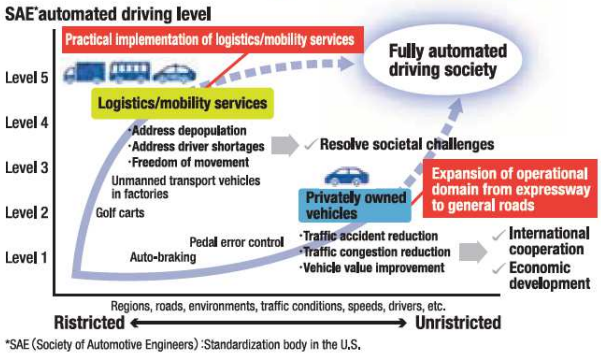
Automated Driving for Universal Services

For a society with the safest and smoothest mobility for all people

To contribute towards solving social issues, such as the reduction of traffic accidents, traffic congestion, securing means of transportation in underpopulated areas, improving shortage of drivers in the logistics industry, and etc. and achieving a society where everyone can travel safely and smoothly, wherein, "expansion of the practical application of automated driving from expressways to general roads," and "commercialization of logistics/mobility services using automated driving technology," will be implemented.



Program Director

Seigo Kuzumaki

Toyota Motor Corporation

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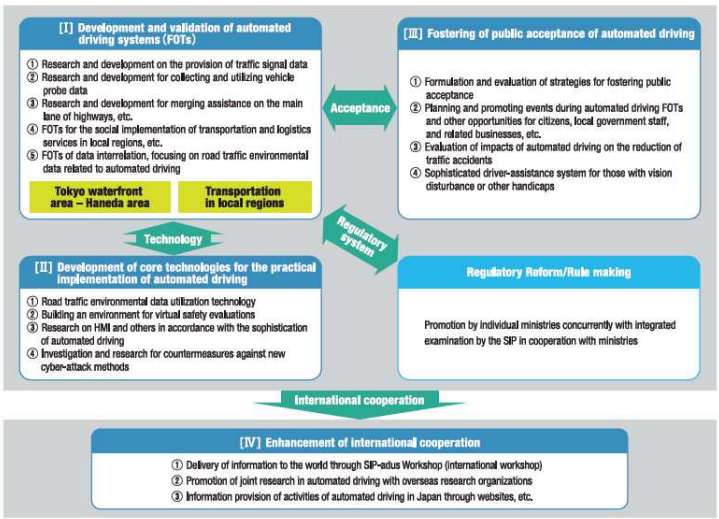
Fellow

Profile

Mr. Kuzumaki received a master's degree in aeronautical engineering from Kyoto University in 1985. The same year, he joined Toyota Motor Corporation in the Body Design Department. In 2003, he began working in technology planning and technical development as the vehicle safety function supervisor in the Vehicle Technology Development Department at Toyota. He has served in his present post since 2019.

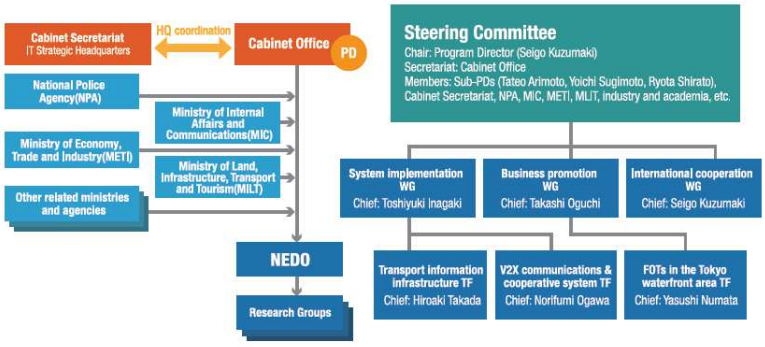
Research and Development Topics

For the social implementation of automated driving, it is necessary to overcome three barriers: technology, regulatory system, and public acceptance. The SIP will divide into competitive area and cooperative area, and promote R&D on issues that should be addressed through cross-ministry and industry-academic-government collaboration. Specifically, focus will be on four pillars – core technology, including technology for provision of traffic environmental data to support automated and advanced driving and development of simulation tools for safety assurance, fostering public acceptance, enhancement of international cooperation, and planning/promotion of FOTs that can contribute towards accelerating the identification of issues, efforts towards practical applications, and promote preparation of the transport infrastructure. To overcome the aforementioned barriers, while making efforts towards the progress of technology in an integral manner with systems developed by individual ministries, events will be held and information will be provided by using the opportunities of demonstrating experiments. Additionally, international cooperation will be promoted through opportunities for discussions and deliberations, overseas manufacturers are taking part in.



Implementation Structure

Under the Program Director (PD), the steering committee and three working groups (WG) will determine the direction of and manage R&D. Cross-ministry and industry-academic-government cooperation is essential for the provision of traffic signal data, road regulations, and other traffic environmental data.
Based on R&D in the first period of the SIP, cross-disciplinary efforts will be deepened for higher achievements and the government-industry-academia cooperation system will be expanded on a nationwide level in the second period.



