AP 2021
ITS Asia Pacific Forum Brisbane

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ITS Vision: Creating Values for the People and the Society

Hajime Amano

President, ITS Japan

#ITSAP2021

Progress Report of Japanese Automated Driving Project

Source: Seigo KUZUMAKI, Automated Vehicles Symposium 2020
Yasuyuki KOGA, SIP-adus Workshop 2020

Details: https://en.sip-adus.go.jp/evt/workshop2020/

SIP

Cabinet Office

Vehicle Position Detection using HD 3D Map

GNSS

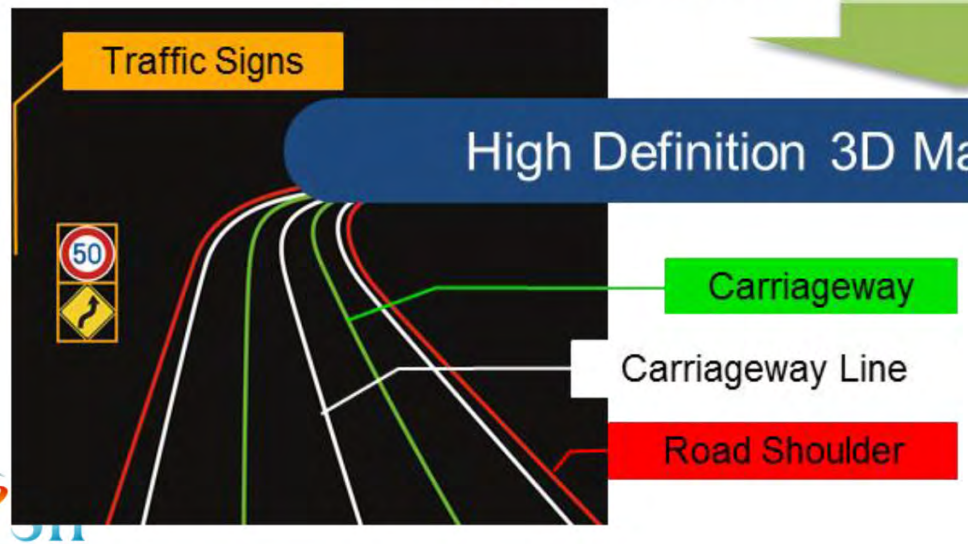
Laser Scanner(LiDAR)

