\Orchestrating a brighter world

NEC

Introduction to NEC Solution Innovators, Ltd. And Our focusing Business Domain

Nov 23rd 2017

Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.
We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

NEC's social solution business

Providing infrastructures for an abundant society for all people via ICT

Social Value Innovations

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Safety	Ensuring broad range of safety for all from individual to country
Security	Serving society and the Earth
Efficiency	Realizing sustainable growth
Equality	Closing the social divide and eliminate inequality

Supporting the Evolution of Worldwide Social Infrastructures through ICT

Energy / Meteorology

Agriculture

Manufacturing

Distribution

Transportation

Disaster prevention / security

Medicine

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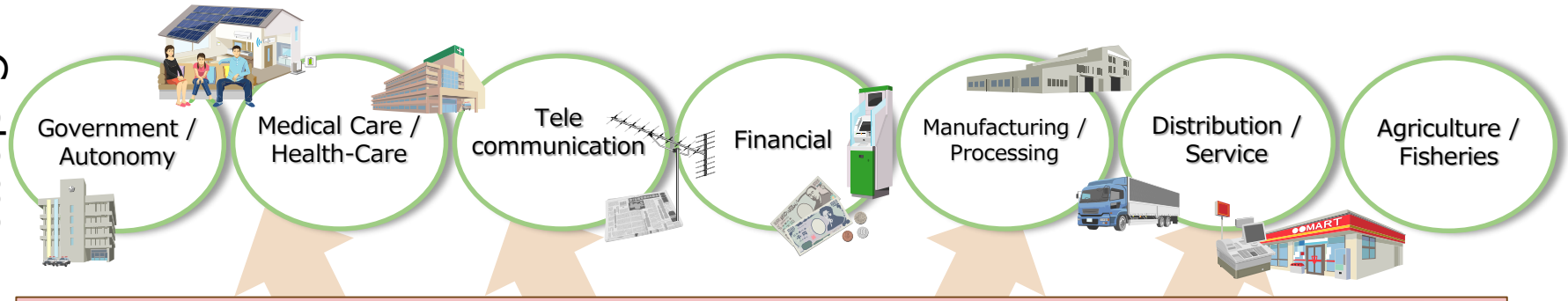
Company profile

Company Name	NEC Solution Innovators, Ltd.
Established	September 9, 1975 *NEC Solution Innovators was established on April 1, 2014
Capital	8,668 million Yen
Head Office	1-18-7 Shinkiba, Koto-ku, Tokyo, 136-8627 Japan
President	Kiyoshi Sugiyama
Employees	13,181(As of April 1, 2017)
Services	✓ Business Solutions (Consulting, Systems integration) ✓ Services Cloud Services (SaaS) Maintenance and Operation Service Outsourcing (ITO/BPO) ✓ Platform Software Development ✓ Sales of System/Network products, Program packages
Affiliates	NEC Soft (Jinan) Co., Ltd. NEC System Technologies (HangZhou),Ltd NEC Vietnam Co., Ltd. NEC Technologies India Private Limited

NEC Solution Innovators' business domains

Use our solutions to create social value with customers

Customer



Business Solutions
- ✓ Consulting
- ✓ System Plan, Design, Development, and Introduction

Services
- ✓ Cloud Services (SaaS)
- ✓ Maintenance and Operation Service Outsourcing (ITO/BPO)

Important ICT Themes
Cloud Computing | Big Data | AI | Security

IoT

Platform Software Development
- ✓ Product Development for Middleware of Server
- ✓ Common Platform Development and Built-in Software

NEC Solution Innovators' Business Domains

SaaS : Software as a Service (Provide application and/or by services)
ITO : Information Technology Outsourcing (Companies entrust their IT operation to other companies)
BPO : Business Process Outsourcing (Companies entrust their operation to other companies)
AI : Artificial Intelligence (Intelligence exhibited by machines)
IoT : Internet of Things (Network of physical objects that enables various objects to collect and exchange data)

