

Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050.

## Cybernetic avatar infrastructure for diversity and inclusion

- ## Cybernetic avatar life

- [Reference]-----



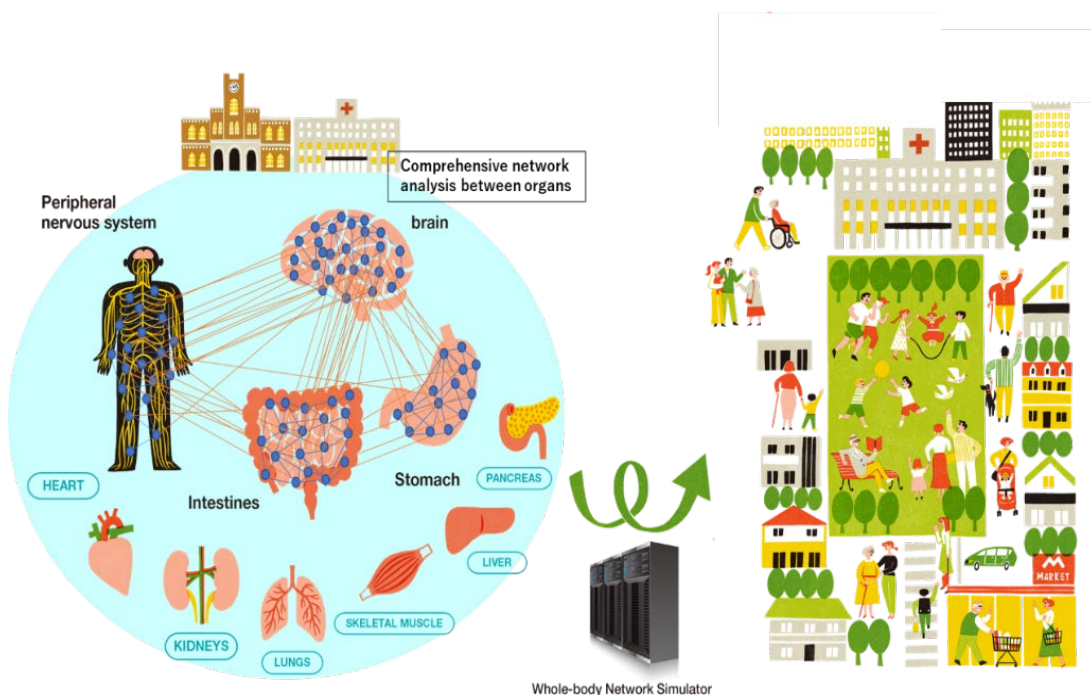
## <Moonshot Goal 2>

Realization of ultra-early disease prediction and intervention by 2050.

### <Target of Moonshot Goal>

- Establishment of a system for disease prediction and evaluation of pre-symptomatic states in order to suppress and prevent disease onset, through integrated analysis of the entire functional network between human organs, by 2050.
- Establishment of a strategy that enables the conversion of a pre-symptomatic state to a healthy state, by clarification of functional changes in human physiology along life course considering the comprehensive network between organs, by 2050.
- Identification of disease-related network structures and establishment of innovative prediction and intervention methods by 2050.
- Understanding of the comprehensive network between human organs by 2030.

-----[Reference]-----



### <Moonshot Goal 3>

Realization of AI robots that autonomously learn, adapt to their environment, evolve in intelligence and act alongside human beings, by 2050.

#### <Target of Moonshot Goal>

- Development of AI robots that humans feel comfortable with, have physical abilities equivalent to or greater than humans, and grow in harmony with human life, by 2050.
- Development of AI robots that behave well with humans under certain conditions, and allow over 90% of people to feel comfortable with them, by 2030.
- Development of an automated AI robot system that aims to discover impactful scientific principles and solutions, by thinking and acting in the field of natural science, by 2050.
- Development of an automated AI robot system that aims to support the process of discovery for scientific principles and solutions to specific problems by 2030.
- Development of AI robots that autonomously make judgements and act in environments where it is difficult for humans to act by 2050.
- Development of AI robots that operate unattended under human supervision in specific circumstances by 2030.

