



An Approach to the Next Generation Transportation Systems

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Cross-ministerial Strategic Innovation promotion Program (SIP)



Scope

Systematic combination of the diverse traffic systems

1. Reduction of traffic accident, congestion and CO2 emission by **optimizing Public transit sharing ratio**.
2. **Accessibility support** for person who required accessible services and infrastructures should be considered as a prior factor.
3. **By utilizing Automated Driving Technologies and Traffic Information Control Systems** such as PTPS and PICS, the Urban Transportation will be changed to the Next Generation Systems.
4. With Rapid, On-time and Safety features, **Demand responsive minimum waiting time operation** will be realized.



Different Concept from existing BRT(Bus Rapid Transit)

Existing BRT takes alternative mass transit roles of railway network

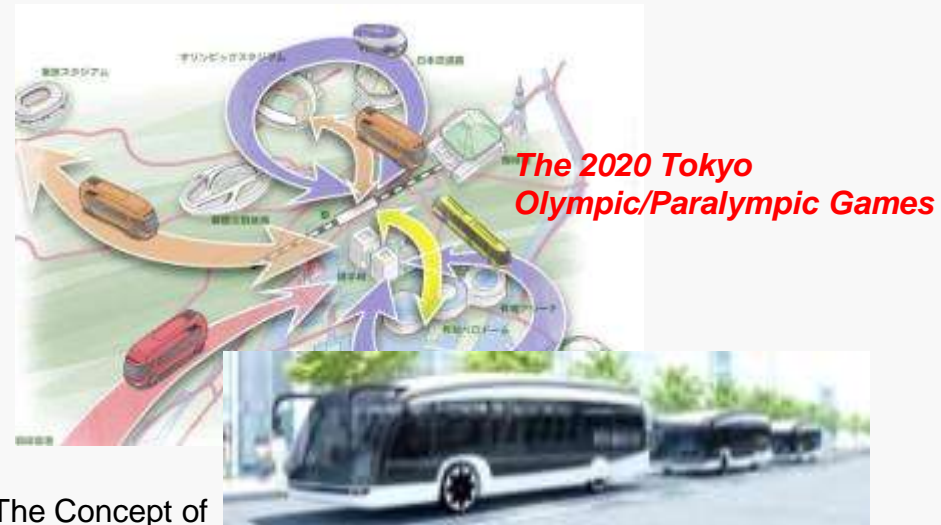


A different concept for the Next Generation Urban Transportation Systems can be considered as a combination with existing sophisticated railway network



BRT in Bogota Colombia

Photo: Taken by Prof. Fumihiko Nakamura
(Yokohama National University, JAPAN)



The Concept of
Next Generation Urban Transportation Systems

Four important layers for the development

Integrated Rapid Transit : Not only physically fast in travel speed, the whole time from the origin to destination should be minimized including connection, boarding, fare collection, etc.

Fundamental philosophy of Universal access for all at every physical and information spaces



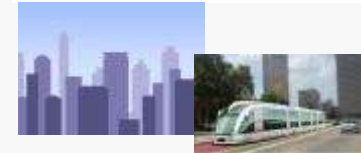
(A) Total design of the whole transportation systems in the targeted district

(B) Performance design as a public transportation system

(C) Effective operation and service system design utilizing automated driving technologies

(D) Fundamental system design supporting for above 3 layers; Vehicle structure, Control system/devices, Comm. systems

Comprehensive traffic policy



Public transit systems



Control system requirements and specifications



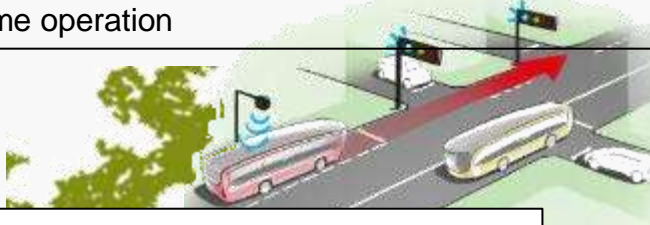
Vehicle structure
Control system/devices
Communication systems



Next Generation Urban Transportation Systems *ART(Advanced Rapid Transit) Concept*

Advanced PTPS(Public Transportation Priority System)