Sales by business domains

Cloud Infrastructure

Server
Software

Smart Device

Automotive,
Automotive parts

Electronics,
Machinery

Drug, Food

Hotel

Logistics

Retail trade
Wholesale

Bank, Insurance, Securities

Traffic control /
Air traffic control

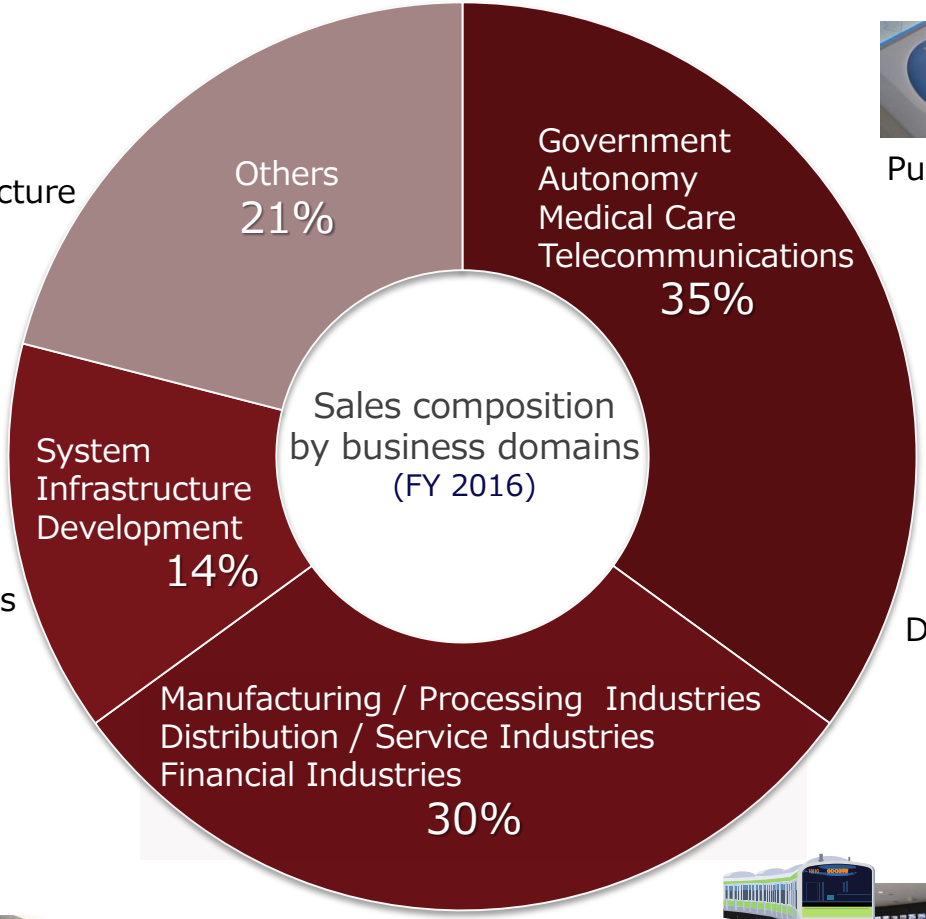
Education

Hospital

Fire Safety &
Disaster Preparedness

Public service

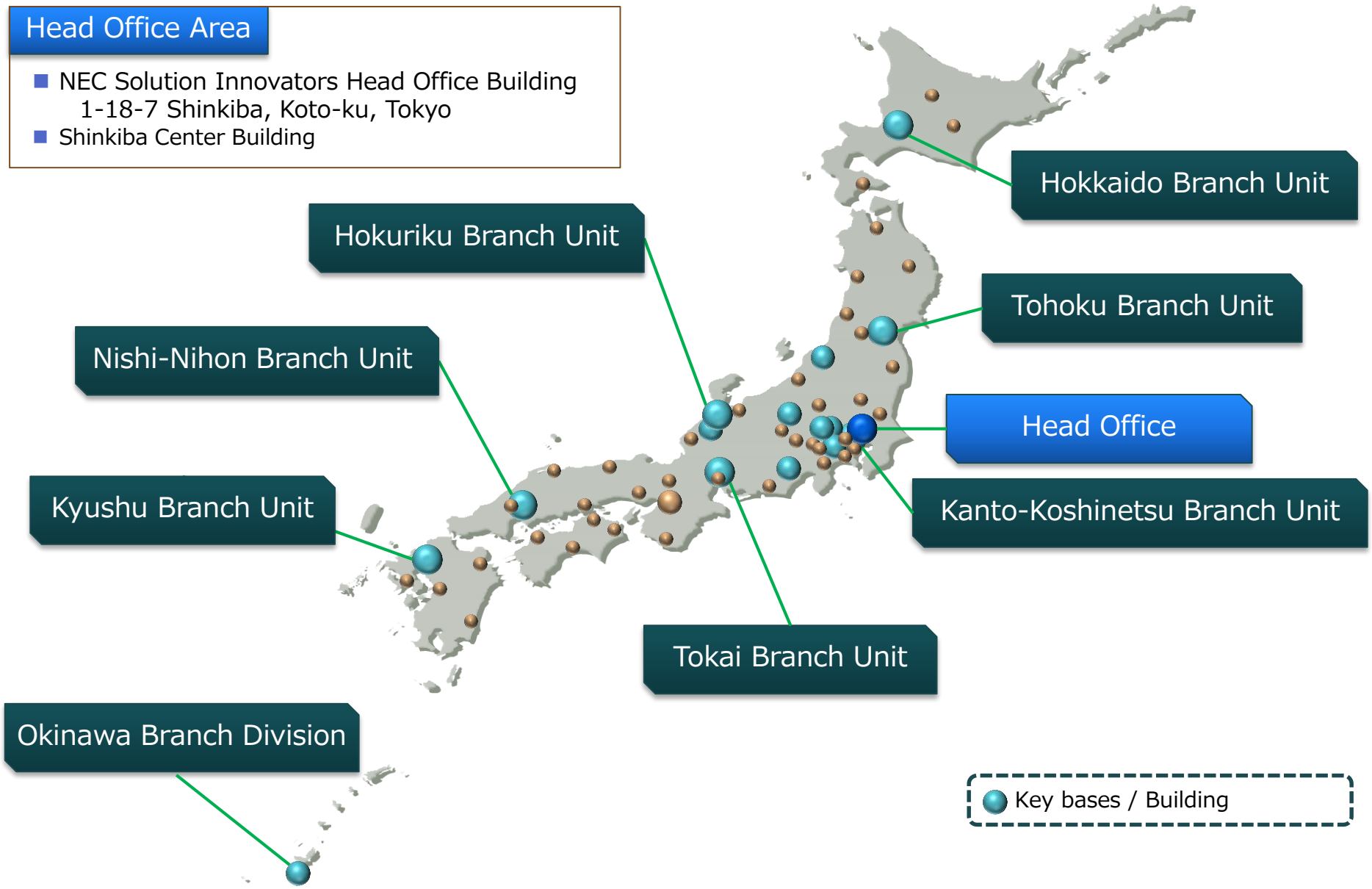
Public Safety



NEC Solution Innovators in Japan

Head Office Area

- NEC Solution Innovators Head Office Building
  1-18-7 Shinkiba, Koto-ku, Tokyo
- Shinkiba Center Building



NEC Solution Innovators' Organization

Sep. 2017

Public Solutions Business Unit

Enterprise Solutions Business Unit

NIS Business Unit

Platform Solutions Business Unit

Branch Office

- Branch Unit Coordination Division
- Hokkaido Branch Unit
- Hokuriku Buranch Unit
- Tohoku Branch Unit
- Nishi-Nihon Branch Unit
- Kanto-Koshinetsu Branch Unit
- Kyusyu Branch Unit
- Tokai Branch Unit