-----[Reference]-----



### <Moonshot Goal 4>

Realization of sustainable resource circulation to recover the global environment by 2050.

#### <Target of Moonshot Goal>

Solutions to the global warming problem (the Cool Earth) and environmental pollution problem (the Clean Earth) through realization of sustainable resource circulation for the global environment.

#### Cool Earth and Clean Earth

- Global deployment of commercial plants or products utilizing circulation technology by 2050.

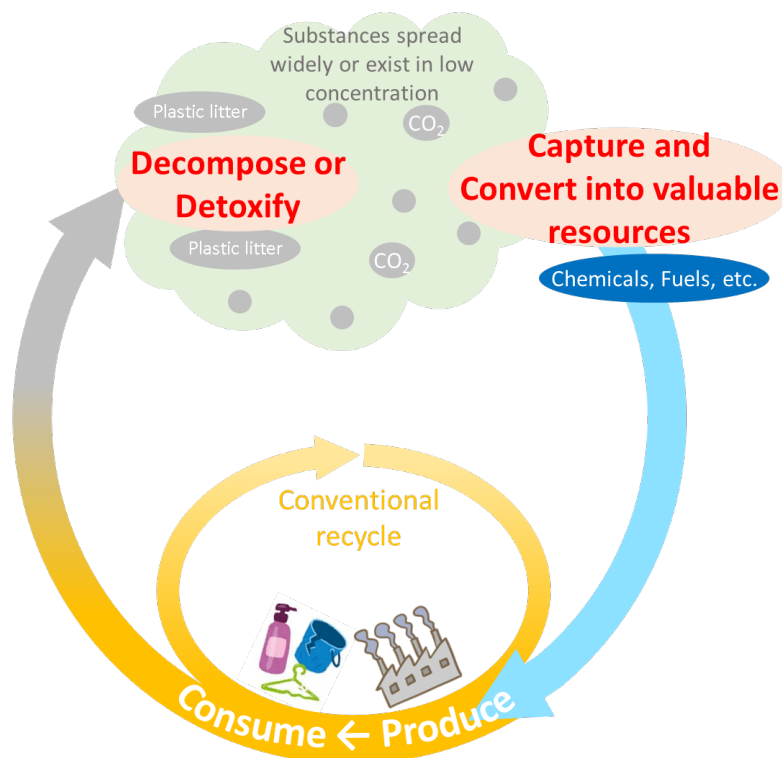
#### Cool Earth

- Development of circulation technology on a pilot scale for reducing greenhouse gases that is also effective in terms of life cycle assessment (LCA) by 2030.

#### Clean Earth

- Development of technology on a pilot scale or in a form of prototype that converts environmentally harmful substances into valuable or harmless materials by 2030.