Deployment Milestone

To achieve smooth commercialization, R&D involving stakeholders necessary for the social implementation of automated driving will be conducted. Specifically, private investment and commercialization planning will be promoted through the following efforts.

Acceleration of the deployment of automated driving using the opportunities of the Olympic and Paralympic Games Tokyo 2020 (Levels 2～4 on expressways and general roads)

Matching fund-type FOTs will be conducted as opportunities of open discussion occasion taking advantage of the attention drawn to the Olympic and Paralympic Games Tokyo 2020 to facilitate investments from stakeholders, which will lead to practical application and commercialization.

Promotion of automated driving mobility services according to business plans of business operators and local government-related parties

Concerning the securing of mobility and logistics services in depopulated areas, which is an urgent social issue, FOTs in anticipation of commercialization will be promoted in cooperation/partnership with business operators, local governments and other stakeholders. Efforts to verify the establishment of sustainable business models and foster public acceptance through the participation of the general public will be made through long-term FOTs, to achieve the creation of examples of social implementation in line with government strategies.

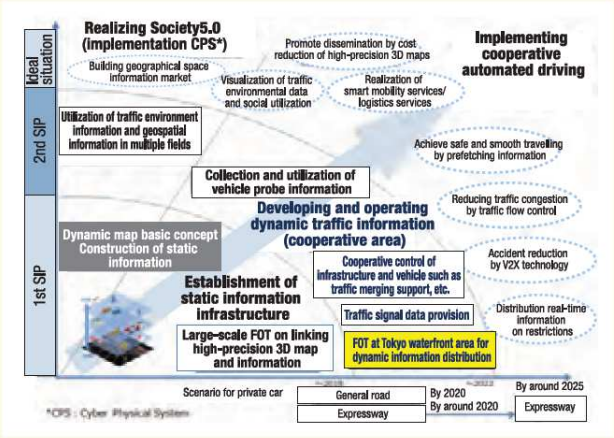
Expected Outcomes

To ensure safe automated driving, more timely and precise information provision will be achieved by delivering traffic signal data, vehicle probes, and other traffic environmental data linked to a high-precision 3D map. In addition, promoting the utilization of such information for various purposes will lead to the early realization of a cyberphysical system aimed at, by Society 5.0. Efforts will also be made towards the establishment of a safety validation technology to simulate various traffic environments to achieve safe practical applications of automated driving.

Utilization of traffic environmental data and establishment of architecture

✓A system to utilize dynamic traffic environmental data that changes constantly will be established by linking such information to a high-precision 3D map data unified specification in the first phase of SIP, and achieved the practical implementation of more sophisticated vehicle-infrastructure cooperative automated driving.

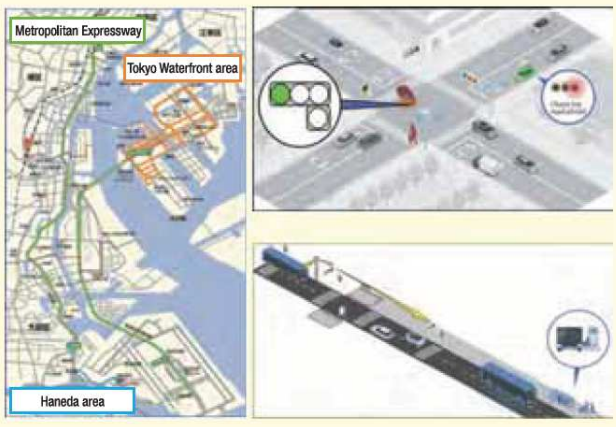
✓And so, to realize the coordination with data from various fields and the multi-purpose utilization, the reference architecture in the field of automated driving will be organized and structured. This will contribute towards establishing Society5.0 by facilitating data distribution and realizing the multi-purpose utilization.



FOTs in Tokyo waterfront area

✓Diverse participants from industrial and academic sectors in Japan and other countries will validate the technology necessary for realizing vehicle-infrastructure cooperative automated driving through FOTs in actual traffic environments using traffic signal data, merging support and other traffic environmental data provided from roadside infrastructures. International standardization and development of automated vehicles for the practical implementation of advanced automated driving will also be promoted.

✓Investigations of the influence of automated vehicles under mixed-traffic environment and trial driving events to facilitate public acceptance will also be conducted.



Safety assurance technologies for automated driving in a virtual space

✓Replicating various driving environment conditions with real vehicles on public roads for safety assurance of automated driving is difficult and many manual hours are required for assessment too. Therefore, a method must be developed that enables the safety assurance of automated vehicles under specific driving environment conditions, like various objects (e.g., vehicles, bicycles, pedestrians), weather conditions (e.g., rain, snow, backlight), and traffic environments (e.g., expressway, general road) in virtual spaces. The international cooperation will be promoted to make it an open, standard platform.