Corporate common divisions

- **Innovation Strategy Division**
- **Smart-agriculture Business Promotion Division**
- Process Innovation and Software Engineering Division
- Corporate Sales and Sales Operations Division
- Security Business Promotion Division
- Cloud Service Division
- Innovation Lab

Corporate Staff

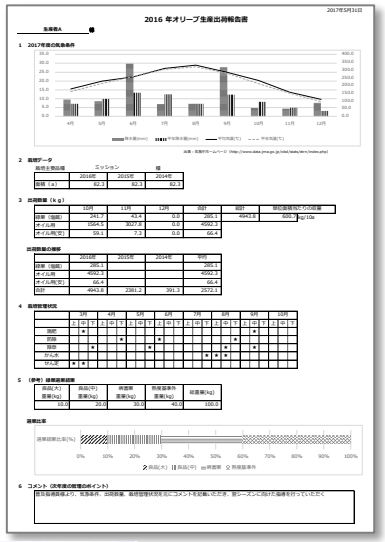
Business Domain for Research in IVO

IoT in Smart Agriculture :High Performance Greenhouse Plant

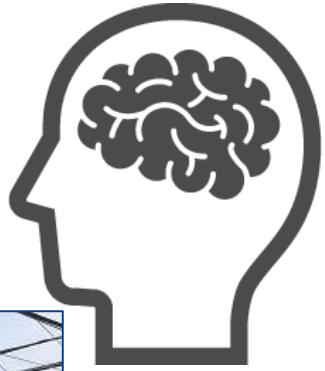
IoT × **Facilities** × **Cultivation Knowledge**

High Performance Greenhouse Plant
- High Yield
- High Quality
- Low Cost

Reporting



Knowledge



ICT **User Interface**

Greenhouse

Faclities

Sensors

High Performance Greenhouse Plant

Research for "Possibility of High Performance Greenhouse Plant" and "Market potential of the Greenhouse Plant"

"High Performance" means

- High yield
- High quality
- Low cost – both of "initial cost" and "running cost"

Greenhouse Plant's components are

- IoT system – ICT and Sensor
- Cultivation Knowledge
- Greenhouse facilities – House, Facility and Construction
- Seeds and Seedlings
- Fertilizer

⋮

We are Interesting in….

Tell us situation bellow in your country…

Performance of IoT system

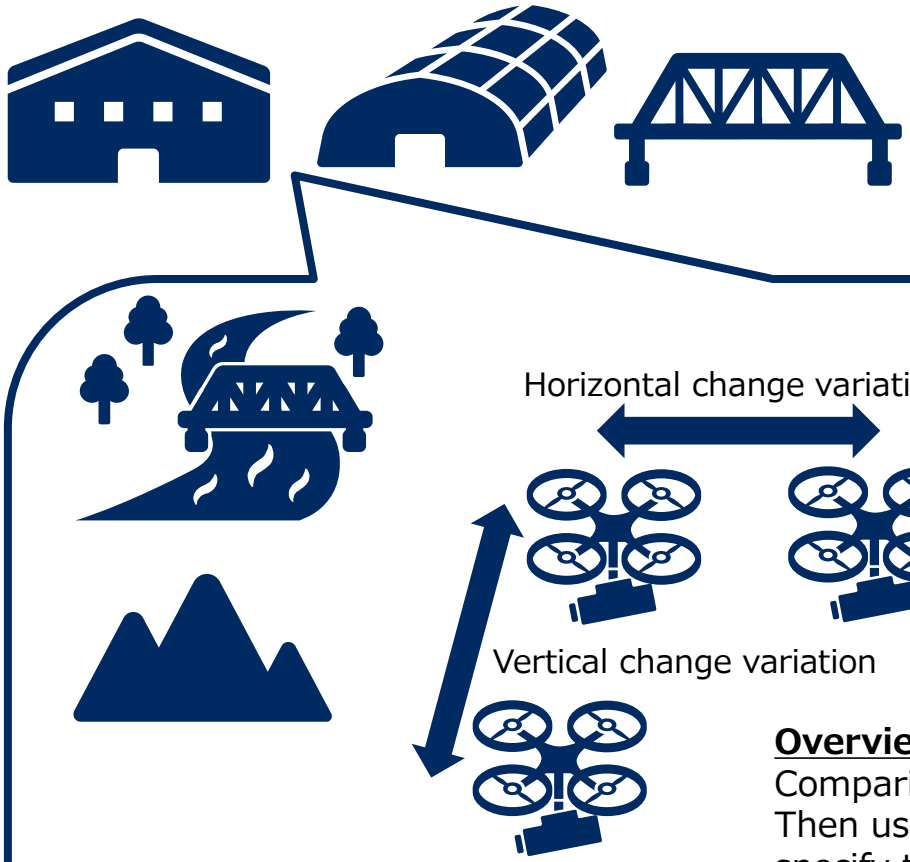
- System Architecture (Hardware, software)
- Function
- Network Response
- Security Level
- Initial Cost
- Running Cost

