

Toyota Defines Future of Mobility with Concept Car “Toyota Concept-i” Series Debuting at Tokyo Motor Show 2017

Advanced artificial intelligence learns from and aims to grow with the driver

Toyota City, Japan, October 16, 2017—Toyota Motor Corporation (Toyota) today announced an outline of the concept car “Toyota Concept-i” series that embodies the future vision of a mobility society through which artificial intelligence (AI) enables cars to understand the driver, effectively allowing people and cars to become partners.

In addition to the four-wheel model Toyota Concept-i exhibited at the 2017 International Consumer Electronics Show (CES) in January this year, a universal small mobility vehicle and a walking area mobility vehicle have been added to the Toyota Concept-i series. They are expected to be exhibited under the theme of “Let’s move the world from here. Beyond the Motor” at the 45th Tokyo Motor Show 2017, which will be held at Tokyo Big Sight for 12 days¹ from October 25 through November 5.

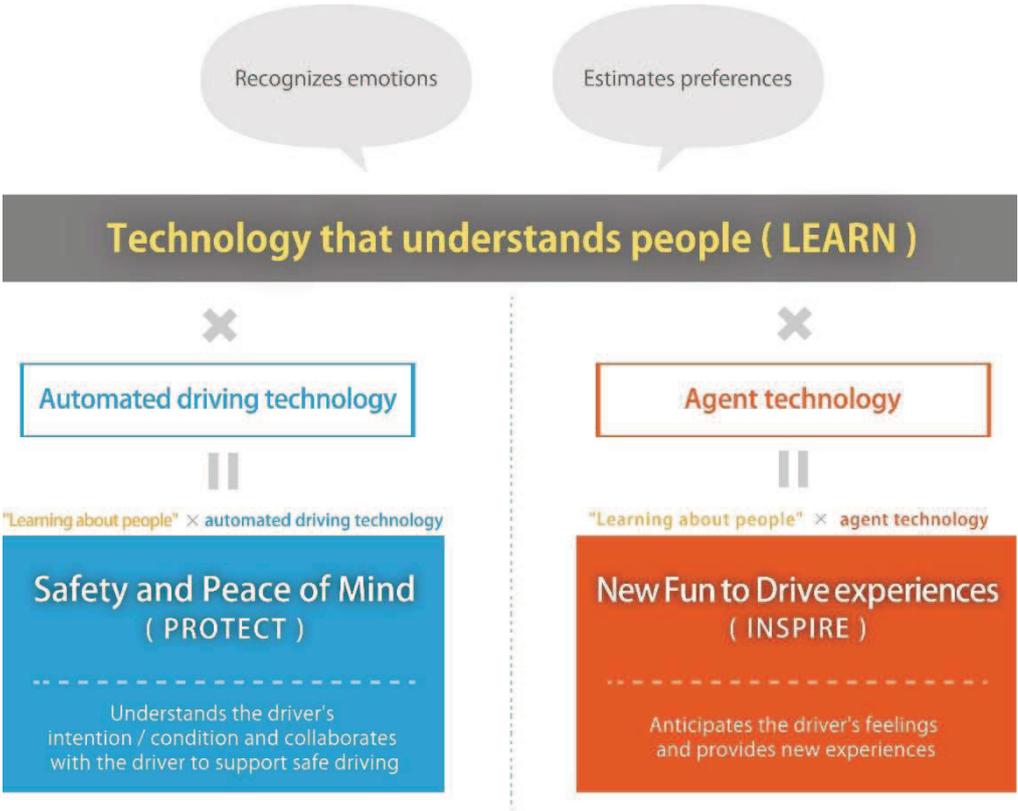


TOYOTA Concept-i series

Toyota has infused each era with irreplaceable excitement such as “freedom and joy of mobility” based on the idea that cars are among the manufactured goods that are preceded by the word “*beloved.*” The Toyota Concept-i series aims to become a “beloved car” of a new era guided by the concept of “*more than a machine, a partner*” to better understand the driver and grow together with the driver as an irreplaceable partner.

The core technology common to the Toyota Concept-i series is a technology that understands people (LEARN), applying AI to recognize emotions and estimate driver preferences. The technology that understands people (LEARN) and automated driving technology combine to lead the driver to safety and provide peace of mind (PROTECT). In addition, by combining the technology with the agent technology, it will be possible to advance technology to the point that the driver's feelings can be anticipated, leading to new Fun to Drive experiences (INSPIRE).