Radar

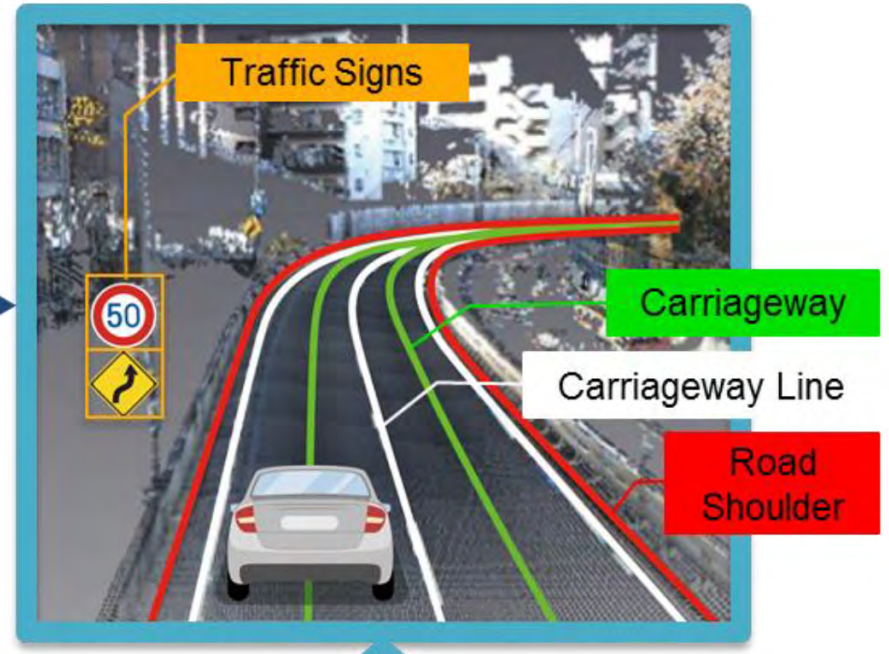
Camera

Sensed Data

Compare to estimate the position



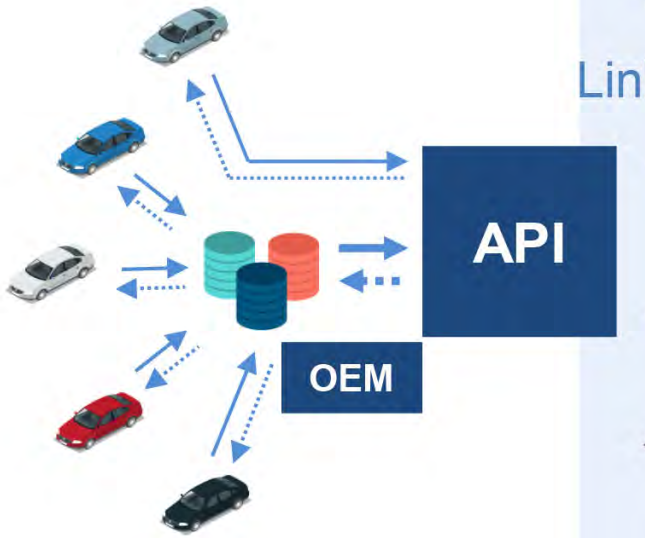
High Definition 3D Map



Estimate the position of the vehicle

Dynamic Map

To use combination database of high definition 3D map data with dynamic data such as traffic jam, road construction info.



API : Application Program Interface

Dynamic Data

Movement of Vehicles, Status of Pedestrians, Traffic Signals etc.

Semi-dynamic Data

Accidents, Traffic Jams, Detailed Weather etc.

Semi-static Data

Traffic Regulation, Road Construction, Weather etc.

Static Data

High Definition 3D Map

Road, Lane, 3D Shape of Structures etc.

Digital Mapping

3D Common Platform Data

Point Clouds, Graphics, Probe Data etc.

Competitive area

Additional data

Common (Basic) data

Cooperative area

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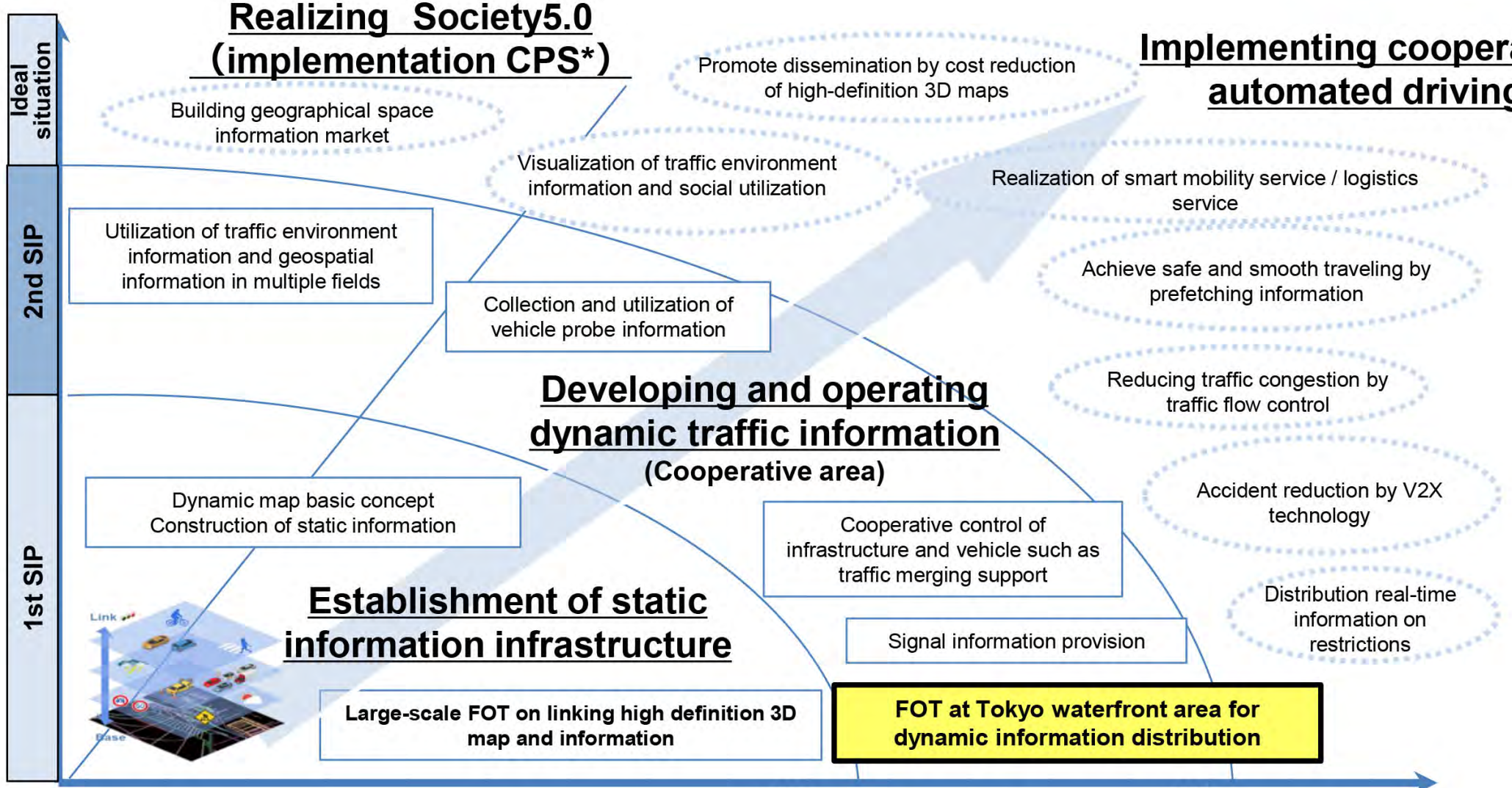
Building the Traffic Environmental Info. Framework