IoT system includes Drone/Robotics Technology.

Cultivation Knowledge

- Collecting, Accumulating and Delivering process
- Retaining of freshness process
- Classifying process

Case study: Estimation for drone self position



Research overview

Technology of handling the self position estimation at the out of GPS range (ex. Inside of greenhouse, near by bridges, etc.), using by only RGM camera of drone.

Overview of technology realization

Comparing the RGB camera images by the unit of frames. Then using by the time-series image changes, estimate and specify the change rate of the self position.

Based on the time-series processing from its takeoff, it can estimate and detect the change rate at anyplace (height).

Control the self position with highly accurate level without sensors.

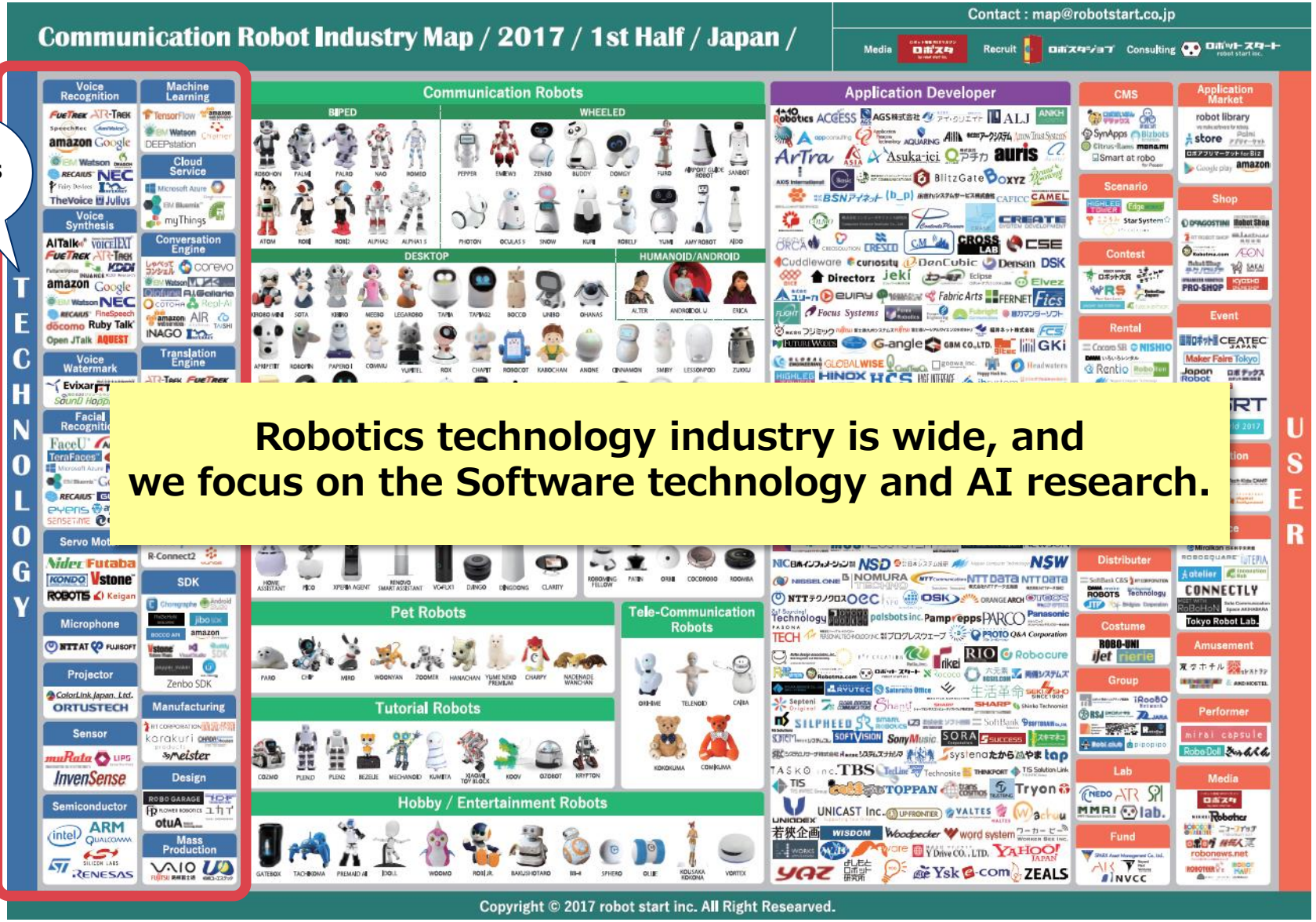
The other Technology Research Area in next step

