MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM

Overview of Moonshot R&D at JST

2020.10.22
Department of Moonshot R&D Program

Japan Science and Technology Agency

What is Moonshot?

MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM

A bold new program for creating disruptive innovation in Japan.

We will tackle the challenges facing future society through ambitious goal-oriented research projects, leaping beyond the limits of conventional technology without fear of failure.

International collaborations and diverse research teams will generate results of real value to stakeholders across the globe.

Focus Areas

Society

Turn our aging society into an innovative and sustainable one through diversity and techno-social transformation.

Environment

Protect the global environment while stimulating growth.

Economy

Explore frontiers with science and technology.

‘Moonshot for human well-being’

Creating the Goals

Inspiring

- Bold goals with self-evident value.
- Significant impact on future society and industry.
- Research talent gathered from all over the world.

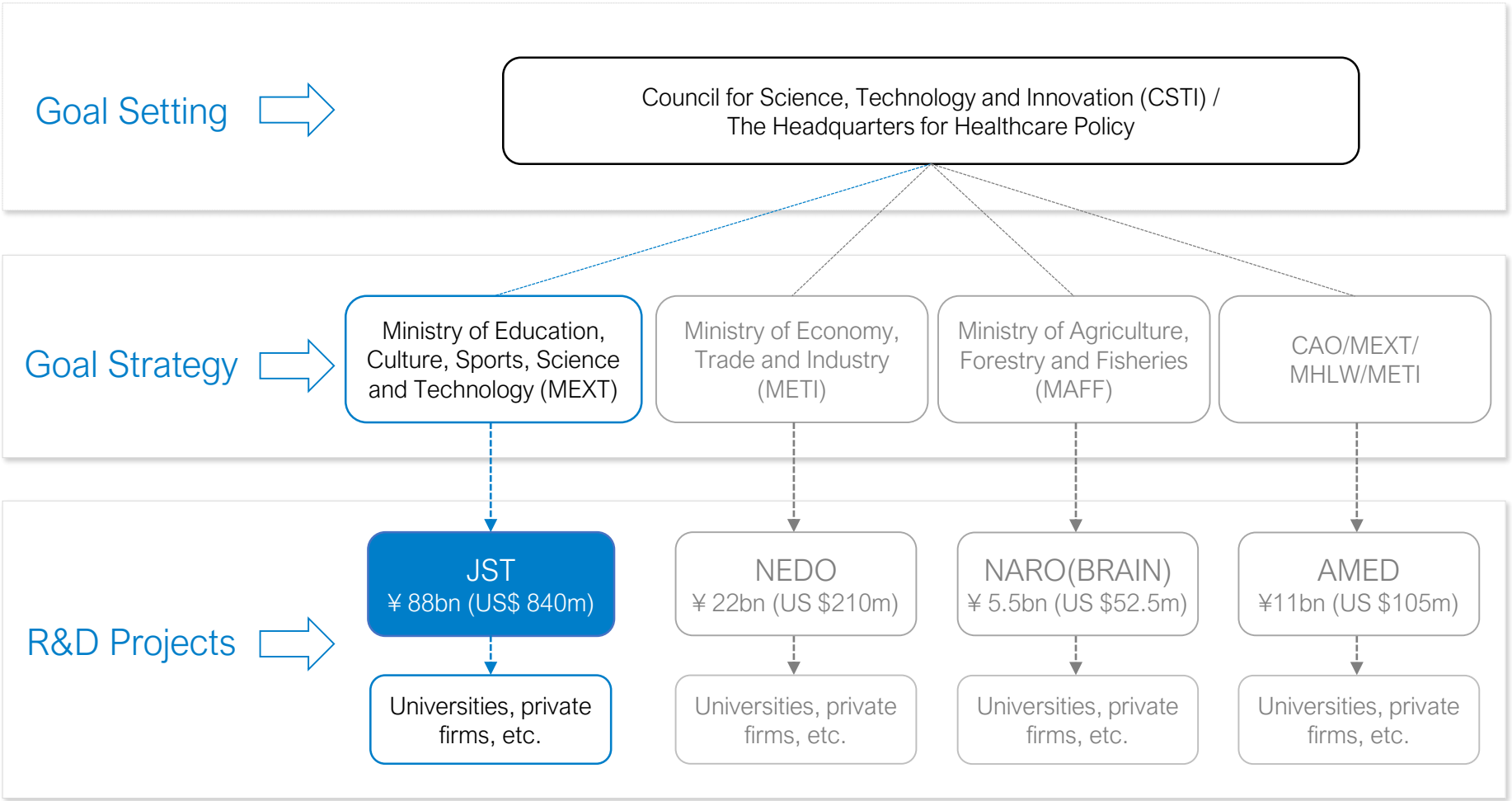
Imaginative

- Radical reimagining of future social structures.
- Direction not limited to conventional approaches.

Credible

- Ambitious but also scientifically feasible.
- Specific, measurable objectives.
- Consistent with relevant strategies and policies.