*CPS : Cyber Physical System

【Scenario for private car】

Ordinary road<L2>

Expressway<L2・L3>

By 2020

By around 2020

By around 2025

Expressway<L4>

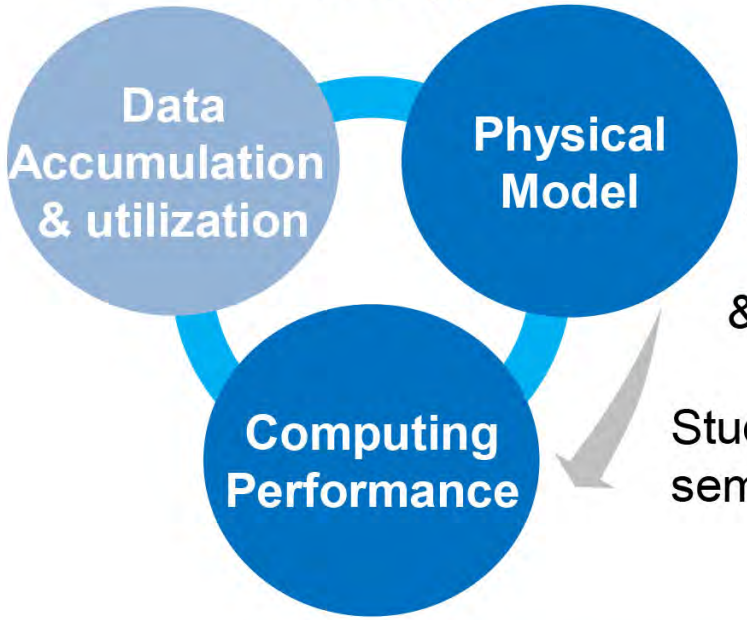
Safety assurance

DIVP™ Driving Intelligence Validation Platform

- Scope & Objectives

DIVP™ scope

Trinitarian approach



Platform implementation

&

Study reasonable semiconductor spec

DIVP™ Objectives

- ***Open Standard Interface***
- ***Reference platform with reasonable verification level***
- ***E & S pair model based approach***
  (E : Environmental model, S : Sensor model)

DIVP™ will improve Simulation based AD Safety validation for Consumer acceptable Safety assurance

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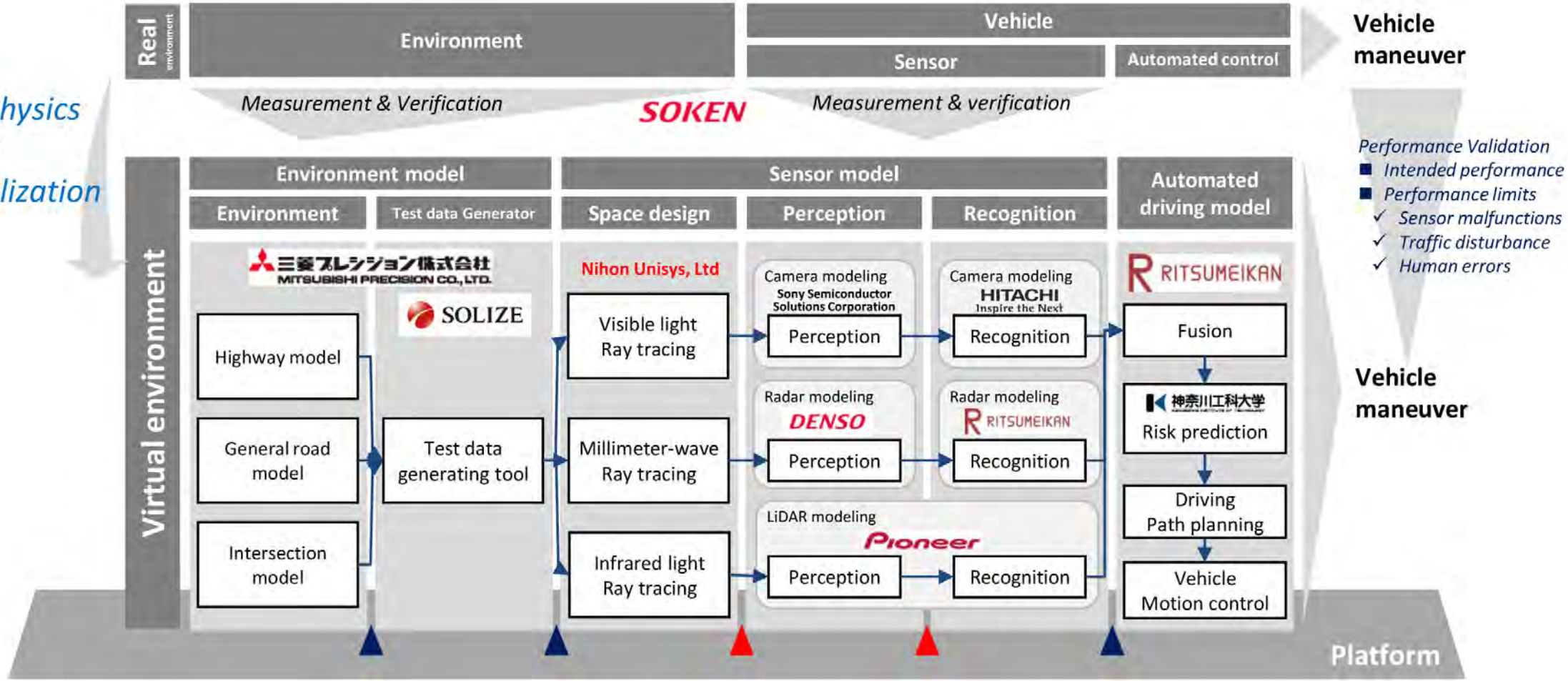
Sensor evaluation model & project structure