We focus on the robotics, especially technology research of communication robots and drones.

Communication Robots	Mobile robot type		Wearable type	Boarding type	Universal type
	Controllable type	Autonomous type			
Supporting daily life (Customer service, guidance, education, etc.) 	Surgical robots, Rescue robots, Drone, etc.  da Vinchi  Rescue Robots  Drone	Cleaning robots, Security robots, Guidance robots, Transport robots, etc.  Guard robo  Robina	Robot suits, Motion assists, Robot for transferring to bed, etc.  HAL  Transfer assist	Transfer support robots  Ninebot (Segway)  Mobiro	Universal Humanoid  ASIMO  ATLAS

Source:: METI (Ministry of Economy, Trade and Industry) with revised and edited

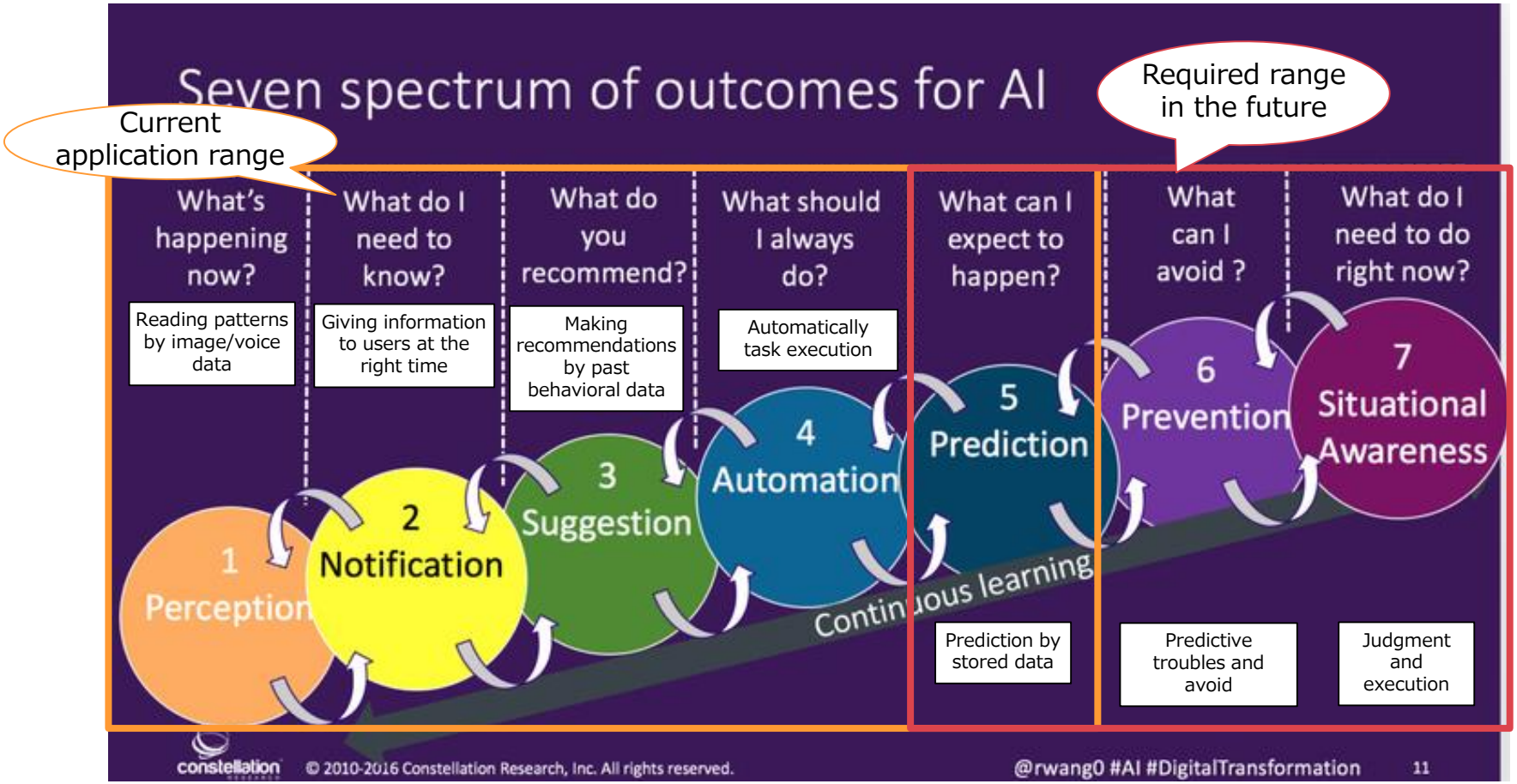
Ref : Communication Robot Industry Map in Japan



Communication Robot Industry Map 2017 1st – (c) Robot Start Inc.

AI technology research in robotics

- Our technology research target is autonomous operating robot by their own recognition and judgment with AI.
  - In particular, we research the technology for risk avoidance and decision/execution by using prediction.



Source: http://www.zdnet.com/article/how-to-build-any-ai-driven-smart-service/ (English)
http://ai-4-u.com/basic/spectrum-seven-artificial-intelligence-outcomes (Japanese)

Research theme in next step

1 Cognitive robotics technology

Cognitive development robotics	To acquire the technologies for approaching the unknown tasks

Ex. Learning the unknown tool's operation, Moving unknown place with out of touch, etc.

Symbol emergence in robotics	To acquire various actions and concepts by experiences, and communicate by recognized symbols (≒language)

Ex. Communicate by learning language, etc

Robot social intelligence	To acquire communication skills through social learning with unique knowledge and inference functions.

Ex. Understand rules, read the situation, etc

2 Drone control technology with image recognition

To estimate the situation by image recognition, and control their own devices.

Ex. To approach and collect detail information when robots detects anomaly of objects by camera,
To estimate self position by time-series variations of camera images, etc.

3 Efficiency technology for machine learning data

To streamline the improvement of machine learning by defining the category of learning data.

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Find an invisible
future with our hearts

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