Program Structure

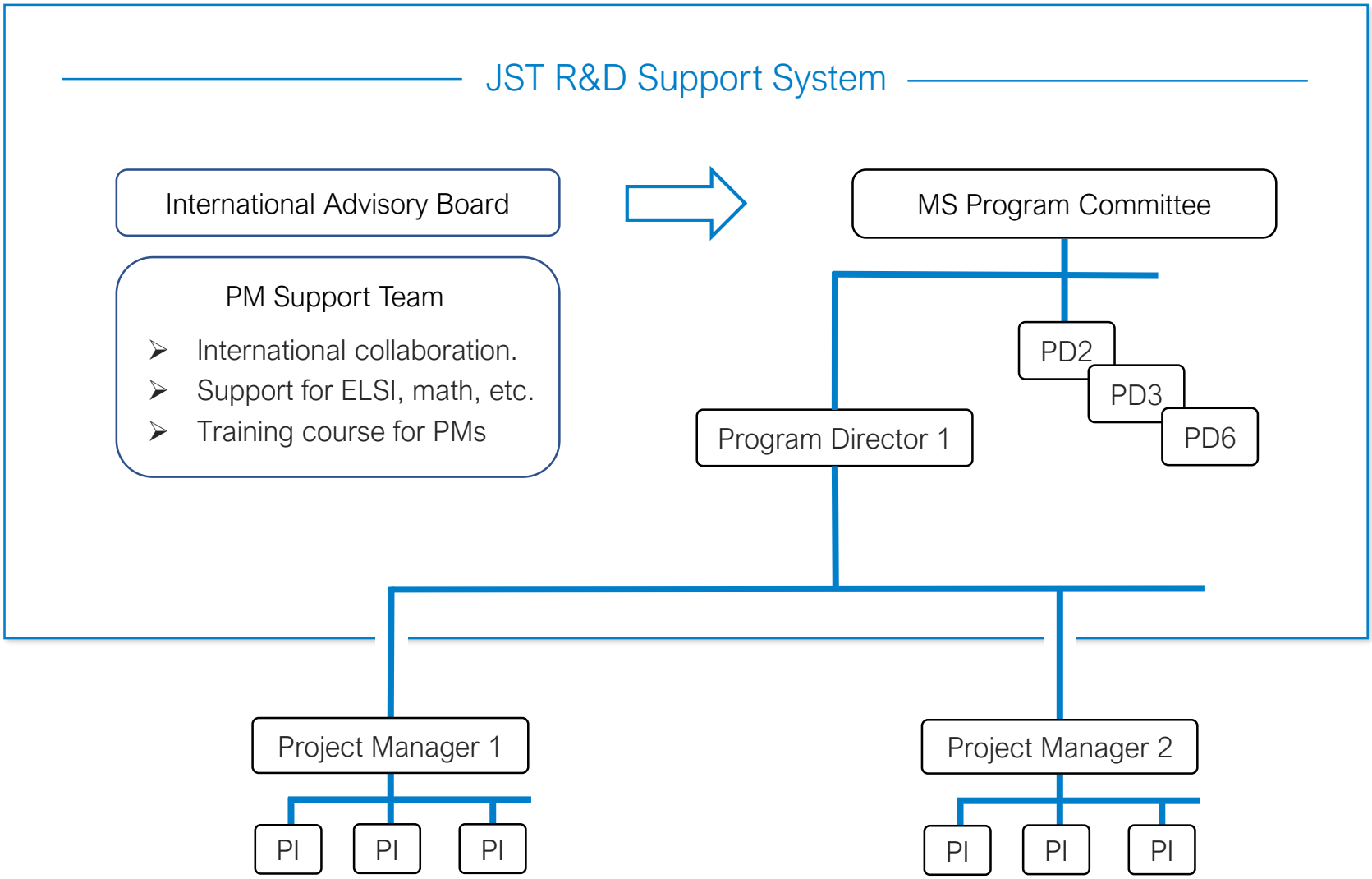


The Moonshot Goals

Goal 1:	Realization of a society in which human beings can be free from limitations of body, brain, space, and time.
Goal 2:	Realization of ultra-early disease prediction and intervention.
Goal 3:	Realization of AI robots that autonomously learn, adapt to their environment, evolve in intelligence and act alongside human beings.
Goal 4:	Realization of sustainable resource circulation to recover the global environment.*