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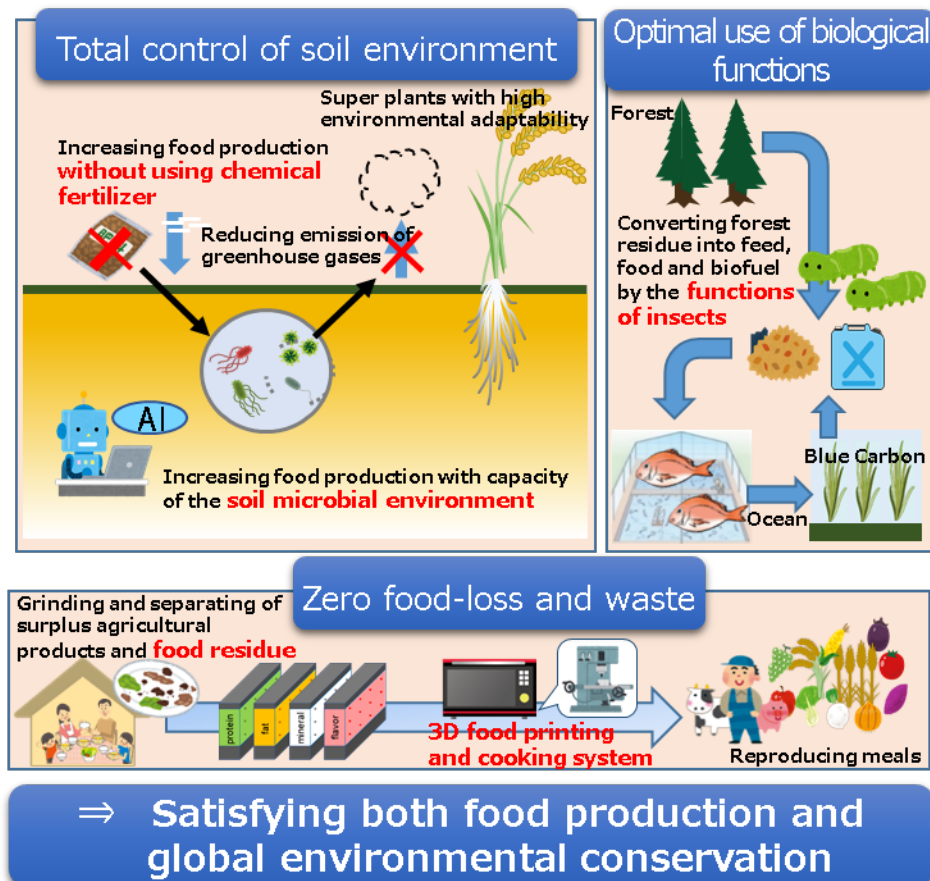
### <Moonshot Goal 5>

Creation of the industry that enables sustainable global food supply by exploiting unused biological resources by 2050.

#### <Target of Moonshot Goal>

- Technical development of the circular food production systems by biological measures, e.g. utilizing microbes and insects, by 2050.
- Development of technical solutions for eliminating food loss and waste and for achieving both healthy life and sustainable food consumption by 2050.
- Evaluation of the technical achievements and discussion on the ethical, legal and social implications (ELSI) matters will be done by 2030, for global spread of the technology by 2050.

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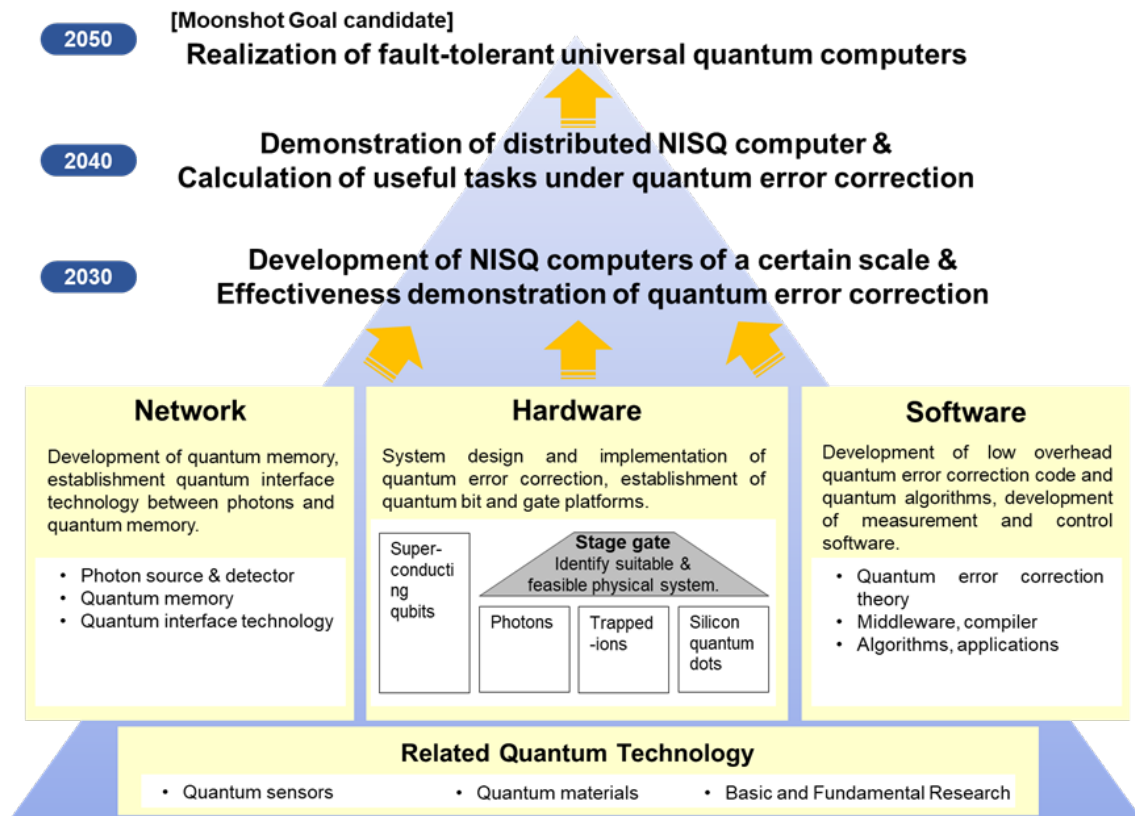
## <Moonshot Goal 6>