Designed research theme, Precisely Duplicate from Real to Virtual,
and Verification of correlation level by 10-experts as DIVP™ Consortium



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DIVP™ Consortium

神奈川工科大学 KANAGAWA INSTITUTE OF TECHNOLOGY

Nihon Unisys, Ltd

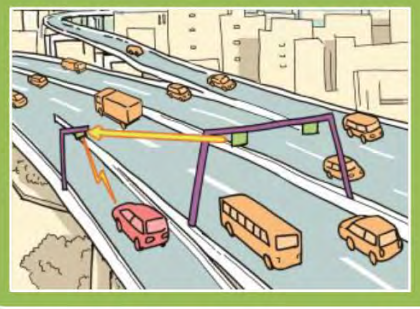
FOT in Tokyo waterfront city area

Tokyo Waterfront City area

- Signal display and change timing information via ITS infrastructure
- HD 3D map linked with signal info. etc

Haneda Airport area

- Signal display and change timing information via ITS infrastructure
- Magnetic marker
- Bus stop, designated lane for bus service



Metropolitan Express way

- Merging assistance on the main lane of highways
- ETC gate open/close info.
- Lane level traffic flow regulation info. Etc.

Period; October 2019 – March 2021

Participants of FOT

◆ Total 29 entities including OEMs, suppliers, venture companies and universities with 100 vehicles are participating in our FOT from Oct. 2019.

Alphabetical order. A total of 29 institutions

SIP

Adjustment of Laws and Regulations

Amended **Road Transport Vehicle Act** enacted, intended to secure safety uniformly from the design and manufacturing processes through usage of automated-driving vehicles etc.
(enacted April 2020)

The amended **Road Traffic Act** establishes provisions related to liability of drivers and others in accordance with commercialization of automated-driving technologies
(enacted April 2020)

Standards on permission to use public roads were revised in connection with feasibility testing of automated driving on public roads (September 2019)
Commercialization is possible under frameworks of remote testing and testing of vehicles equipped with designated equipment

Under **the Act on Securing Compensation for Automobile Accidents**, the operator remains liable for accidents arising while using automated driving systems

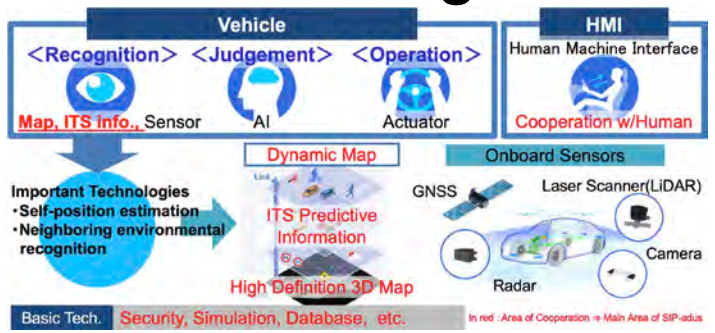
Source: Junji KIKUSHIMA, SIP-adus Workshop 2020, https://en.sip-adus.go.jp/evt/workshop2020/

Near Future Applications of Automated Driving

Privately owned Cars

Enhancement of ADAS
Up to Level 3

Technologies



Driving environment
Infrastructure, ODD definition

Laws and Regulations
Traffic Rules, Vehicle Standards

Public Acceptance
Benefits, Risks, Concerns

Public Transportation

- Route Buses
- On Demand Services

Controlled Environment
Narrowly defined ODD
(Level 4)

Logistic Operations

- Long Haul
- Delivery

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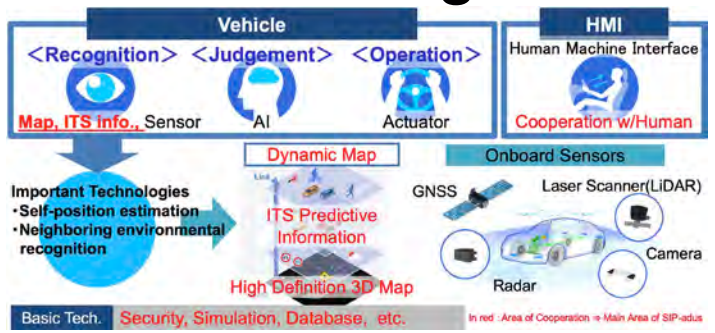

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Public Acceptance

Citizens make decision.

