02. Intelligent Knowledge Processing Technology to Integrate Physical and Cyber spaces Leading to Society 5.0

Vision

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Overview

Advanced cyber-physical systems (CPS) are a key factor for Japan to realize Society 5.0. They collect, process, and use actual socio-economic data to improve the efficiency of social systems, create new industries, and increase intellectual productivity. This project is designed to address technological issues related to the establishment of CPS and create a common edge computing platform that facilitates producing IoT solutions with no expertise. The dissemination and utilization of an edge computing platform will solve Japan's social issues and promote economic development, thereby leading to realization of Society 5.0.

Goals

- To develop the world's first platform capable of reducing the development period and/or cost of IoT solutions by 90% or more, compared with conventional methods, as the core technology of Society 5.0.
- To develop technologies for realizing measurement in environments where sensors otherwise could not be installed, including realization of low-energy IoT chips, and innovative sensors which will reduce the energy required for near-sensor processing by 80% or more.
- To demonstrate the effectiveness of the platform and technologies for IoT chips and innovative sensors mentioned above in production and other areas, to create examples of commercialization and establish a route to social implementation.

Exit Strategies

showing specific examples of solving physical space issues in the industry, build a mechanism that can maintain and update Edge PF autonomously by a consortium of related companies, etc., and promote.
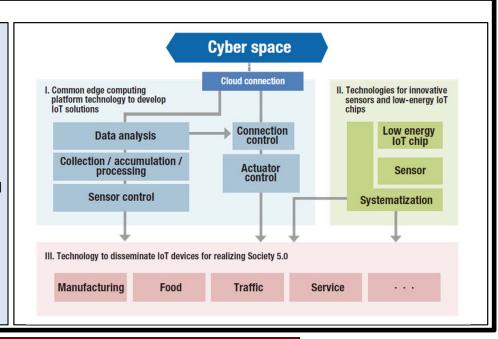
Societal Impact

- Will increase the rate of introduction of IoT solutions by companies to 90% or higher, which is the level required for global competition, in FY2025. *1
- Contribute IoT and AI on economic growth (indicated by the market size) up to 1,495 quadrillion yen in 2030. *2

*1 MIC document 2016   *2 MIC document 2017

To Achieve

R&D Topics

I. Common edge computing platform technology to develop IoT solutions

Research and development will be carried out to develop a common edge computing platform that facilitates the creation and operation of IoT solutions without IT expertise. The platform will include technologies to collect an extensive amount of data by controlling sensors in physical space, digitize collected data through advanced AI technology, and accurately control smart devices in physical space in accordance with instructions sent through cyberspace.

II. Technologies for innovative sensors and low-energy IoT chips

Innovative sensors and low-energy IoT chips will be developed and commercialized. The innovative sensors are expected to be small in size and available at low cost with unprecedented data collection capability. Data processing will be possible at lower levels of power consumption by using the new IoT chips.

III. Technology to disseminate IoT devices for realizing Society 5.0

With the aim of realizing Society 5.0, technologies to disseminate IoT devices in society will be developed. These technologies will promote the introduction and use of robots and other IoT devices in manufacturing processes where such devices have not yet been applied, nursing care, transportation, and service areas.

Ministry concerned: MIC, MEXT, MAFF, METI