*Rapid and On-time operation



Advanced operation system
with automated control systems

*Seamless and stress free connection



Automated acceleration control

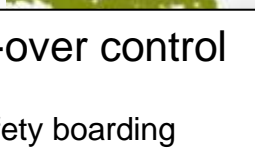
*Smooth & Comfortable ride



Automated pull-over control

*Accessibility

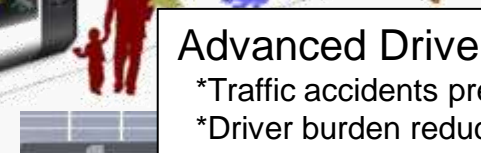
*Short time and Safety boarding



Advanced Driver Assistance

*Traffic accidents prevention

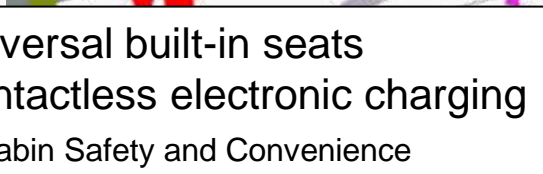
*Driver burden reduction



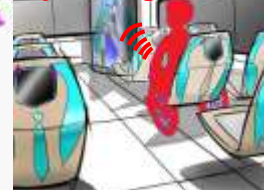
Universal built-in seats

Contactless electronic charging

*Cabin Safety and Convenience



Cyber Agent



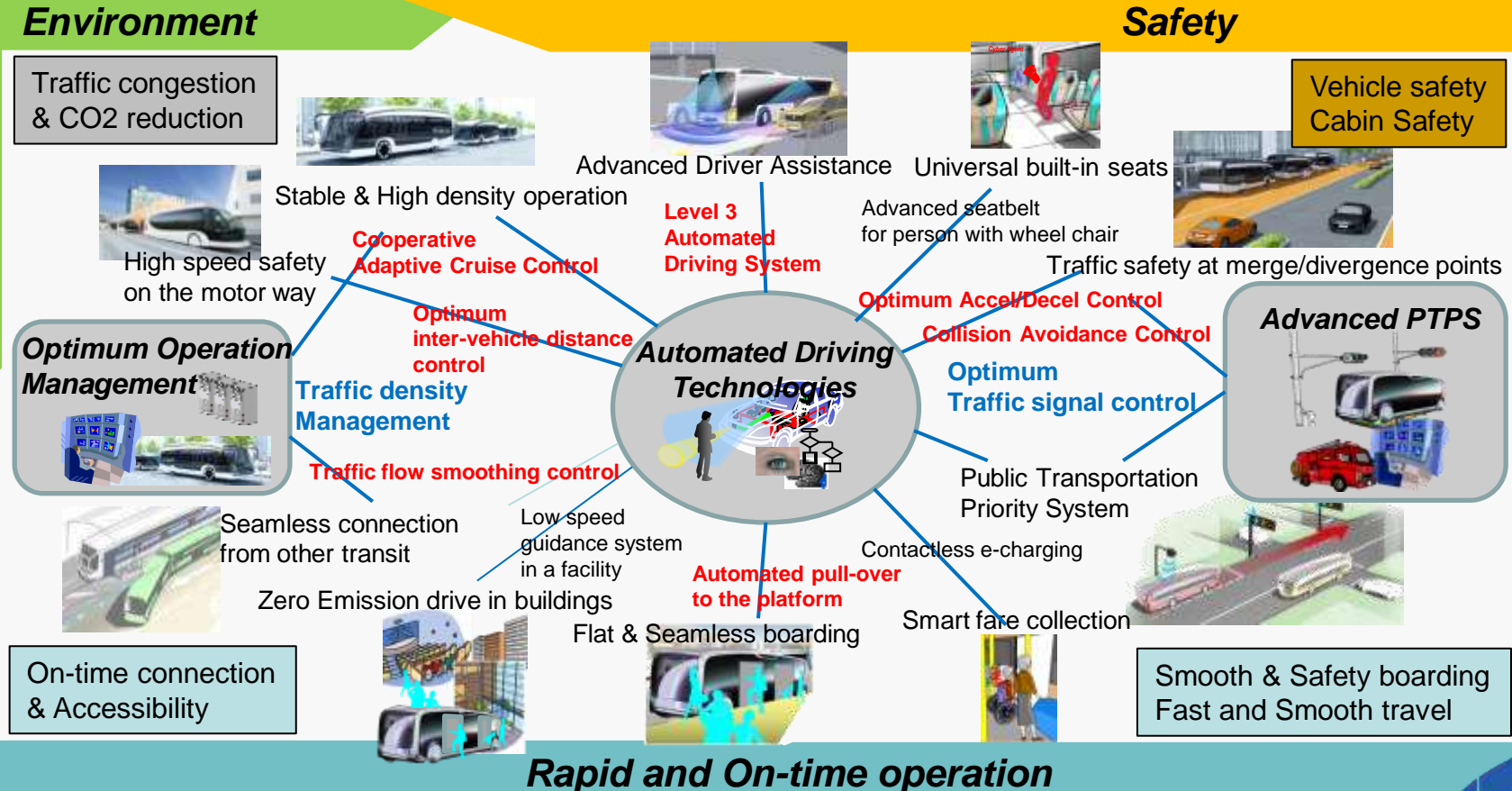
Cooperative ACC

*Traffic congestion/CO2 reduction



Next Generation Urban Transportation Systems: Advanced Rapid Transit

Technological requirements for the system



Next Generation Urban Transportation Systems

Concept for the Accessibility Assistance Systems

Open Big Data



Elevator location
with congestion info.