They will have to take risks for benefits.
Large investment of government resources is required.
They may have to change way of life and give up something.

The Role of Experts is to show the general public:

Options to consider,
Both positive and negative Implications of those options, and
Scientific evidences for substantial discussions.

Ethical, Legal and Social Issues (ELSI)

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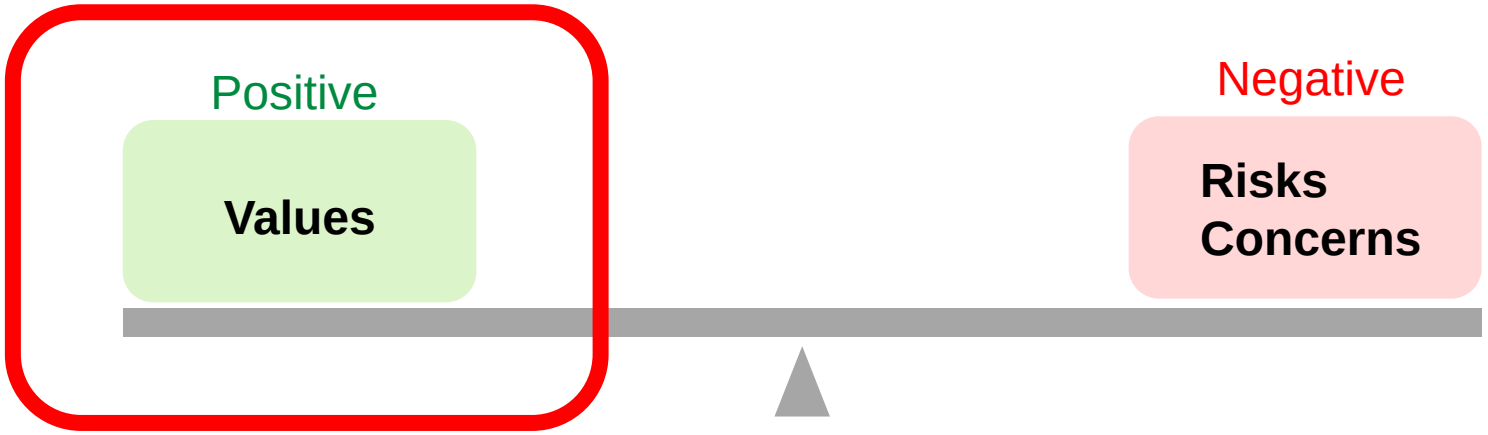


Values for Individuals and Society

Values:

what we really want to have,
what we really want to do, and
measures to overcome challenges we are really concerned.

ITS Japan

Radical and Pervasive Penetration of New Technologies and Implications to the Society

1) Electrification of road vehicles and energy management

- Reduction of CO_2 emission to mitigate global warming
- Renewed competition in new set of technologies with new breed of engineers
- Highly advanced controllability essential for automated driving

2) Big data collection, analysis and services

- Mobile network and service platform transforming consumers to "Prosumers"
- Serious challenge for established manufacturing and distribution stakeholders
- Opportunities for “Platformers” and “Unicorns”
- Concerns over the future where very few people control everything

3) Automated driving integrating all other new technologies

- Expectation for flexible and efficient integrated mobility services
- Challenges to transform legal and regulatory framework
- Need for solutions on human factors and ethical issues to foster acceptance

Industries: Declining Japanese Competitiveness

GDP / Capita Ranking in OECD

1990	2000	2010	2019
7th	16th	18th	22th

Source: Organization for Economic Co-operation and Development (OECD)

GDP Share in the World

1990	2000	2010	2019
8.9%	6.8%	5.0%	4.1%

Source: International Monetary Fund (IMF)

World Competitiveness Ranking

1990	2010	2017	2020
1st	27th	26th	34th

Source: International Institute for Management Development (IMD)