Realization of a fault-tolerant universal quantum computer that will revolutionize economy, industry, and security by 2050.

### <Target of Moonshot Goal>

- Achievement of the large-scale integration required for fault-tolerant universal quantum computers by around 2050.
- Development of a certain scale of NISQ computer and demonstration of the effectiveness of quantum error correction by 2030.

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## <Moonshot Goal 7>

“Realization of sustainable care systems to overcome major diseases by 2040, for enjoying one’s life with relief and release from health concerns until 100 years old”

### <Target of Moonshot Goal>

[Realization of a society where everyone can prevent diseases spontaneously in daily life]

- Establish infrastructure to maintain good mental and physical health by developing technologies, in order to stay healthy and prevent the onset and aggravation of diseases by regulation of immune systems or sleep, etc., and to visualize individual physical and mental state in daily life and urge people to voluntarily take healthy maintenance actions most suitable for them by 2040.
- Develop technologies to monitor all living body trends with lower physical and mental load by 2030.

[Realization of medical networks accessible for anyone from anywhere in the world]

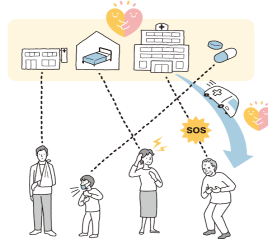
- Establish a medical network to provide the same level of medical care as a normal time regardless of region and even upon disasters and emergencies by developing diagnostic and treatment devices for simple tests and treatments at home, etc. and diagnosis- and treatment-free technologies for part of chronic diseases by 2040. In addition, develop methods for radical treatment and precision medicine for diseases such as cancer and dementia by substantially reducing the development period of drugs and medical devices, etc. through establishment of data science and evaluation systems by 2040.
- Establish a technology platform to provide quality medical and nursing care suitable for each individual appropriately even with less providers by developing compact, speedy and high-sensitivity diagnostic and treatment devices as well as technologies to further enhance doctors’ medical opinion and diagnostic capability by 2030.

[Realization of drastic improvement of QoL without feeling load (realization of an inclusive society without health disparity)]

- Establish a social infrastructure to enable self-reliant life at home without depending on nursing care by developing such technologies as the recovery of body function with rehabilitation without feeling load, normalization of ailing biocontrol systems, regeneration or substitution of weakened organs and so forth by 2040.
- Develop technologies to improve body function through load-reducing rehabilitation and support self-reliant life at home and to improve ailing living biocontrol systems by 2030.

\* For attaining the goal, it is important to have various research approaches which cross over between basic research and practical research or between medical research and research of other fields and the adoption of the latest knowledge.