Goal 5:	Creation of the industry that enables sustainable global food supply by exploiting unused biological resources.*
Goal 6:	Realization of a fault-tolerant universal quantum computer that will revolutionize economy, industry, and security.
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.*

* Managed outside JST

Research Project Management Structure

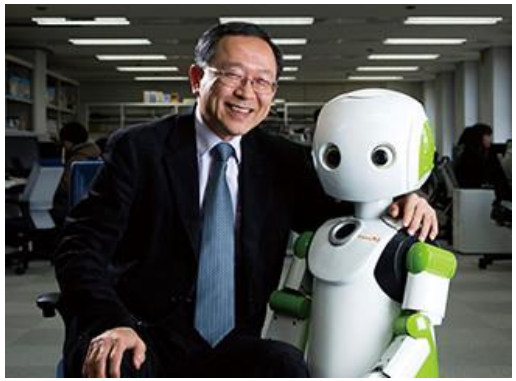


Current Goals:

Moonshot Goal 1

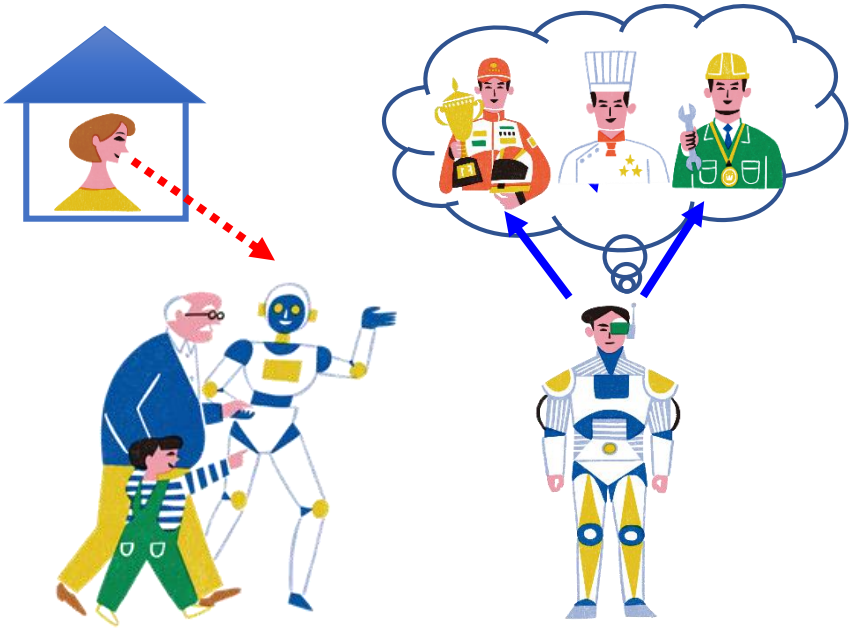
Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050.