Productivity of Manufacturing Sector

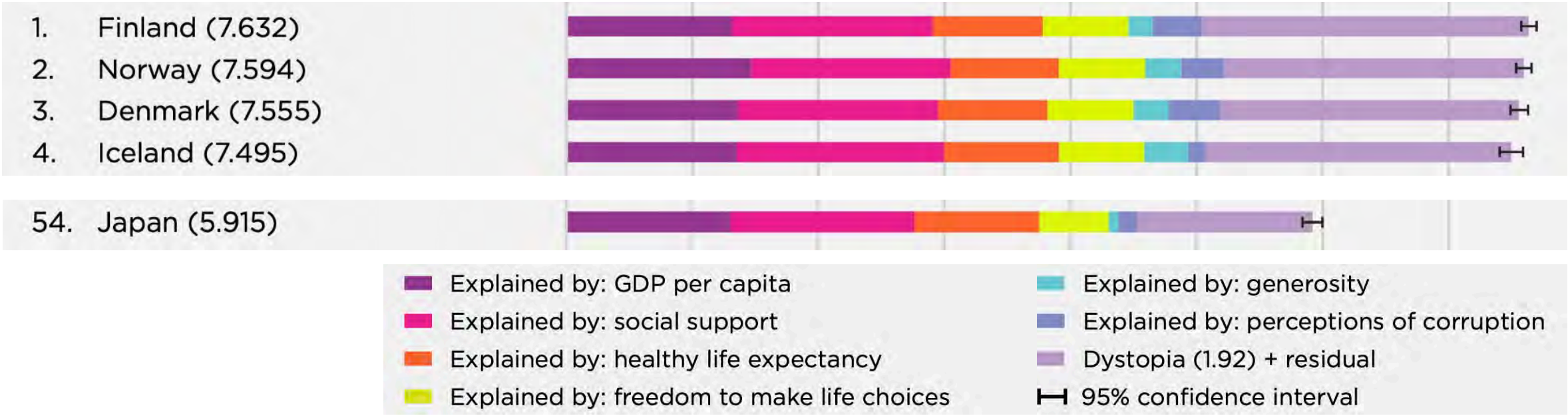
1995	2000	2005	2010	2015	2018
1st	1st	7th	10th	14th	14th

Source: Organization for Economic Co-operation and Development (OECD)

People: Lacking Sense of Fulfillment in Japan

World Happiness Report (Source: UN Sustainable Development Solutions Network)

Recognized **level of happiness** is **54**th in **141** countries (2018)
People don't see themselves happy, although economic and welfare indicators are good enough.



Employee Engagement (Source: Hiroki Yoshino, "Report Card of Heisei Era", Bungei-shunjyu, 2019)

Number of **Motivated employees** (citing 'Employee Engagement' survey by Gallup Poll)

Japan : **6%**, **132**th in **139** countries

Japanese Government Policy Promoting Diversity

People in all generations play active roles with their motivation and capabilities.

Diversity in human resource development

- multiple-track education system to promote diversity
- ability to identify and overcome challenges, conceptualize and design future society, and make logical and normative judgement
- expansion of recurrent education for changing and diverse labor demands

Transformation to the inclusive society

- opportunities for diverse people to actively engage in generating values
- opportunities for all the people apply their skills and experiences
- active ageing with working opportunities at least up to 70s

Revitalization of the local economy in rural areas

- matching human resource demand and supply across the country and across the industries
- active roles by experienced business persons in rural areas with “dual-habitation”

Source: Basic Policy on Economic and Fiscal Management and Reform 2019

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Departure from the Monolithic Society

Source: Basic Policy on Economic and Fiscal Management and Reform 2019

Values for individuals: What we really want

Workshop 1: 26 general managers (August 2019)

- Diversity and permissiveness are embedded in their personal life, invisible in their business behavior.
- Curiosity and passion of school boys never diminish for the entire life.
- Trained to execute a plan and achieve the goals through business experiences.
- Physical experiences as the core values, cyber space to arrange the actions.
- Motivated to contribute to the community, creating ties with people.
- Second foothold for their extra activities.

ITS Japan Standing Permanent Committee members

DENSO FUJITSU HITACHI HONDA
JTEKT MITSUBISHI ELECTRIC NEC NISSAN OKI
Panasonic SUMITOMO ELECTRIC TOSHIBA TOYOTA

Intensive Discussions









They do have diversity in their personal life

A: Ride motorcycles with families against it, even after very serious injuries

B: Raise rice and vegetables on weekends inherited from ancestors

C: Dive deep in the sea with professional instructor’s license

D: Study Buddhism to become a priest and help the people with difficulty

E: Paint landscape since kindergarten, winning awards years ago

F: Play rugby football until recently, now coaching boys’ team

G: Take pictures of the stars, including solar eclipse anywhere in the world

H: Study the Japanese history, visiting historic sites and reading literatures

Although they seem to be living modest life,
they have another pocket to pay for their particulars.

Values for individuals: What we really want

Workshop 2: 23 junior managers (December 2019)

- Busy for business, raising children, house chores, social relationship
- Wasting time for commuting, most of the time working alone in the office
- Admire teamwork, learning from each other, making decision through open discussion, and expanding scope and responsibility
- Recognize values of family ties and respect self-fulfillment of each family member at the same time, removing constraint of living location
- Cyber space to set us free from locations and physical experiences to foster core values of human interactions

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Approaches to the ITS Japan Vision

ITS Japan is compiling ITS vision and action plans for 2021 - 2025 (fiscal year) .
Here are some ideas.

