Boshoku will be demonstrating—with trial experiences—a new type of mobility vehicle interior space in a variety of autonomous driving situations utilizing the autonomous driving concept space, MOOX*1.

*1: A combination of the words Mobile & Box denoting a private space that can be utilized freely while in motion

Outline of Demonstration Experiment

Held at the Aichi Expo Memorial Park under the theme of "mobility with the experience of a new cabin space in outdoor public facilities," the demonstration will allow visitors to experience autonomous driving with MOOX, as they try out a new entertainment experience with games and live performances while riding on a route that goes around the park's large lawn area.

The MOOX vehicle interior provides a new mobility experience in automated driving with systems that provide sounds, vibrations, and smells matching the AR (Augmented Reality) video displayed on the vehicle's window and video corresponding to operations effected in response the test rider's gestures.

In addition, we will demonstrate a space offering the most advanced safe and secure vehicle interior space that monitors the test rider's condition and an automatic sterilizing system utilizing deep ultraviolet light.

The night driving demonstration experiment will demonstrate the nighttime entertainment possibilities in autonomous vehicles by using projection mapping from MOOX to project images outside the vehicle.

About MOOX

1) Vehicle Overview



Vehicle Exterior View



Vehicle Interior



Seats

<Specifications>

- Autonomous driving concept service space
- Autonomous driving OS: Slow Mobility equipped with Autoware^{*2}, LiDAR (autonomous driving sensor), camera, etc.
- The unit has no steering wheel or pedals. Riders will be accompanied by a conductor during the test drive.
- Test rider capacity: 2 occupants

^{*2} Registered trademark of the Autoware Foundation

2) Main Equipment Features

- Virtual tour content experience using transparent display and five-sense stimulation device
- Contactless occupant status monitoring
- Deep UV sterilizing system employed when vehicle is not in operation
- "Drowsiness Suppression Seat System" remote monitoring system

3) Installed Feature Details

Virtual tour experience utilizing transparent display and five senses stimulation device

Operated automatically, MOOX provides a new entertainment experience, allowing occupants to enjoy games, live performances, and other types of entertainment while on the move.

The system includes features allowing the occupants to rediscover the park's attractions. For example, the transparent display shows AR (augmented reality) video content corresponding to the vehicle's location data and introduces notable spots in the area while naturally directing the test rider's line of sight. In addition, the depth sensor^{*3} gauges the test rider's gestures to provide an interactive experience with the content.

The aim of the MOOX spatial control system is to provide a new mobile experience in theme parks, tourist areas/sightseeing spots, smart cities, and other locations in the future.

^{*3}: Sensor capable of recognizing the shapes of people, objects, and other items as three-dimensional solids.

Occupant Status Monitoring System
This system estimates passengers' temperatures without contact and detects whether or not occupants are wearing masks. In addition, flexible sensors built into the seat surface gauge cardio-ballistic conditions from the slight body movements of seat's occupant, while an algorithm utilizing proprietary noise processing estimates the pulse and RRI (R-R heart rate interval).
Deep UV Automatic Sterilizing System
After the occupants exit the vehicle, the unoccupied interior space is irradiated with deep ultraviolet rays from a portable device mounted on the headliner, sterilizing the seats, table, and other surfaces before the subsequent run.
Antibacterial Processing using "V-CAT®"^{*4} visible light-responsive photocatalyst
"V-CAT®," a visible light-responsive photocatalyst designed to have an antibacterial effect when exposed not only to ultraviolet light, but also visible light from fluorescent lamps and other such sources, is applied to places in the vehicle interior that may be touched by occupants. *4: Visible light-responsive photocatalyst developed by Toyota Central R & D Labs., Inc.; registered trademark property of Toyota Tsusho Corporation. (Reference article: https://www.toyota-tsusho.com/english/press/detail/200714_004649.html)
Drowsiness Suppression Seat System set in remote monitor seat during autonomous driving
A camera reads the facial expressions of the remote monitor seat's occupant and estimates the person's drowsiness level, which prevents the individual from falling asleep with music and vibrations from the seat. It supports monitoring of safe autonomous driving for extended periods without discomfort.
Reference) Autonomous Driving and Nighttime Entertainment Featuring Projection Mapping
MOOX is equipped with a compact projector to display projection mapping images into the darkness outside the vehicle. The images projected onto the road surface change according to the position of the moving vehicle. The effort behind this technology is based on the idea of autonomous vehicles offering nighttime entertainment, and we are investigating and verifying its potential in terms of technology and business models. (Vehicle provide by Toyota Boshoku)

Onboard Equipment Partners

Aisan Technology Co., Ltd.; Shinji Mizuno Lab, Faculty of Information Science, Aichi Institute of Technology; Foster Electric Company, Limited; ReBock Co., Ltd.; Toyota Central R & D Labs., Inc.

Outline of Demonstration Experiment and Exhibition (Reference)

1. Dates: February 12th (Friday) to 19th (Friday), 2021

*Nighttime demonstration to be held on February 12th (Friday).

2. Site: Aichi Expo Memorial Park (Aichi Prefecture, Japan), vicinity around large lawn area

3. Route: Circuit around large lawn area (465 m; approx. 10 minutes)

Departure/arrival point: Stage rest area

4. Demonstration test rider: February 12th (Friday) News media (no test drive at night)

February 13th (Saturday) and 14th (Sunday): General test riders

February 15th (Monday) to 19th (Friday): No test drives, but general viewing allowed

* For an overview of the press release and other details, please check the news release of the Aichi Prefectural Bureau of Economy, Trade and Industry, Industry Department, Industrial Promotion Division, Automobile Industry Group.