The core value provided by the Toyota Concept-i series



In order to provide new experiences and excitements to more people based on the idea of “freedom and pleasure of mobility for all,” a universal small mobility vehicle has been added to the Toyota Concept-i series so that anyone can have freedom of mobility, including wheelchair users and the elderly. Additionally, a pedestrian zone mobility vehicle has been added to the series to enable free movement in the same space as pedestrians.

The AI Agent, which understands people, is able to disengage and re-engage with the driver across the vehicles in the series, thereby supporting seamless mobility and being together with the driver to achieve safe and fun mobility.

Toyota Concept-i

- A four-wheel model representing the Toyota Concept-i series
Using artificial intelligence, and as a partner that understands people, this vehicle aims to become a "beloved car" of a new era.
- It combines technology that understands people ("LEARN") with automated driving and agent technology, and provides drivers with safety and peace of mind ("PROTECT"), and new Fun to Drive experiences ("INSPIRE") to enrich the enjoyment of moving.
- A cabin with a forward projecting futuristic silhouette and an advanced HMI², as well as interactions with the Agent, achieves a new user experience.
- Toyota plans to conduct road tests of vehicles equipped with some of the concept car's functions in Japan by around 2020.



TOYOTA Concept-i Exterior



TOYOTA Concept-i Interior

Main Features

Technology that understands people (LEARN)

Concept-i estimates emotion and level of alertness by reading the driver's expressions, actions, and tone of voice in a complex manner. It compares general information such as news on the web with information on individuals such as social media activity, GPS information, and conversation history in the car, and estimates the driver's preferences based on re-occurring topics that arise.

Technologies such as deep learning are used for the technology that understands people (LEARN), such as measuring emotions and estimating preferences. Based on this technology, the Toyota Concept-i series provides value innovation in the areas of safety and security (PROTECT) and new Fun to Drive experiences (INSPIRE).

Safety and peace of mind (PROTECT) "Learning about people" x automated driving technology

In addition to the car's external conditions, Concept-i estimates the driver's condition using technology that understands people, and monitors the reliability of the driver and the car. For example, if the car's reliability is high and car support is deemed necessary, such as a situation in which the driver is overcome by a dangerous or high-stress situation, Concept-i switches to automated driving. Based on Toyota's "Mobility Teammate Concept" for automated driving, which aims to both watch over and assist

drivers as needed, Concept-i guides with safety and security. Furthermore, it supports the driver by stimulating the five senses, including vision, touch, and smell depending on the driver's emotion, degree of fatigue, and level of alertness to rouse drivers into an alert state when they feel drowsy, and to help drivers experiencing higher levels of stress feel more relaxed.

New Fun to Drive experiences (INSPIRE) “Learning about people” x agent technology

Concept-i engages in conversation based on the emotions and preferences of the driver. The car suggests topics of interest based on the mood of the driver, achieving a completely new style of two-way free conversation. In addition, it creates an “Emotion Map” by periodically mapping the driver's emotion and GPS data. By collecting data on individual emotions and using this information as big data, the Toyota Concept-i series can deliver fresh experiences by suggesting new, enjoyable routes as slight detours.

The vehicle design comprises a cabin with a forward projecting futuristic silhouette and a simple and open interior, and starting from the Agent located at the center of the instrument panel, the design theme flows from the inside out with seamless styling in which the design of the instrument panel continues to the body exterior. In addition, it provides a new user experience through intuitive HMI interaction with the Agent using a 3D-HUD (head-up display).

Toyota plans to have the Toyota Concept-i on the road by around 2020 and conduct road tests of vehicles equipped with some of the concept car's functions from this exhibition in Japan.

Main Specifications

Length/Width/Height (mm)	4,510 /1,830 /1,475
Wheelbase (mm)	2,700
Occupancy	4 persons
Powertrain	EV
EV cruising range	Approximately 300 km

Toyota Concept-i RIDE

- A small mobility vehicle that emphasizes universality based on the concept of "user-friendly city mobility."
It features gull-wing doors, an electric universal sliding seat, and a joystick, achieving user-friendly operation for wheelchair users.
- The seat layout and automated driving functions make it possible for anyone to drive safely and securely.
- Use with sharing services is also envisioned. By sharing with more people, universal mobility is made easier to use.