Roles of Intelligent Transport Systems

(2015 version)

Societal Challenges

- Declining Birthrate and Aging Population
- Stagnant Economy
- Conversion to Renewable Energy and Global Warming Prevention
- Urgent Need to Improve Safety, Security and Disaster Management

Approaches

- Breakdown from Values to Technologies
- Work in the field with Local Communities
- Redefine boundaries of cooperation and competition
- Establish global collaboration and harmonization

Hierarchical Structure

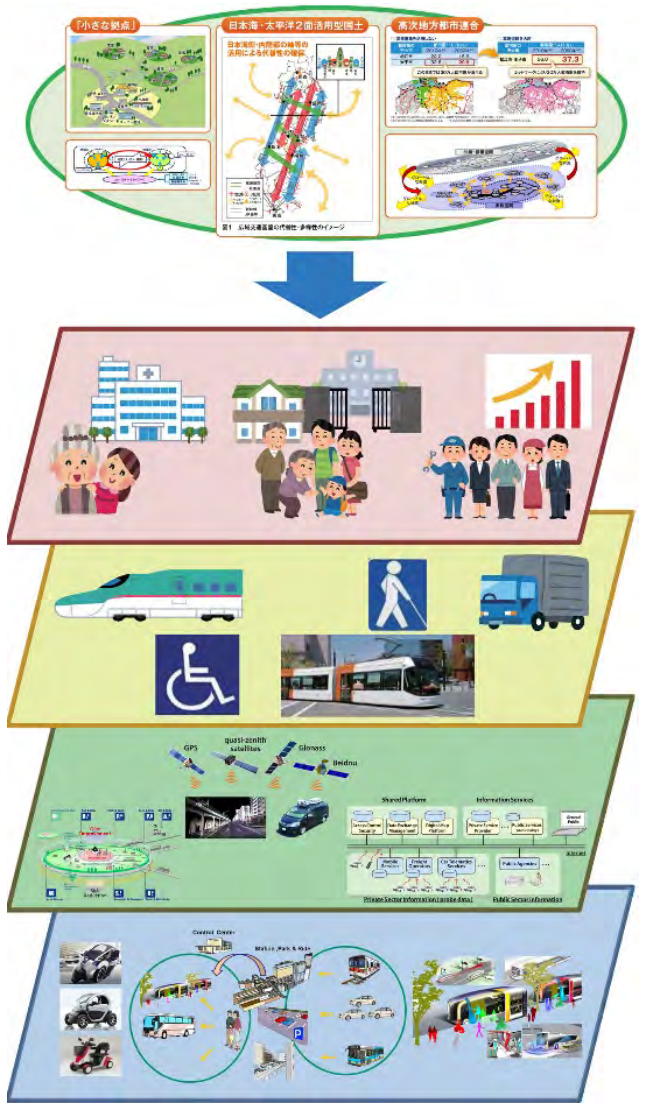
Field
of deployment

Values
to be created

Services
to materialize the value

Platforms
services are build on

Technologies
to realize the services



Mobility Driving Societal Transformation

(2020 version)

Values for Individuals

Self-fulfillment and Relief from Concerns

Permissiveness of Diversity
(Age, Gender, Preferences, etc.)

Extended Physical Experiences
(Cyber space to clear
initial barriers of engagement)

Ties with People and Teamwork
(Sense of Accomplishment)

Participation to the Communities
(Local and Global Commons)

Mobility

Accessible, Efficient and Sustainable Mobility

Mobility as a Service
Mobility on Demand

Connected, Automated,
Shared and Electric

Emerging Technologies

Values for the Society

Viable Solutions for the Societal Challenges

Ageing and Declining Population
(Transformation to Inclusive Society)

Global Warming and Energy Security
(Shift to Renewable Energy)

Declining Competitiveness of Industries
(Transformation from Monolithic society
to Diverse society)

Safety and Security
(Resilience to natural and man-made
disasters)

Structural Transformation of the Society

Extension of Living Space

National and Urban Development Plans

Industrial Structure and Competitive Advantages

Draft ITS Japan Vision for 2021 - 2025

Long Term Vision of the Society:

Diversity of People

Capacities fostered through diverse background and experiences are respected and prosper creating values.

Human Ties

Communities of diverse people work together beyond time-space constraints and create values for the society.

Sustainability

Creation of vigorous and inclusive society enables sustainable development and disaster resilience.