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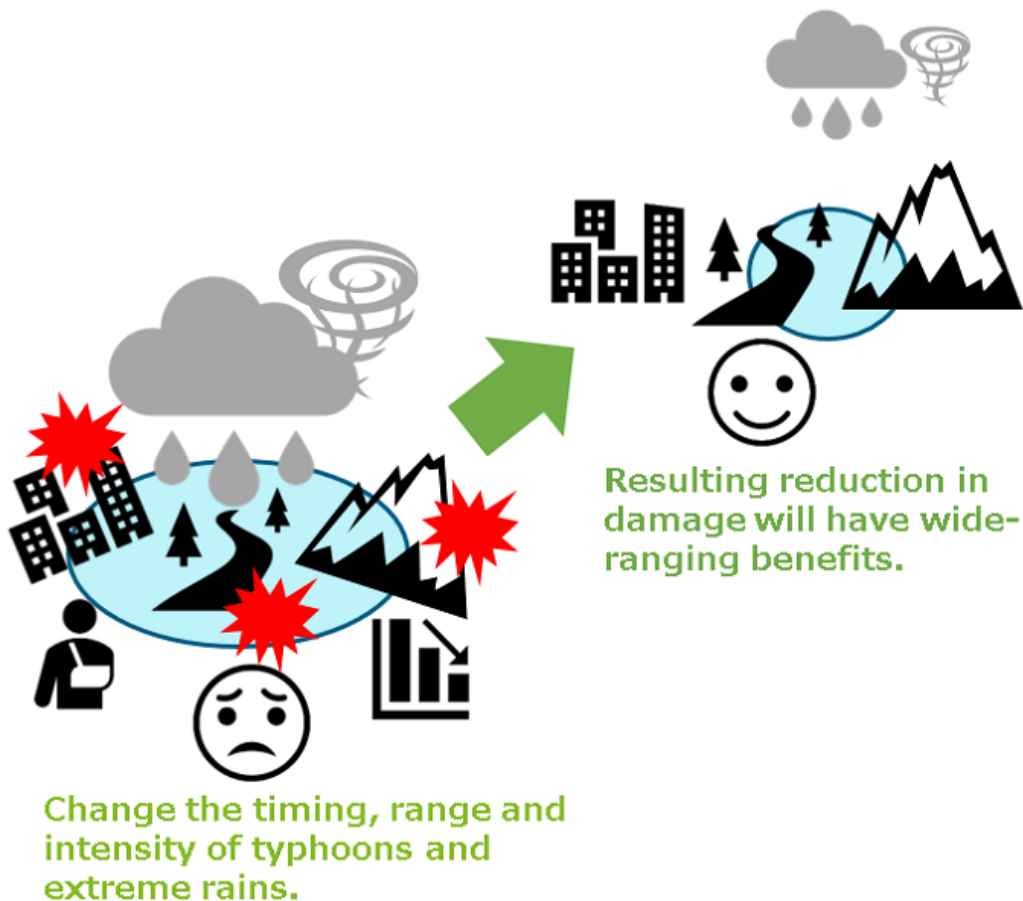
### <Moonshot Goal 8>

Realization of a society safe from the threat of extreme winds and rains by controlling and modifying the weather by 2050.

#### <Target of Moonshot Goal>

- Making it possible to intervene to change the timing, range and intensity of typhoons and extreme rains (including those that occur in linear precipitation zones), significantly reducing disaster damage and bringing a wide range of benefits to society by 2050.
- Demonstration on a computer that it is possible to reduce disaster damage by controlling typhoons and extreme rains using realistic intervention operations, and conduct experiments to verify these operations by 2030.

-----[Reference]-----



### <Moonshot Goal 9>

Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050.

#### <Target of Moonshot Goal>

- Realization of a society in which people have high individual mental stability with an active role in their own lives, and people can accurately understand their mental status and move towards their desired status through technology by 2050.
- Development of motivating technologies through extraction and measurement of elements that influence the human mind (present in culture, tradition, art, etc.) and elucidate the mechanism of mental influence by 2030. In addition, to undertake broad consideration of the issues in implementing these technologies in the community and thereby finding solutions to achieve wide uptake by the populace.
- Realization of a society that can widely accept and utilize diversity, using technology to enhance the empathy, stability, and creativity of groups, and to disseminate mental support services around the world by 2050.

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