Development of technologies, including remotely operable avatars, that overcome limitations of geography and physical ability to allow everyone to participate in social activities.



PD : Dr. HAGITA Norihiro

Chair and Professor, Art Science Department, Osaka University of Arts



Society of diversity and inclusion

Moonshot Goal 1 - PMs

ISHIGURO Hiroshi Professor, Graduate School of Engineering Science, Osaka University	Realization of a Human-Avatar Symbiotic Society where Everyone can Experience a Diverse Range of Human Activities
KANAI Ryota President and CEO, Araya, Inc.	Freedom from Bodily Limitations by Expanding Physical and Perceptional Capabilities
MINAMIZAWA Kouta Professor, Graduate School of Media Design Keio University	Development of Cybernetic Avatars to Create Shared-Experience with Harmonious Physical and Social Characteristics

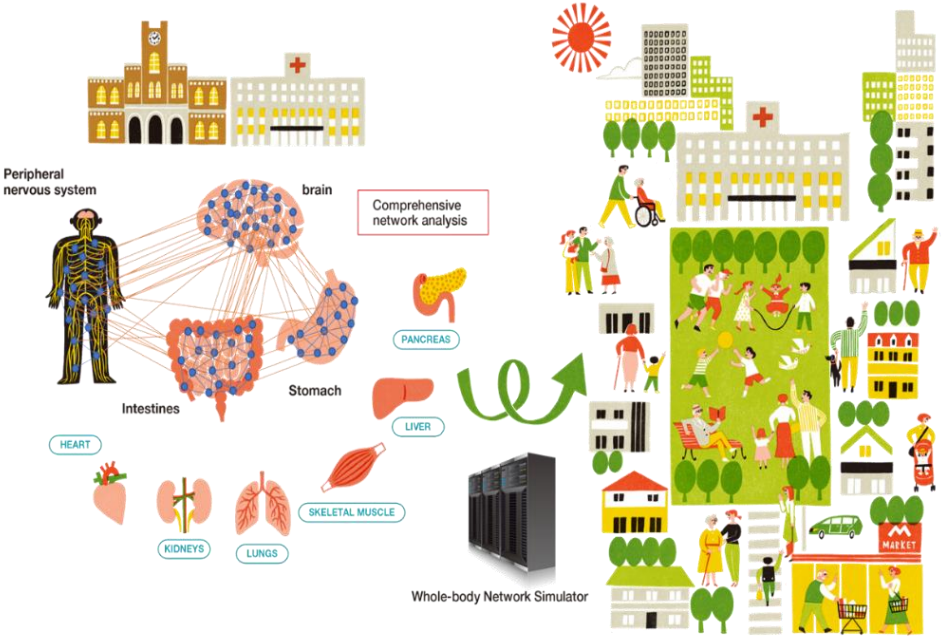
Moonshot Goal 2

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

Development of technologies to prevent serious diseases such as dementia and cancer by regulating the networks between the brain, intestine and other organs for which the relationships have not been fully analyzed.

PD : Dr. SOBUE Gen

Chairperson
Aichi Medical University



Moonshot Goal 2 - PMs

AIHARA Kazuyuki University Professor The University of Tokyo	Comprehensive Mathematical Understanding of the Complex Control System between Organs and Challenge for Ultra-Early Precision Medicine
OHNO Shigeo Emeritus Professor and Project Professor Graduate School of Medicine, Yokohama City University	Challenge toward the Control of Intractable Cancer through Understanding of Molecular, Cellular, and Interorgan Networks
KATAGIRI Hideki Professor, Graduate School of Medicine Tohoku University	Challenge for Eradication of Diabetes and Comorbidities through Understanding and Manipulating Homeostatic Systems

Moonshot Goal 2 - PMs

TAKAHASHI Ryosuke Professor, Graduate School of Medicine Kyoto University	Towards Overcoming Disorders Linked to Dementia based on a Comprehensive Understanding of Organ Connectivity
MATSUURA Yoshiharu Professor, Research Institute for Microbial Diseases, Osaka University	Understanding and Control of Virus-Human Interaction Networks

Moonshot Goal 3

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

Development of AI robots that have the same sensitivity as humans, physical abilities equal to or higher than humans, and grow together with humans.