Access to the restroom
for handicapped

Accessibility map utilizing the Open Big Data

Guidance to
the slope for wheel chair



Location & vacancy info.
of handicapper parking



Advanced PICS

(Pedestrian Information
Communication System)

*Improvement of safety at the crosswalk

Advanced Safety and Convenience of Public Transit



Vehicle to Pedestrian Communication

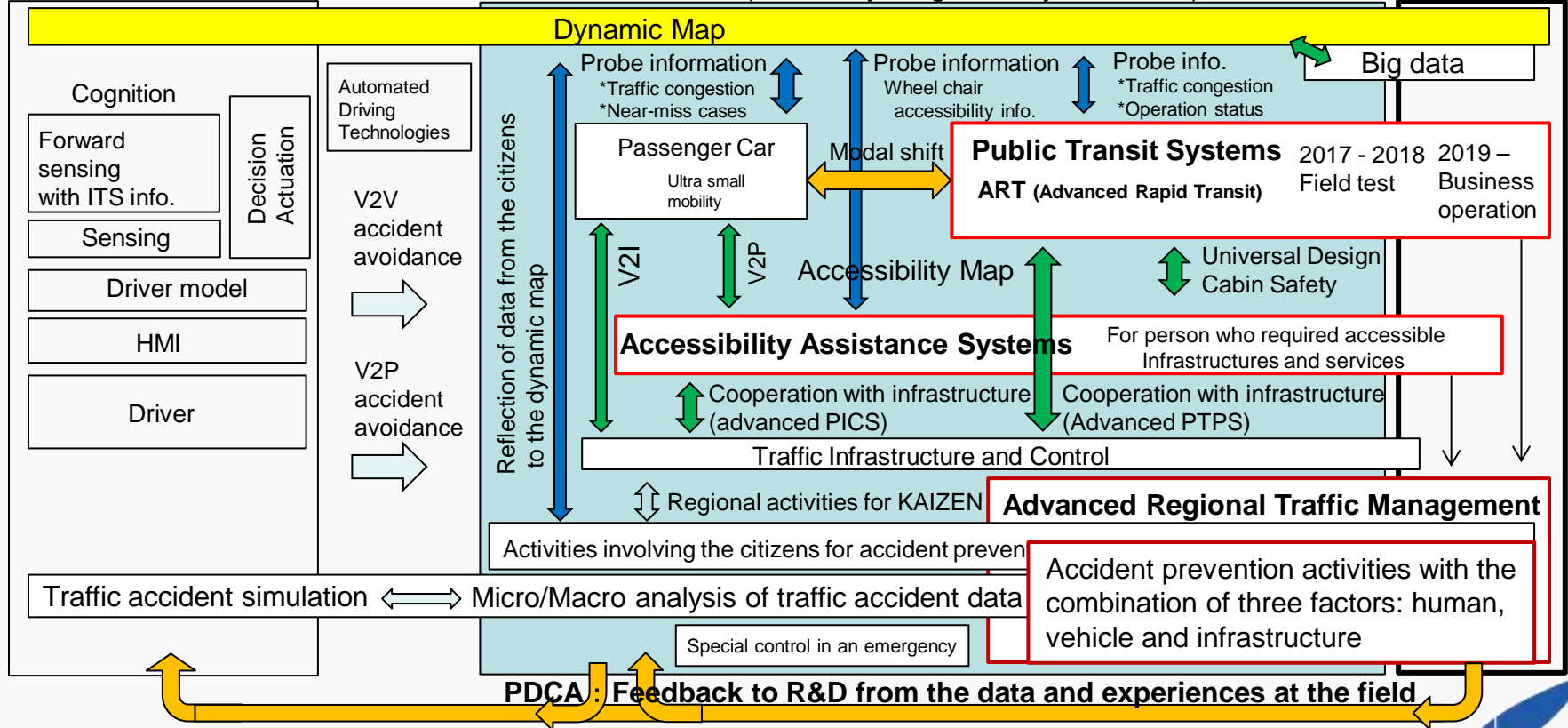


Positioning of the Next Generation Urban Transportation Systems in the Automated Driving theme

Automated Driving System Approach to the practical use

R&D at the actual field with traffic problems
(Urban city, Regional city, rural area)

Implementation to the society



Summary

1. The basic concept for Next Generation Urban Transportation Systems was made in the Cross-ministerial Strategic Innovation Promotion Program (SIP) in Japan.
2. Key component of the Advanced Rapid Transit (ART) concept is Automated Driving Technologies for **Traffic safety**, **Cabin safety** and **Traffic congestion/CO2 reduction** as well as **Rapid, Comfortable and On-time** operation of Public Transit.
3. **The 2020 Tokyo Olympic/Paralympic Games** is considered as the first important milestone of launching it into the megacity.



Thank you for your attention

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