

# 6 systems of MX221

## Overview

As the Interior Space Creator, Toyota Boshoku is committed to providing our customers and consumers with the most innovative solutions that allow them to have more fun, do more, and feel good in the highest quality of time and space in their vehicle interiors.

To realize this, the MaaS rideshare interior space concept MX221\*<sup>1</sup> meets a diverse range of rideshare user needs with versatility that provides exceptional ride experience to the passengers while providing operational efficiency and differentiating value offerings to the rideshare service providers. We call this Diversatility\*<sup>2</sup>.

\*<sup>1</sup>. "MX221" : signifies Mobility Experience 2022 1st model

\*<sup>2</sup>. "Diversatility" : A coined word that combines Versatility and Diversity

## System 1: Always Clean Space

In a rideshare vehicle, the passengers will want to be in a clean, fresh-feeling, and comfortable cabin environment each time. With the "Always Clean Space" system, as soon as the previous passenger gets off the vehicle,

- the seat is automatically arranged to the next passenger's preferred seating layout
- the cabin air is purified, deodorized, and disinfected through the HVAC system that has a built-in UVC LED lamp that suppresses airborne bacteria and viruses.
- The in-cabin-monitoring System detects any surfaces that are touched and occupied by previous passengers and activates the overhead UVC LED lamp to radiate and disinfect the affected surfaces while the vehicle is on the way to pick up the next passenger.
- When the next passenger hails the ride, she can specify the desired cabin temperature, for a comfortably personalized cabin environment.

## System 2: Seamless On/Off boarding

When the vehicle arrives, the passenger needs to quickly identify the correct taxi to get onboard.

- Through a combination of three indicators – icon, color, and a passenger-designated nickname, the triple identification system helps to ensure the passenger gets into the right vehicle among many other similar rideshare vehicles.
- When the passenger approaches the correctly matching vehicle, the smartphone digital key will authenticate the passenger to unlock and open the door.
- When the door opens, jet streams of air is blown down from above, to keep the external elements

out while maintaining the cabin temperature.

- When the vehicle arrives at the destination, the in-cabin-monitoring system checks for any belongings left behind by the passenger and immediately alerts the passenger as he opens the door to exit. Both visual and audio alerts remind the passenger of a forgotten item.
- As getting off, the vehicle informs which direction to walk towards the final destination, assisting the passenger to arrive at the final destination safely and seamlessly.

### System 3: Health & Safety Space

To ensure safety and well-being, the following features are integrated.

- Each seat with 3-sided airbags; there are near and far side airbags for lateral protection, as well as the frontal lap airbag for forward protection. The occupant is protected, regardless of any seat position.
- The Occupant Sensing system. The vehicle monitors the passenger's biometric condition through the onboard cabin monitoring camera and sensors embedded in the seat. The biometric data is privately kept for the passenger confidentiality, but if there is an urgent care issue that arises during the ride, the medical emergency service can be called, as well as a caring family member.
- Two innovative solutions to deal with motion sickness, by means of prevention and mitigation.
  - Prevention: Integrated into the MX221 is the "Directional Sensory Forewarning" system. Its purpose is to inform the passengers which direction the vehicle will move with a split-second advanced alert, through the combination of audio, seat and seatbelt vibration, and visual illumination. This system allows the passengers to anticipate the upcoming movement direction of the vehicle, to minimize the cause for motion sickness.
  - Mitigation: In case motion sickness, each seat is, integrated with the Motion Sickness Mitigation system, which is inspired by ancient Japanese remedies. By activating the system, a cool rapid jet of air is blown to the back of the neck, relieving the symptoms of motion sickness and helping the passenger to recover quickly back to normal state.

### System 4: Diverse UX Space

Many multitainment<sup>\*3</sup> features are integrated in the cabin space for enhanced user experience:

\*3. "multitainment" : various forms of entertainments plus infotainment

- A large display that allows the passengers to enjoy entertainment media and play games that are fun and engaging.
- In the seat headrest is industry-first "Privacy Audio System". It allows the passengers to watch the movies together or listen to own music from personal device without disrupting other passenger. This is possible through an innovative sound engineering solution that allows only the passenger sitting in the seat can enjoy the audio.

- Time saving & convenience: the passenger can have a meal in the vehicle by ordering the food delivered to the vehicle by a delivery drone. On the rear end of the roof in MX221 is a drone-accessible automatic delivery door. When the drone approaches the top of the vehicle and sends a signal to the vehicle for safe drop off, the delivery door will open to deploy the receiving tray to drop down the meal. Once the meal is delivered, the meal is served to the passenger through the overhead serving tray console riding on the overhead rails.
- A microwave power supply in the cabin, which can charge the smartphone anywhere in the vehicle, even in the pockets or purses.
- In MX PLUS and MX PRIME, the heated seat and air bladder massage systems are available to relieve the stress; heated seat pay-per-use for MX PASS.
- In MX PRIME, the premium space provides a luxurious private space full of comfort and convenience features.
  - In a large private space, the seat is surrounded by a premium finish furniture wall which contains a UVC-LED phone sanitizer unit to keep the personal smartphone germ-free
  - the Aroma Mist Generator sprays fine mist of hyaluronic acid that keeps the skin moisturized.
  - Privacy Audio in the headrest
  - 8 air bladder massage system, heated seating surfaces including the ottoman leg support, and heated floor mat as well.
  - The seat comfort of MX PRIME is developed using the industry-leading comfort engineering technology from Toyota Boshoku, to provide the most comfortable seating experience.
  - an integrated touch keyboard on the table surface, to enable work on the road.
  - Cloud Swing seat that enables quick entry to sleep, helping busy executives to catch a power-nap.

### System 5: Versatile Space

As this vehicle interior is designed for the rideshare service providers' operational efficiency, many Maintenance features are integrated:

- the Cabin Usage Monitoring system. With the onboard camera and advanced algorithm, the system monitors vehicle usage throughout the day and recommends if any parts need to be replaced for maintenance or damage repair.
- Because the seat is designed as a modular system, the frequently damaged components can be easily swapped out. This will lower the overall operational cost for the service provider while ensuring a clean cabin for the passengers.
- The module swapping allows the seat to be upgraded to new features as they are made available, using the same mounting system. This is not only economical but also environmentally sustainable as the undamaged parts continue to be in service.
- Tailored Space System with long slide rails that allow the interior seat modules to be exchanged

easily. Once the vehicle comes back to the Service Hub, the Automatic Guided Vehicles (AGVs) mounted with the same slide rails dock against the back of the vehicle. The modules in the vehicle slide out and transfer to the AGV. Then another AGV with different interior seat modules slides in, forming a different grade of interior trim for the next passenger. This interchangeable interior system can provide a variety of differentiating interior experiences while keeping the same fleet of vehicles to keep overall operational efficiency.

### System 6: Greener Space

As part of our corporate commitment to sustainability goals, we have incorporated all of our interior components that are recyclable and reusable, to reduce the overall carbon footprint and achieve a circular design.

- We have used extensively our eco-friendly kenaf in the plastic panels, to reduce weight and increase organic base material usage.
- Much of the plastic raw materials such as Polypropylene and PVC are gathered from recycled plastics to form various parts of the vehicle, and some PET bottles transform into becoming yarns to create seat fabric covers. When these parts are no longer in service, they are collected back to be further processed into usable raw materials again, to contribute to lowering the overall CO<sub>2</sub> emission.
- The seat structure can be kept over several generations of vehicles as long as it does not incur any damage, as it is designed to be separate from the seating surface. This not only reduces the overall cost of retrofit but also helps to lower CO<sub>2</sub> emission by reusing the seat structure.