PD : Dr. FUKUDA Toshio

Professor, Graduate School of Science and Technology, Meijo University

Moonshot Goal 3 - PMs

SUGANO Shigeki Professor Faculty of Science and Engineering Waseda University	Smart Robot that is Close to One Person for a Lifetime
NAGATANI Keiji Project Professor School of Engineering The University of Tokyo	Innovation in Construction of Infrastructure with Cooperative AI and Multi-Robots Adapting to Various Environments
HARADA Kanako Associate Professor Graduate School of Medicine Graduate School of Engineering The University of Tokyo	Co-evolution of Human and AI-Robots to Expand Science Frontiers
HIRATA Yasuhisa Professor Graduate School of Engineering Tohoku University	A New Lifestyle Alongside AI-enabled Robots to Create Together a Diverse and Inclusive Society that Leaves No One Behind

Moonshot Goal 6

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

Development of large-scale, versatile quantum computers that can make significant contributions to multiple areas of society.

PD : Dr. KITAGAWA Masahiro

Professor, Graduate School of Engineering Science, Osaka University

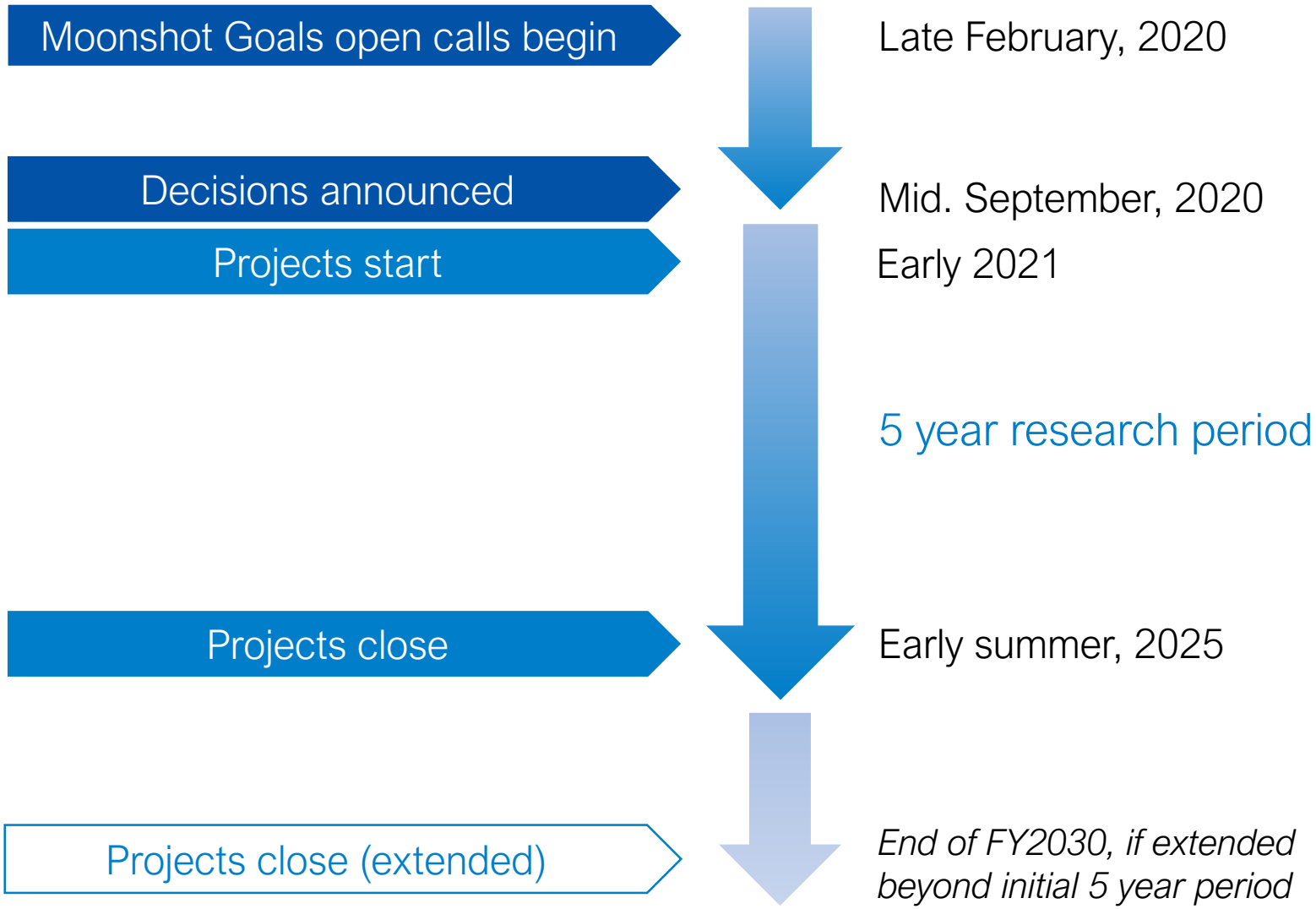
Moonshot Goal 6 - PMs

KOASHI Masato Professor, Graduate School of Engineering The University of Tokyo	Research and Development of Theory and Software for Fault-tolerant Quantum Computers
KOSAKA Hideo Professor, Faculty of Engineering / Institute of Advanced Sciences Yokohama National University	Development of Quantum Interfaces for Building Quantum Computer Networks
TAKAHASHI Hiroki Assistant Professor Experimental Quantum Information Physics Unit, Okinawa Institute of Science and Technology Graduate University	Fault-tolerant Quantum Computing with Photonically Interconnected Ion Traps
FURUSAWA Akira Professor, School of Engineering The University of Tokyo	Development of Large-scale Fault-tolerant Universal Optical Quantum Computers

Moonshot Goal 6 - PMs

MIZUNO Hiroyuki Senior Chief Researcher Center for Exploratory Research R&D Group, Hitachi, Ltd.	Silicon Massively Parallel NISQ Computer
YAMAMOTO Takashi Professor, Graduate School of Engineering Science/Institute for Open and Transdisciplinary Research Initiatives Osaka University	Quantum Cyberspace with Networked Quantum Computer
YAMAMOTO Tsuyoshi Research Fellow, System Platform Research Laboratories NEC Corporation	Development of Integration Technologies for Superconducting Quantum Circuits