Scope of ITS Activities for 2021 - 2025:

1. **Integrated Mobility Services**
2. **Safe, Efficient and Accessible Mobility**
3. **Electrification and Energy Supply for Road Vehicles**
4. **Mobility Platform for Disaster Resilience**
5. **Mobility Services for Vigorous Human Interactions**

Sample images

Mobility to Motivate People

EV as a part of Smart Grid System

Integrated Multimodality

Greener and more efficient Logics

What SIP-adus stands for

Cross-Ministerial Strategic Innovation Promotion program
Innovation of Automated Driving for Universal Services

“SIP- adus”

- Mobility Bringing Everyone a Smile -

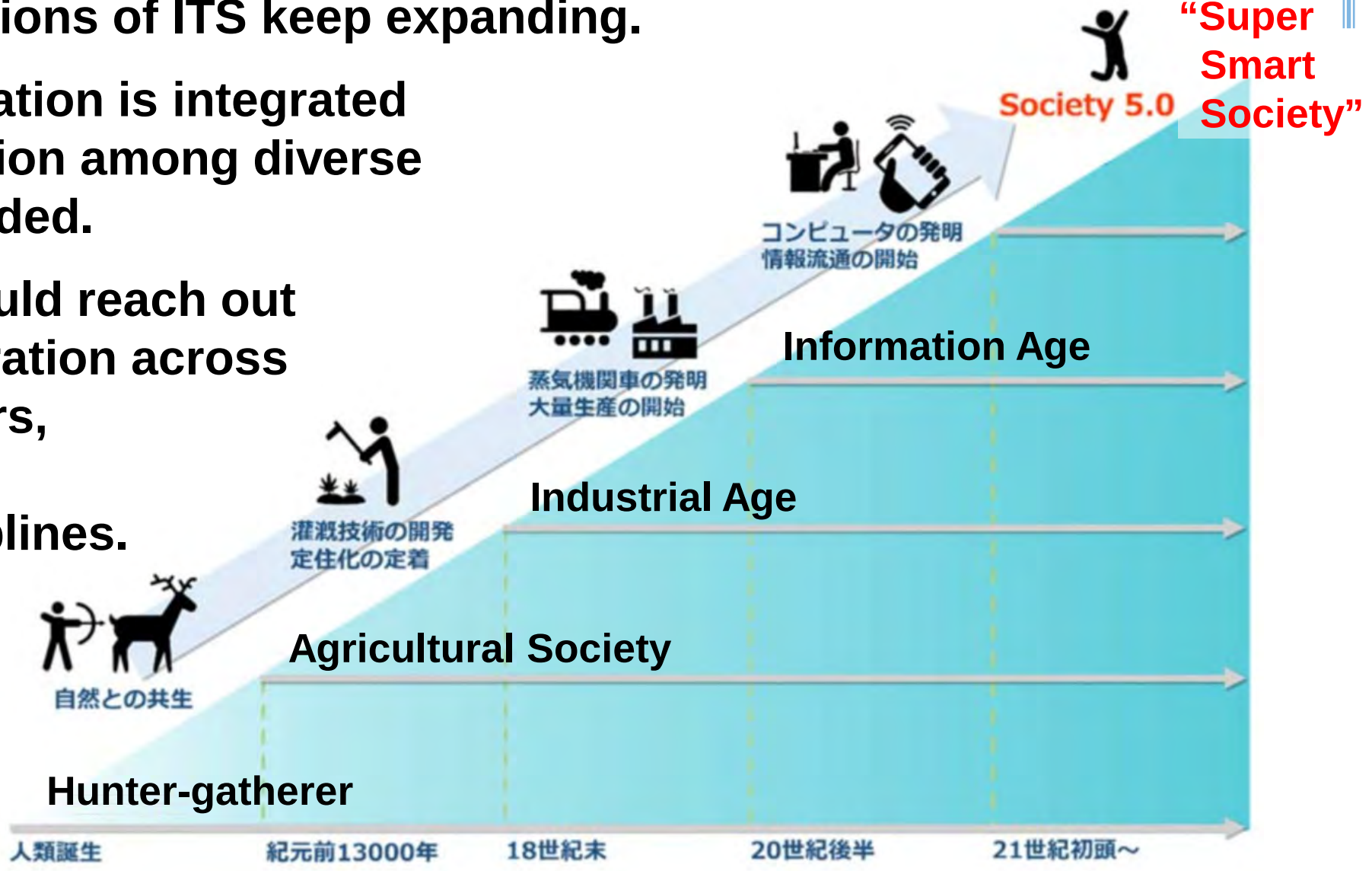
Inclusive society, where diverse people in diverse communities actively participate in generating values, will enhance both wellness of individuals and economic development. Automated driving technologies integrated with social innovations should provide everyone with mobility to fully exercise his or her capacity, enabling sustainable development of the society.

ITS Enabling Transformation of our Society

Scope and expectations of ITS keep expanding.

The more transportation is integrated the more collaboration among diverse stakeholders is needed.

ITS community should reach out to facilitate collaboration across the industrial sectors, the jurisdiction, the academic disciplines.



Picture: Statement on 'The 5th Science and Technology Basic Plan', Japan Business Federation, April 19, 2016