TOYOTA Concept-i RIDE Exterior



TOYOTA Concept-i RIDE Interior

Main Features

Universal specifications with usability for wheelchair users

The model features gull-wing doors that provide a large opening and an electric seat that slides to the entrance, so that even wheelchair users who feel uneasy when moving between the wheelchair and the car can transfer easily. Also, the opening and closing of the gull-wing door supports loading and unloading of the wheelchair, and the operation of the seat has been designed so that the wheelchair can be easily stored in the rear section.

In addition, a joystick is used, eliminating the steering wheel, accelerator and brake pedals, and the vehicle size enables wheelchair users to park and enter/exit a common parking space for one vehicle, with emphasis placed on easy operation while driving, and stopping or parking.

Moreover, the AI Agent, which is a feature of the Toyota Concept-i series, is positioned on the large-size display of the instrument panel and actively provides information that supports and enhances outings, such as the provision of information on barrier-free facilities.

Vehicles that provide safety and peace of mind

The driver's seat is positioned at the center when driving³. While parking and stopping, driving assistance functions such as automated parking and automated valet parking, are employed, allowing anyone, including not only wheelchair users but also elderly people, to drive safely with peace of mind.

Toyota also envisions the use of sharing services with the Toyota Concept-i RIDE. By sharing with many people access to universal mobility, which is currently accessible mainly on an individual ownership basis, Toyota aims to provide convenient mobility that can easily be used and accessed by anyone. The Toyota Concept-i RIDE provides safe, convenient, and enjoyable movement even at outside locations, using the AI Agent to disengage and re-engage with the driver across the vehicles in the series, thereby being together with the driver.

Main Specifications

Length/Width/Height (mm)	2,500 /1,300 /1,500
Wheelbase (mm)	1,800
Occupancy	2 persons
Powertrain	EV
EV cruising range	Approximately 100-150 km

Toyota Concept-i WALK

- With its compact size fitting in with walking areas and automated driving function, this mobility vehicle can increase the range of movement with safety and security.
- Three wheels, a wheelbase variable mechanism, steering function, and a low floor make it easy to use and does not necessitate the use of specific clothing or footwear.
- Use via sharing services and such at sightseeing spots and other locations is envisioned, providing support at outside locations.



TOYOTA Concept-i WALK



TOYOTA Concept-i WALK

Main Features

Drive safely on sidewalks in a vehicle fitting in with walking areas

It is possible to rotate on the spot within a length less than a person's stride and width less than a person's shoulder width. It is a compact vehicle taking up space equivalent to that of a pedestrian while walking. It also understands the driver based on conversation with the Agent and data obtained from sensors in the handles and guides the driver to a safe state depending on the situation. If the vehicle senses danger while driving, it will actively warn the driver and automatically take avoidance measures. Furthermore, three wheels and a wheelbase variable mechanism that corresponds to speed are used, thus ensuring stability when stopping and driving.

Easy for anyone to use

By using a steering function, riders do not need to operate the Toyota Concept-i WALK by shifting their body weight, which enables anyone to operate it easily. Thanks to the lowered floor, people can get on and off easily and ride without being restricted by their age, gender, or clothing, such as elderly people or women wearing skirts.

With the Toyota Concept-i WALK, Toyota envisions sharing services that take advantage of the characteristic of the “AI Agent” to disengage and re-engage with the rider across the vehicles in the series, thereby being together with the riders. The aim is for a mobility vehicle that can be used as part of short distance movement in coordination with other transportation facilities, such as use at outside locations and when walking around sightseeing spots.

Main Specifications

Length/Width/Height (step height) (mm)	500-700 /400 /1,130 (140)
Turning radius (mm)	Less than total length
Powertrain	EV
EV cruising range	Approximately 10-20 km

¹Tokyo Motor Show 2017 is to be held at Tokyo Big Sight in Tokyo's waterfront area from October 25 through November 5, with press days on October 25 and 26, a special-invitation day on October 26, a preview day on October 27 and general-public days from October 28 to November 5.

²Human Machine Interface. The name for methods, systems, and software designed to facilitate communication between humans and machines.

³When one person is riding

Tokyo Motor Show 2017 website: <http://newsroom.toyota.co.jp/en/tms2017/>