Timeline

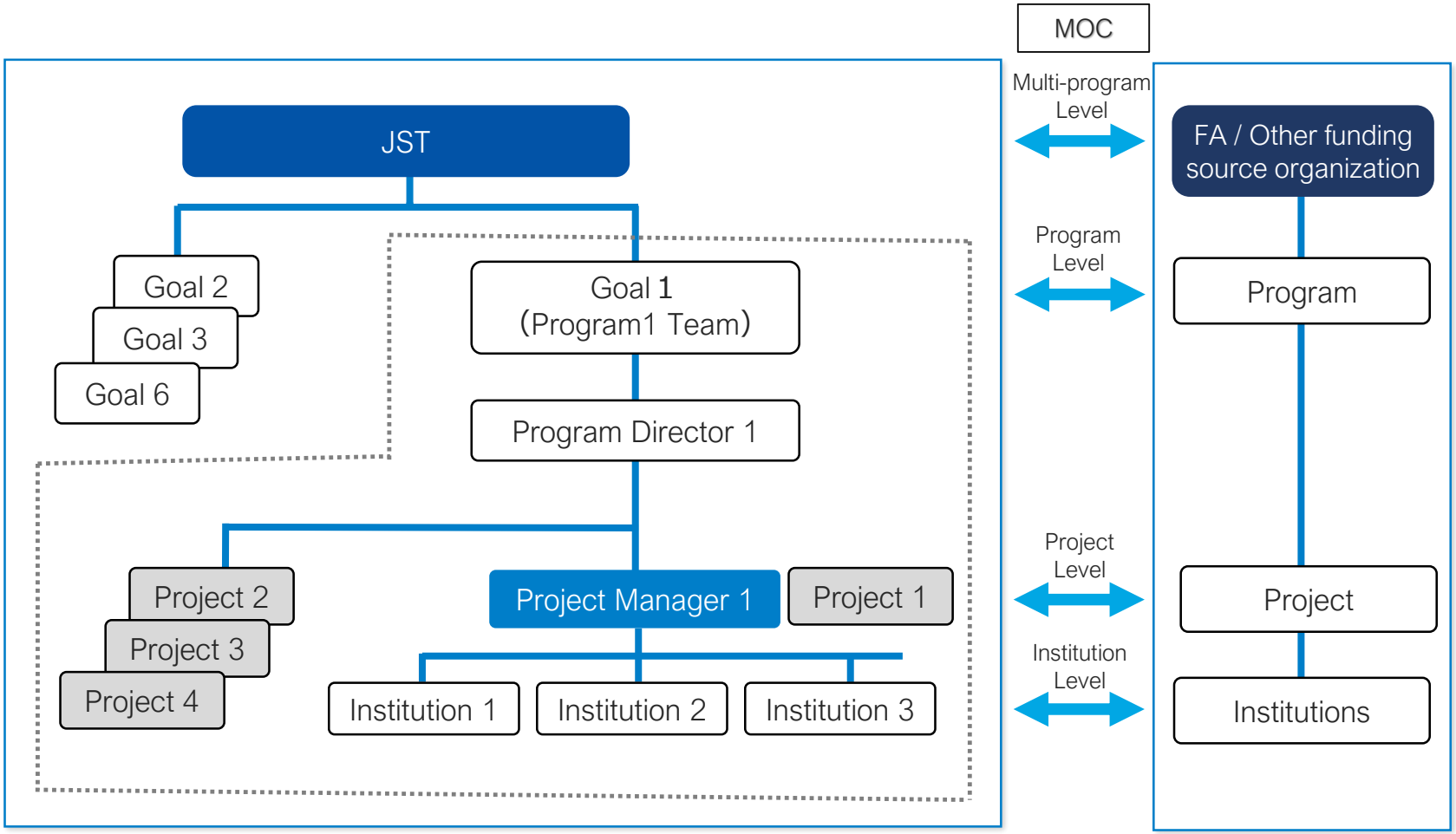

Moonshot Goals open calls begin
Late February, 2020
Decisions announced
Mid. September, 2020
Projects start
Early 2021
5 year research period
Projects close
Early summer, 2025
Projects close (extended)
End of FY2030, if extended beyond initial 5 year period

International Collaborations:

International Collaborations

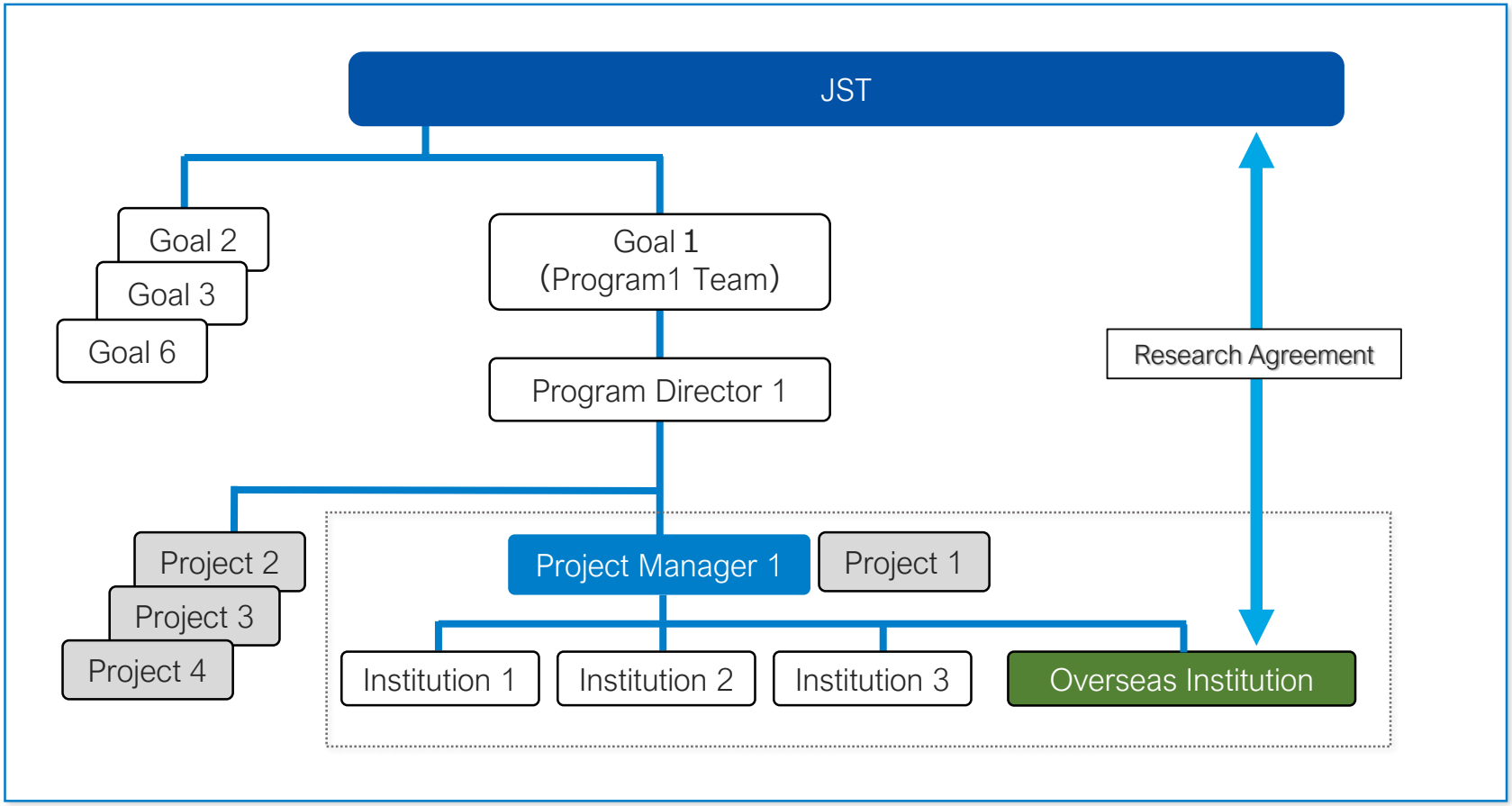
Case1 Co-funding type collaboration	Case2 JST-funding type collaboration
Participating in Moonshot R&D Program as co-researchers without receiving JST's fund	Participating in Moonshot R&D Program as performers by receiving JST's fund
MOC	Research Agreement

International Collaborations – Case 1



For overseas institution without receiving JST's fund;
- Conditions in MOC or equivalent document will be decided through discussion among relevant institutions.
  *Confirmation is required by JST (and overseas FA or other funding source organization if requested) prior to signing.

International Collaborations – Case 2



For overseas institution participating in Moonshot R&D Program by receiving the fund from JST;

- Unless otherwise agreed by the parties in writing, participating overseas institution shall agree that JST owns all rights, titles, and interests in IPRs, and, in no case, JST's ownership shall be less than 50%